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
	:	JANUARY 13, 2004

RESPONSES TO CONNECTICUT SITING
COUNCIL PRE-HEARING INTERROGATORIES (SET II)

On December 31, 2003, Dominion Nuclear Connecticut, Inc. ("DNC"), received from the Connecticut Siting Council ("Council") pre-hearing interrogatories relating to the above-captioned application (the "Application"). Below are DNC's responses.

To date, in this proceeding, DNC has responded to interrogatories and cross examination questions from the Council and other parties in order to provide the Council and the public with information about the Application, even though, as DNC has indicated, and the Council has acknowledged, the scope of the proceeding is limited by the exclusive jurisdiction of the U.S. Nuclear Regulatory Commission ("NRC") over radiological safety, security and public health, including the NRC's prior licensing actions. Certain interrogatories herein focus on issues or considerations outside the scope of this docket and the Council's authority. In order to assure there are no misunderstandings in further hearings, DNC reserves its right to continue to object to questions based on the scope of this proceeding and the jurisdiction of the NRC.

Question No. 18

Identify all correspondence specifying date, author and recipient, topic of contents and volume exchanged between Dominion Nuclear Connecticut and the Nuclear Regulatory Commission in regards with the proposed Independent Spent Fuel Storage Installation Facility.

Response

- On November 26, 2002, the NRC issued a Notice of Licensee Meeting to discuss the Millstone ISFSI proposal to be held on December 12, 2002. DNC's presentation and a list of attendees from the December 12, 2002 meeting are available in the NRC's electronic reading room.
- On December 17, 2002, Stephen C. O'Connor, Senior Project Manager, NRC sent a letter to Rajinderbir S. Harnal, Senior Engineer, Special Projects, DNC regarding Docket and Contacts for the Millstone Dry Spent Fuel Storage activities.
- On August 25, 2003, DNC sent a copy of the Application to the NRC with a cover letter from Kenneth C. Baldwin, Esq.
- On October 31, 2003, Martin J. Virgilio, Director, Office of Nuclear Material Safety and Safeguards, NRC sent a letter with accompanying attachments to David A. Christian, Senior Vice President and Chief Nuclear Officer, Millstone Power Station, DNC regarding Issuance of Order for Interim Safeguards and Security Compensation Measures for Millstone Power Station.
- On November 14, 2003, John D. Monniger, Chief, Licensing, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards sent a letter with accompanying attachment to David A. Christian, Senior Vice President and Chief

Nuclear Officer, Millstone Power Station, DNC regarding Editorial Correction to Issuance of Order from Interim Safeguards and Security Compensatory Measures for Millstone Power Station.

Question No. 19

Why is it not prudent to maintain all spent fuel in the existing pools through 2010 when the Department of Energy may have a better understanding of choice in vendor and manner of spent fuel acceptance?

Response

Maintaining all spent fuel in the existing spent fuel pools through 2010 is not a viable option. Continued operation of Millstone Unit 2 past the spring of 2005 cannot be assured unless spent fuel is removed from the Unit 2 spent fuel pool. As described extensively in the Application and in DNC's responses to the Siting Council and Town of Waterford Interrogatories, maintaining full core reserve capability in the Unit 2 and Unit 3 spent fuel pools is a spent fuel management priority at Millstone. This DNC policy implements a practice, based on operational safety, economic and practical considerations, to ensure that an adequately sized open space in each spent fuel pool is available for the fuel from the reactor core. It is desirable and necessary to maintain this open space in the spent fuel pool to provide for operational flexibility to remove all fuel from the reactor during routine refueling outages. In fact, as a matter of practice, the Unit 3 reactor is completely de-fueled during each refueling outage. The Unit 2 reactor is completely de-fueled at a historical frequency of about one out of every 3 refueling outages. This complete de-fueling is needed for required inspections and/or maintenance. Thus, full core reserve capability is needed for Unit 2 and Unit 3 refueling outages. It is also desirable to maintain full core reserve capability during the operating cycle of Unit 2 and Unit 3, if some unexpected event occurred which required removal of all fuel from the reactor. Such an event has previously occurred at Unit 2. *See* Response to Interrogatory No. 40 below, full core reserve in the Unit 2 spent fuel pool will be lost following the Spring 2005 refueling outage. Therefore, continued operation of Unit 2 is at risk past the Spring of 2005, should a full core offload be needed for inspection or maintenance reasons, but there is insufficient space in the spent fuel pool to accommodate the full core offload. If spent fuel is not removed from the Unit 2 spent fuel pool, in the year 2010 continued operation of Unit 2 will no longer be possible since the Unit 2 spent fuel pool would be completely full.

<u>Question No. 20</u>

Is it possible to rerack spent fuel in the Unit 2 spent fuel pool? Provide a calculation for reracking the maximum amount of spent fuel in the Unit 2 spent fuel pool and the year this would happen?

<u>Response</u>

No. The Unit 2 spent fuel pool storage capacity cannot be increased by reracking. The currently installed capacity of 1,346 spent fuel storage locations is the maximum number of storage locations for the Unit 2 pool. The Unit 2 spent fuel pool was reracked in the mid 1970's and again in the mid 1980's. Further, in the last 10 years, Millstone received approval from the NRC to use Unit 2 spent fuel storage locations that had been previously not available for fuel storage. Thus, Millstone has made every effort to increase the amount of fuel storage in the Unit 2 spent fuel pool over its first 30 years of operation, but it is now at its maximum capacity. In order to maintain full core reserve capability in the Unit 2 spent fuel pool and to accommodate additional spent fuel produced by the continued operation of Millstone Unit 2, spent fuel that has been adequately cooled in the Unit 2 spent fuel pool will need to be removed and stored elsewhere. As indicated in the Application, DNC is proposing to store that excess fuel in the Millstone Independent Spent Fuel Storage Installation ("ISFSI").

Question No. 21

Is it possible to store Unit 2 spent fuel in the Unit 3 spent fuel pool? Provide a calculation for reracking the maximum amount for both Unit 2 and Unit 3 spent fuel in the Unit 3 spent fuel pool? Provide the specific number of fuel assemblies from Unit 2 and Unit 3 that would be stored in the Unit 3 spent fuel pool.

Response

As stated in DNC's Response to Siting Council Interrogatory No. 8, if DNC sought, and the NRC approved, an amendment to the current operating license for Millstone Units 2 and 3, DNC could store spent fuel from Unit 2 in the Unit 3 spent fuel pool.

The Unit 3 spent fuel pool currently has an installed fuel storage capacity of 1,779 fuel assemblies. It is possible to increase the capacity of the Unit 3 spent fuel pool by replacing certain of the racks presently installed in the pool with higher density storage racks, as well as using a small amount of open area in the pool. Although Unit 2 and Unit 3 fuel assemblies are not the same size, the fuel storage racks in the Unit 3 spent fuel pool are physically sized to accommodate either Unit 3 or Unit 2 spent fuel. However, there are technical considerations that would make reracking of the Unit 3 spent fuel pool difficult. For example, a key overhead crane in the Unit 3 spent fuel building does not have the ability to traverse over much of the required area of the pool needed for reracking. Further, the rerack of the unit 3 pool would have to be performed with a large amount of spent fuel already present in the pool, making the logistics of performing the reracking technically challenging.

Even if the Unit 3 pool was reracked, storage of Unit 2 fuel in the Millstone 3 spent fuel pool would cause the pool to be full sometime between 2015 to 2020, with the exact date depending on the details of the actual rerack. DNC has no present assurance that DOE will be ready to remove fuel by this time, with the result that an ISFSI would still be needed. Accordingly, the 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. 22

Identify all approvals necessary for maximum storage of spent fuel in each individual spent fuel pool for Unit 2 and Unit 3.

Response

DNC assumes that by "maximum storage" the Council is referring to "reracking" the existing spent fuel pools. As stated in response to Interrogatory 20 above, it is not possible to further increase the storage capacity of the Unit 2 spent fuel pool. In order to increase the storage capacity of the Unit 3 spent fuel pool, an amendment to the Unit 3 NRC operating license would be required. The NRC license amendment process is specified in 10 CFR § 50.90.

Question No. 23

Identify all approvals necessary for storage of Unit 2 spent fuel in the Unit 3 spent fuel pool.

Response

As described in the Response to Interrogatory No. 22 above, an amendment to DNC's current Unit 3 NRC operating license would be required in order to store spent fuel from Unit 2 in the Unit 3 spent fuel pool. The NRC license amendment process is specified in 10 CFR § 50.90.

Question No. 24

List the advantages and disadvantages, including but not limited to economic, security, or public health and safety, to move Unit 1 fuel into dry storage.

Response

As described in the Application, DNC has no immediate intent to remove spent fuel from the Unit 1 spent fuel pool and store it in the ISFSI. The advantages or disadvantages of moving Unit 1 fuel into dry storage may depend upon a number of future developments, including, among others, DOE satisfying its obligation under the Standard Contract to take and permanently store spent fuel in a federal repository. Due to the uncertainty associated with the opening of the federal repository at Yucca Mountain, DNC has the advantage of time before a definitive decision must be made on how to deal with spent fuel in the Unit 1 spent fuel pool.

As Mr. Scace testified during the December 15, 2003 evidentiary hearing, both the wet and dry systems for storage of spent fuel are safe. 12/15/03 Transcript ("Tr.") at 137-38. Neither system affords public health or safety benefits over the other. Likewise, both systems are physically secure and adequately protected. Neither system is more secure than the other. There are costs that would be associated with moving spent fuel from the Unit 1 spent fuel pool to dry storage. There are also, however, costs associated with maintaining the spent fuel in the Unit 1 spent fuel pool.

Question No. 25

Has DNC considered the possibility of having to transfer and maintain all fuel in dry storage and, if so, how would their plans change from those currently being considered?

Response

Yes. In fact, the original ISFSI proposal discussed with the Town of Waterford ("Town") called for the installation of 234 horizontal storage modules ("HSMs"). *See* DNC Exhibit 3, p. 4; 12/15/03 Tr. at 84. The total of 234 HSMs assumed that DNC would operate Unit 2 and Unit 3 through current license and license extension periods and all fuel stored in the Unit 1, Unit 2 and Unit 3 spent fuel pools would be moved to dry storage. This larger ISFSI extended to the east of the existing access road and railway spur, closer to the wetlands and other natural areas on the site. The Town expressed significant concerns with the overall size of the expanded ISFSI and its potential impact on these natural areas. In response to the Town's concerns, DNC revised the ISFSI site layout plan and reduced the number of HSMs to 135.

Question No. 26

Clarify the storage capacity of a single canister that would be housed in a single horizontal concrete module (HCM) relative to the licensed units identified on the Nuclear Regulatory Commission's (NRC) webpage (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dry-cask-storage.html).

Response

The storage capacity of a single canister is indicated in the model designation NUHOMS®-XXYZ. The XX indicates the number of fuel assemblies that can be stored in the canister. The Y indicates whether the canister is used for storage of pressurized water reactor (designated by a "P") or boiling water reactor (designated by a "B") assemblies. The Z indicates whether the canister is for storage only (designated by a blank) or is anticipated to be transportable in transportation casks (designated by a "T").

The dry shielded canister ("DSC") that DNC will use for storage of Millstone Unit 1 spent fuel (if necessary) is the NUHOMS®-61BT canister. Each 61BT canister can be housed in a single HSM, can store a total of 61 boiling water reactor ("BWR") assemblies and is transportable. The DSC that DNC will use for storage of Millstone Unit 2 and Unit 3 spent fuel is the NUHOMS®-32PT canister. Each 32PT DSC can be housed in a single HSM, can store a total of 32 pressurized water reactor ("PWR") assemblies and is transportable. The NUHOMS®-32PT canister was added to the "List of Approved Spent Fuel Storage Casks" effective January 7, 2004 and appears on the NRC's webpage referenced above. *See* Federal Register Vol. 69, No. 4, page 849.

Question No. 27

What is the nature of the quality control procedures governing welding of the metal canisters, both during manufacture and when on-site welding of the canister end covers takes place?

Response

Chapter 11 of the current Revision of the NUHOMS® Final Safety Analysis Report ("FSAR"), which was provided as a bulk file exhibit in this docket (DNC Exh. 5a.), provides a description of the Quality Assurance Program to be applied to the safety related and important-to-safety activities associated with the NUHOMS® System. In general, the program is described in the Transnuclear, Inc. ("TN") Quality Assurance Program Description. TN's Quality Assurance Program will be applied to the important-to-safety activities. The TN Quality Assurance Program complies with the criteria and requirements of 10 CFR 72, Subpart G and had been approved by the NRC.

Specific acceptance testing required for the welding of metal canisters, both during manufacture and on-site welding of the canister end covers, is delineated in Amendment 5 to Certificate of Compliance ("C of C") 1004 Chapter 9, Section M.9.1.2. In general, the design, fabrication, testing and inspection of the confinement welds are in accordance with the American

Society of Mechanical Engineers ("ASME") Boiler and Pressure Vessel ("B&PV") Code Section III, Subsection NB. DNC plans to utilize its Nuclear Quality Assurance Program (10 CFR 50, Appendix B) during closure welding.

Question No. 28

Have there been any studies to evaluate possible corrosive effects of moisture and salt air on the metal canister within the concrete module? Does coolant air flowing through the vent system contact the exterior metal surface of the canister? What is the type of corrosion likely on the steel canisters? In what time period? What is the treatment to correct or remove corrosion that may develop? What type of seal is used when the cover is bolted to the end of the module? Does the seal require maintenance?

Response

There are many publicly available testing programs and studies in the nuclear industry related to the corrosion of the specific metal used in the DSC. The "design life" of a dry storage system is directly dependent on the selection of materials and design techniques that would produce a structure that would be as good on the last day of the design life as the first day it was loaded. Put another way, no material degradation of any of the components of a system is expected to occur during its design life, even under the most adverse environmental conditions. In the development of the NUHOMS® design, a "tried and true" method for selection of materials and fabrication techniques was applied. Therefore, the NUHOMS® dry storage system does not use experimental or unproven materials or techniques, which have insufficient test data and experience.

The DSC utilizes stainless steel for all exterior surfaces. The type of stainless steel selected, Type 304, was chosen over other materials, such as Type 316, due to the greater amount of testing and experience with Type 304 and also the greater weldability of this material. The NRC has examined the issue of suitability of Type 304 stainless steel and has observed:

> The potential for surface corrosion (i.e., pitting corrosion) under the ambient environmental condition and its effect on the retrievability of the DSC has been considered by the selection of corrosion resistant materials. The DSC shell structure is fabricated from ASME SA 240, Type 304 stainless steel. Type 304 stainless steel has excellent corrosion resistance in a wide range of atmospheric environments and many corrosive media. The corrosion resistance is provided by the 18 percent minimum chromium content….Additionally, both the DSC and the DSC support structure are housed inside of the HSM reinforced concrete structure which protects it from direct exposure to the weather. Therefore, [NRC] staff concludes that none of the DSC and HSM rail materials are expected to degrade or react with each other. Further, staff concludes that the NUHOMS design considers the effects of environmental conditions … [and meets NRC requirements].

See Federal Register Vol. 69, No. 4, page 851, January 7, 2004.

Although a marine environment can be severe, stainless steels afford long-term resistance to that environment. Tests of Type 304 stainless steel, located 250 meters (800 feet) from the North American Atlantic seaboard, have shown that after 15 years exposure, the general corrosion rate was less than 0.001 mils/year and average pit depths were approximately 1.1 mils (.0011 inches). The DSC shell plate is 0.5 inches (500 mils) thick. Furthermore, tests on similarly exposed austenitic stainless steels demonstrated they were not susceptible to stress-corrosion cracking. The industry data demonstrates that Type 304 stainless will experience minimal general corrosion, pitting, and crevice corrosion, even over a 100 year design life. Similar conclusions were reached by the NRC in an earlier review of the NUHOMS® System. "The DSC is enclosed within the HSM and is not exposed to external water. Laboratory experiments have indicated a general corrosion rate of less than 0.00001 inches per year for similar stainless steels. The NRC believes these experiments more accurately bound DSC corrosion that experiences in unrelated industries." (*See* Federal Register Vol. 59, No.245, page 65902 December 22, 1994).

As far as the potential effects a marine atmosphere may have on austenitic stainless steel weldments is concerned, consideration should be given to intergranular stress corrosion cracking ("IGSCC") at the weld's heat affected zone. Whether a given material actually suffers IGSCC depends on a combination of three conditions operating simultaneously: 1) the degree of sensitization, 2) the state of stress in the sensitized material, and 3) the presence of a corrosive environment. If any one of these conditions is not present, IGSCC will not occur.

In the case of the DSC, the element that is not present is a high stress state. Applied loads on the DSC are very small and will make almost no contribution to stress. Generally speaking, weld residual stress is also expected to be relatively small because the canister welds (both longitudinal and circumferential) are not restrained and join thin sections. Therefore, IGSCC of the DSC weldments is not a concern, even assuming that a corrosive environment is present.

In view of the exposure duration, the environmental conditions and the component's material condition, storage of DSCs at Millstone is unlikely to result in any appreciable deterioration by corrosion.

The cooling air flowing through the vent system does contact the exterior metal surface of the canister. However, there is a warm dry environment within the HSM due to the temperatures of the DSC and HSM. The DSC shell material is ASME SA 240, Type 304 stainless steel. The types of corrosion to which the material can be susceptible are general corrosion, pitting, and crevice corrosion. However, as mentioned above, industry data demonstrates that Type 304 stainless steel will experience minimal general corrosion, pitting, and crevice corrosion, even over a 100 year design life. No treatment is required to correct or remove corrosion from the DSC during the expected life of the canister. No seal is provided or required for the door of the HSM after the DSC is placed inside the HSM. Thus, no maintenance of a seal is needed.

Question No. 29

When the concrete modules are assembled are there any joints or openings that would allow environmental water to leak to the surface of the metal canister?

Response

The HSM provides protection for the DSC from natural phenomenon such as tornado, and earthquake. Additionally, the HSM protects the DSC from direct exposure to weather. The majority of the rain impacting the top and sides of the HSM would simply run off to the support pad and apron drainage systems. The joints and openings in the HSM, including the air vents, do not totally preclude the in-leakage of environmental water from contacting the surface of the metal DSC, although amounts would be minimal. These amounts will not be significant relative to corrosion or environmental considerations. The environment within the HSM is warm and on the surface of the DSC will tend to maintain a continuous dry environment within the HSM that will further minimize environmental concerns inside the HSM.

Question No. 30

Is the HCM concrete treated with any type of surface sealant? If so, does this require periodic treatment?

Response

No. Surface sealants are not needed and do not offer any benefit to the operation of the dry storage system. Industry experience indicates that the addition of a sealant will not appreciably extend the life and durability of the HSM. Once a sealant is placed on the HSM concrete surfaces, the sealant must be maintained. This is not a simple maintenance function. In general, the sealant is not visible after its application is cured; therefore, assessing the condition of the sealant is not straightforward. The potential for periodic inspection and replacement of the sealant with its associated worker radiological dose consequences does not appear warranted in the absence of a countervailing benefit.

Question No. 31

If a HCM vent were to become blocked, how long, under the FSAR 100 degree weather conditions, would it take for the temperature in a heavily loaded cask to reach a point where fuel or HCM thermal damage was possible?

Response

The blocked vent evaluation is performed for the extreme off-normal temperature of 117 degrees F with isolation to demonstrate that the NUHOMS® System (HSM/DSC) loaded with design basis (24kw) fuel is adequate for a minimum period of 40 hours after a complete blockage of the HSM vents occur. The 40 hour period is expected to be more than sufficient for action to be taken to unblock the event. The system's technical specifications as part of its NRC license require periodic visual inspection of the vents every 24 hours and require action to clear the vents if obstructions are observed in order to return the system to its normal condition. Additionally, as stated in the Pre-Filed Testimony of Robert L. Grubb P.E. (DNC Exh. 11), technicians monitoring the HSMs' concrete temperature are instructed to look for absolute (maximum positive or negative) magnitude and any temperature differences that occur over a 24-hour period of time. Review of this temperature data against specified values allow for the early detection of any abnormal performance, such as vent blockage, and provide sufficient time for corrective action to be taken.

Question No. 32

Is it possible for rodents, birds, or other small animals to get into the HCM vents? Is there any difference, in Dominion company experience, between animal or plant behaviors and effects in cold versus hot climates in or around an ISFSI?

Response

No. The HSM vents are covered with exterior screens to prevent animals and birds from entering the HSM. Dominion has not observed any difference in animal or plant behaviors or effects in cold versus hot climates in or around its ISFSIs.

Question No. 33

Is there any information as to the likelihood that the top surfaces of the concrete storage modules will encourage nesting there by osprey or other species? If so what are the dose implications for such species and/or what control/abatement programs would be implemented to prevent such nesting?

Response

The relative location and height of the ISFSI are such that the use of the top surface by birds for nesting is highly unlikely. Osprey, for example, prefer nesting and perch locations typically at the higher elevations of the surrounding tree line and at remote locations allowing for full field of vision. At Millstone, there are nine (9) available man-made platforms on-site that provide suitable conditions for Osprey nesting. While use of these platforms varies from year to year, Osprey utilized only four of the platforms for reproductive activities during 2003. The remaining sites are available to accommodate additional nesting pairs in the future. The lower elevation or height of the top of the ISFSI compared to available nesting locations also makes the ISFSI relatively unattractive for Osprey. Finally, since Osprey typically prefer locations that are remote from human activities particularly during nest construction and fledging of young, the proximity of the ISFSI to power station activities, including daily inspections, within the Protected Area will essentially preclude the use of the ISFSI for nesting. The available nesting platforms are located around the perimeter of the Millstone site for that reason.

The only other bird species typically observed using the Millstone facilities for perch or nesting is the common seagull. Nesting to date has largely been limited to the roofs of the higher structures such as the turbine buildings. To the extent that Seagulls perch on the ISFSI, the duration would be limited and dose consequences would be negligible.

Question No. 34

Explain under what circumstances the ISFSI requires a *site specific* license rather than a general license? Are you limited under the general license to storage of intact (nondamaged) fuel only? Does DNC have damaged fuel in its inventory? If yes, identify how much per unit. Under what NRC provision is damaged fuel allowed to be stored in dry cask under a general license for an ISFSI? Are the canisters the same as those for intact fuel assemblies?

Response

Prior to the NRC's promulgation of regulations permitting the use of a general license for ISFSIs at power reactor sites licensed by the NRC under 10 CFR Part 50, site specific licenses for ISFSIs were required. In accordance with 10 CFR Part 72, ISFSIs now may be developed through a site specific license or under the provisions of a general license at a Part 50 licensed facility. The establishment of an ISFSI at a location other than at a Part 50 licensed facility would require a site specific license, as would a circumstance where a Part 50 licensee could not meet the conditions of the NRC general license. The general license for an ISFSI requires the use of dry storage systems licensed by the NRC through the issuance of a C of C pursuant to 10

CFR Part 72. As discussed in the Section III.A.6 of the Application, the NUHOMS® System has been certified by the NRC under C of C 72-1004.

Each C of C includes limitations on the type of fuel that is qualified for storage in a given DSC. Depending upon the limitations of the applicable C of C, an ISFSI developed under a general license, may allow for either intact or damaged fuel to be stored.

Fuel from either Unit 2 or Unit 3 is proposed to be stored in the 32PT DSC. The 32PT DSC (authorized by Amendment 5 to C of C 72-1004 issued on January 7, 2004) allows storage of intact fuel with no known or suspected gross cladding breaches. The FSAR for the NUHOMS® System further states, "[c]ladding damage in excess of pinhole or hairline cracks is not authorized to be stored as Intact PWR Fuel." Thus, fuel currently allowed to be stored in the 32PT DSC must either have no cladding breaches or, as indicated, only pinhole or hairline cracks. Any fuel with cladding breaches larger than pinhole or hairline cracks would require an additional amendment of the 32PT C of C in order to authorize the storage of such fuel.

Any damaged fuel from Unit 1 that might be stored at the ISFSI would be stored in the 61BTFF DSC. The 61BTFF DSC (which is expected to be authorized by Amendment 7 to C of C 72-1004) allows storage of either intact or damaged fuel. Intact fuel is defined in the same manner as discussed above for the 32 PT DSC. However, damaged fuel will be allowed to be stored in the 61BTFF provided that the fuel pellet cannot pass through the cladding defect. The 61BTFF DSC used for damaged fuel is essentially the same DSC used for intact fuel; except that top and bottom "end caps" are used for the DSC fuel storage locations with the damaged fuel. Any fuel with cladding breaches that would allow a fuel pellet to pass through the cladding would require further amendment of C of C 72-1004.

Millstone Unit 3 has no known "damaged" fuel assemblies in its spent fuel inventory. It is important to note that fuel inspections will occur prior to placement of fuel into a DSC and damaged fuel could be discovered at a later date. There is one fuel rod with a cladding defect that is currently stored in a special container that may not meet the definition of intact fuel. Other than this one fuel rod, at Unit 3, all fuel is believed to be "intact."

Currently, there are 27 known fuel assemblies or fuel components in the Unit 2 spent fuel pool that contain fuel cladding defects of some magnitude. Some of these 27 may have cladding defects so as to not meet the definition of "intact" and result in the fuel assembly or fuel component being declared "damaged." Fuel inspections will occur prior to placement of fuel into a DSC, so it is possible that damaged fuel could be discovered at a later date. Storage of damaged fuel in the 32PT DSC would require an amendment to C of C 72-1004.

The vast majority of fuel in the Unit 1 spent fuel pool has no cladding defects, and is therefore "intact." However, there are fuel assemblies known in the spent fuel pool that have fuel rods with cladding defects. Again, to be stored in the 61BT/61BTFF DSC, the fuel assemblies must either be "intact" or "damaged" only to the extent that fuel pellets cannot pass through the cladding. More significant damage would require an amendment of C of C 72-1004 for the 61BT DSC. Until fuel inspections are performed, the precise determination of the number of intact or damaged fuel assemblies will not be known. Also, Unit 1 has one fuel assembly that is mechanically damaged; this assembly will probably require a special amendment to the C of C 72-1004 for storage in the 61BT DSC.

Question No. 35

Has DNC received any assurance from DOE that no inspection of the stored fuel, beyond that done by NRC inspector(s) when fuel is loaded from the pool to the canister, will be required prior to acceptance for shipment by DOE?

Response

The Department of Energy ("DOE") has not specified for any company, including DNC, what actions will be needed and requirements established, including inspection requirements, prior to DOE's acceptance of the fuel for disposal. The NRC will establish fuel inspection requirements to transport fuel in the canister as part of their approval of the DSC as a payload for the transportation cask. Inspections performed by DNC prior to placing fuel into the DSC for transportation to the ISFSI and storage will meet these NRC transport requirements.

Question No. 36

Given that DOE has requirements on the condition of fuel to be shipped and there could be a concern if questions of degradation of fuel rod integrity develop during dry storage, if reopening of a sealed canister were necessary, could it be done at the Millstone site?

Response

The 32PT DSC is designed to be transportable in the TN MP197 Transport Cask. TN expects to submit its application for an amendment to add the 32PT DSC as an approved "payload" for the MP197 Transport Cask in 2004. With those approvals in place, DNC does not anticipate the need to reopen sealed DSCs at Millstone to "repackage" the fuel prior to shipment to the federal repository. Further, DNC does not anticipate any degradation of fuel rod integrity during dry storage that would require DNC to reopen sealed DSCs prior to shipment to a federal repository. Nevertheless, the NUHOMS® System design provides the ability to remove the DSC from the HSM and the fuel from the DSC. *See* FSAR, Section 5.1.1.9. This activity, if necessary or required by DOE, could be performed in the spent fuel pools at Millstone.

Question No. 37

Describe the crane mishandling event analysis. Include identification of crane type, ownership of crane, the age and weight capacity of the crane.

Response

"Crane mishandling event analysis" refers to the dropping of heavy loads (e.g., a filled DSCs) into the spent fuel pool. "Heavy loads" are defined in NUREG-0612 as "any loads carried in a given area after a plant becomes operational, that weighs more than the combined weight of a single spent fuel assembly and its associated fuel handling tool for specified plant in question." This analysis is not required at Millstone because both the Millstone Unit 2 and Unit 3 cask handling cranes are being replaced with "Single Failure Proof" cranes as specified in NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants." These cranes incorporate increased safety and redundancy in certain active components that make up the load path. As a result, the cranes can handle spent fuel canisters such that a drop need not be postulated. Each overhead crane has a capacity of 125 tons and is manufactured by American Crane and Equipment Corporation. The suitability of using the Unit 1 cask handling crane with the NUHOMS® System will need to be evaluated.

Question No. 38

What procedures for documentation are in place that assure spent fuel and only spent fuel is placed in a canister? Is there both third party (independent) and non-NRC verification of the process of loading as well as review of documents that authenticate each canister's contents?

Response

The Technical Specifications that DNC expects to be associated with Amendment 5 to C of C 72-1004 and the NRC Safety Evaluation Report ("SER") for the 32PT and 61BT DSCs will specify which fuel assemblies and associated fuel assembly components are approved for storage. The Technical Specifications are expected to state that immediately, before insertion of a spent fuel assembly into a DSC, the identity of each fuel assembly shall be independently verified and documented. Further, the NRC SER is expected to state that a) the utility must prepare loading maps of fuel assemblies including control components and poison road assemblies (if required) to be loaded in a given canister before fuel load based on technical specification, b) this loading map is required to be independently verified before any fuel loading, and c) additional independent verification that the loading map is followed correctly and accurately is required after the fuel is loaded but before the top shield plug is placed.

The specific Millstone procedures to verify and implement the above requirements have not yet been written. Writing of these procedures will occur later in the ISFSI project. However, the above NRC requirements provide the acceptance criteria of those procedures, when they are written. The "independent verification," as used in the quoted provisions, refers to verification by multiple individuals acting independently (rather than individuals outside the licensee's organization, i.e. a "third party"). There is no NRC or other regulatory requirement for the "independent verification" to be conducted by an outside or third party.

Question No. 39

Describe and provide site-specific weather and climate studies used to calculate moisture and humidity levels in the HSM after operation. If none were used, explain what parameters were used and why.

Response

Site-specific weather and climate studies were not used to calculate moisture and humidity levels in the HSM after operation. Bounding ambient conditions for temperature evaluations were developed from publicly available sources as documented in the FSAR Revision 6 Section 8. (DNC Exh. 5a.)

Question No. 40

What are the past histories of cases in which the full fuel core inventory of any of units 1, 2 or 3 has been required to be offloaded to the respective spent fuel pools?

Response

Millstone Unit 1 is no longer operating and all fuel has been offloaded into the spent fuel pool. Full core offloads are routinely used during Unit 2 and Unit 3 refueling outages. Millstone Unit 2 fully offloads the core, on a historical average, about once every three (3) refueling outages. Millstone Unit 3 offloads the full core during each refueling outage. In addition, full core offloads are required for each ten year "In-Service Inspection" of the reactor vessel internals. In 1997, Millstone Unit 2 performed a mid-cycle full core offload to repair a valve.

Question No. 41

Following the end of the Unit 3 license renewal period (presumably, 2045), and based on current thinking by DNC, is it likely that DNC would proceed to obtain approval to expand the ISFSI (in the unfortunate possibility that the DOE had still not removed any of the stored fuel) to accommodate the total of 234 storage units required for all the fuel?

Response

Currently, upon the cessation of operations at each of the units, DNC plans to continue to store any remaining spent fuel in each of the respective units' spent fuel pools in conjunction with the ISFSI. However, if DNC had to empty the spent fuel pools for all three units, 234 HSMs would be needed to accommodate all of the fuel. *See* DNC Exhibit 3, p. 4. If this became necessary, DNC would seek the required approvals at that time to expand the ISFSI to accommodate this additional fuel.

Question No. 42

If DNC does implement the proposed dry storage system and, if DOE does remove all or part of the dry-stored fuel prior to the end of license renewal periods for Unit 2 and/or 3, would it be DNC's plan to reuse existing concrete storage modules to receive more fuel (in canisters) from the spent fuel pools? Is there any time limit (aside from the 20 year license period for a particular cask design) on use of the storage modules? Are any special maintenance procedures or changes required for reuse of the modules?

Response

As Mr. Wakeman testified at the January 7, 2004 hearing, in order to keep the ISFSI as small as possible, DNC may take the spent fuel from the spent fuel pools for shipment off-site prior to removing DSCs from the ISFSI. 1/7/04 Tr. at 218. Depending on DOE's removal schedule, however, it is possible that DSCs could be removed from the existing HSMs for shipment to the federal repository. To the extent DSCs are removed from the HSMs, DNC plans to reuse those HSMs prior to installing new HSMs.

The general license for the storage of spent fuel in each DSC fabricated under a C of C terminates 20 years after the date that the particular DSC is first used by the general licensee to store spent fuel, unless the DSC's C of C is renewed, in which case the general license terminates 20 years after the DSC's C of C renewal date. *See* 10 CFR § 72.212(a)(3). Reuse of the HSM is dependent upon the HSM being in a condition that it can be certified to meet the requirements of C of C 1004 prior to loading. It is not anticipated that any licensed use of a HSM would prevent its re-use with another DSC. Apart from the above time limits and technical criteria specified in the C of C, there are no special time limits or maintenance procedures applicable to HSM re-use.

Question No. 43

Has the State of Connecticut Office of Emergency Management been provided a copy of the application? If so, did DNC receive any comments on the application? If so, provide a copy.

Response

No. DNC has, however, provided a briefing on the Millstone ISFSI project to the Director of the Office of Emergency Management ("OEM"), the Director of the Department of Environmental Protection ("DEP"), Division of Radiation, the Millstone Emergency Planning Zone ("EPZ") Emergency Management Directors ("EMDs") for both Connecticut and New York and key state and local emergency management personnel at a scheduled quarterly emergency management meeting held on October 15, 2003. Representatives from the Federal Emergency Management Agency ("FEMA") Region I and Naval Reactors for Electric Boat were also in attendance. In addition, the Connecticut Department of Homeland Security was briefed on the ISFSI project on May 9, 2003.

Question No. 44

What kind of emergency do you envision? Why is dry storage the solution? Are you assuming a situation that requires federal intervention? What prevents DNC from obtaining assistance from federal agencies, for example, the Department of Energy under its contract, or Homeland Security agencies, for emergency situations?

Response

Facilities licensed by the NRC pursuant to 10 CFR Part 50 must implement specific emergency planning practices, including communications with local, state and federal agencies responsible for addressing emergencies. Similarly, the emergency plans for an NRC-licensed facility must be reviewed and, if appropriate, revised to address an ISFSI developed at the facility. *See* 10 CFR § 72.212(b)(6). The emergency planning activities at Millstone will be revised, as appropriate, to address the presence of the ISFSI on site.

In its emergency planning evaluations, DNC currently uses Emergency Action Levels ("EALs") based on methodology developed by the Nuclear Energy Institute ("NEI"). This methodology establishes initiating conditions that provide guidance on when to enter an emergency response situation and at what level of significance the emergency is to be classified.

The latest version of the NEI document governing the EALs is NEI 99-01, Revision 4 dated January 2003, "Methodology for Development of Emergency Action Levels." Revision 4 expands on the initiating conditions for emergencies involving ISFSIs. The NEI methodology is endorsed by the NRC. (*See* NRC Regulatory Issue Summary 2003-18. Section 3.16 of NEI 99-01 (Rev. 4) addresses the EALs associated with an ISFSI as follows:

> An Independent Spent Fuel Storage Installation (ISFSI) is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. The Final Rule governing Emergency Planning Licensing Requirements for Independent Storage Facilities (Federal Register Volume 60, Number 120 June 22, 1995 Pages 32430-32442) indicated that a significant amount of the radioactive material contained within a cask must escape its packaging and enter the biosphere for there to be a significant environmental impact resulting from an accident involving the dry cask storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety. (emphasis added).

DNC has reviewed and will incorporate the NEI guidance (from NEI 99-01, Rev. 4) for ISFSIs into its Millstone emergency plan. Under the Millstone emergency plan, this EAL would be classified as a Notification of Unusual Event ("NOUE"), which is the lowest of the four emergency classifications defined by 10 CFR Part 50 Appendix E. DNC would likely seek the assistance of available local, state and federal agencies, including the DOE and the Department of Homeland Security, as appropriate, were a situation not otherwise anticipated in the facility's emergency plan to occur. The DOE "Standard Contract" does contain a provision regarding DOE's acceptance of emergency deliveries of spent fuel (Article V.D) and cross-references in associated provisions related to Acceptance Priority (Article VI.B.1.a). However, DNC is unaware of any implementation of these provisions to date.

Based on the classification of any event at the ISFSI as an NOUE, DNC does not anticipate an emergency situation involving the ISFSI that would require federal intervention.

Question No. 45

List the types of actual stress tests that have been applied to the proposed canisters and HSMs. Are computer models used to test the designs of the proposed canisters and HSMs? If so, what type of tests has been modeled for the proposed canisters and HSMs? Has the NRC issued any requests for actual stress tests for the storage canisters and modules?

Response

Specific acceptance testing (structural, leakage, material, thermal conductivity, boron enrichment, etc.) required for the metal canister components both during manufacture and on-site are delineated in Chapter 9 of Amendment 5 to C of C 1004. In general, the design, fabrication, testing and inspection of the canisters are done in accordance with the ASME Boiler & Pressure Vessel Code Section III, Subsection NB. The HSMs are designed in accordance with the requirements American Concrete Institute ("ACI")-349 (Code Requirements for Nuclear Safety Related Concrete Structures) and constructed pursuant to the requirements of ACI-318 (Building Code Requirements for Reinforced Concrete). Numerous tests are identified during the construction of each HSM consistent with industry standards.

Structural, thermal, shielding and criticality analyses using various methods, including computer models which use various forms of input data (including test data) and which are verified and validated consistent with NRC requirements, have been used to qualify the DSC and HSM. These qualifications have all been reviewed and approved by the NRC and are documented in various sections of the FSAR, the NRC SER and the C of C for the approved NUHOMS® System.

Question No. 46

Please explain the advantages of horizontal storage over vertical storage and provide authority (peer review article(s)). Is there delayed corrosion, for example? Are there cost advantages? Please elaborate.

Response

Both horizontal and vertical dry cask storage systems are safe and can be used once approved by the NRC. Advantages and disadvantages are primarily site-specific, a matter of operational preference, influenced by site compatibility and fuel compatibility considerations and schedule and cost factors. For example, the NUHOMS® System for Millstone provides simple horizontal loading and handling operations of the DSCs into the HSMs, thereby eliminating the need for a safety-related lift at the ISFSI pad; is space efficient; provides modular, off-site concrete construction of the HSMs with straightforward site installation; can accommodate both BWR and PWR fuel assemblies; and allows straightforward removal of the DSCs for transport loading. Additionally, the NUHOMS® horizontal system requires minimal maintenance activity over the life of the facility.

"Delayed corrosion" is not a material factor in selection of dry storage systems, as the NRC-approved systems use concrete and stainless steel suitable for their applications.. Cost advantages and disadvantages are a function of initial hardware/capital cost, operational/loading costs and long-term maintenance costs. However, the total of these costs may not be materially influenced by a difference between horizontal and vertical systems and, in fact, the NUHOMS® vendor, TN, offers both horizontal and vertical systems approved by the NRC. The horizontal system was selected as the optimum approach for DNC's use at the Millstone site.

Question No. 47

What factors led to the decision to delay submission for the payload license to the NRC in spring 2004? What are DNC's concerns, if any, should a siting approval condition include DNC's receipt of the transport license component of the NUHOMs system?

Response

No decision was made to "delay" submission for the payload license to the NRC. Rather, fuel assemblies being placed into the NUHOMS®-32PT canisters are not expected to be transported off-site for a number of years, and an amendment to the MP197 Transportation Cask license to add the 32PT canister as an approved payload will be pursued. The NUHOMS®-32PT is designed to be transportable and has already been evaluated for transportation in accordance with the 10 CFR Part 71 conditions associated with the licensed MP197 Transportation Cask. The estimated time needed to amend the MP197 Transportation Cask license to include the NUHOMS®-32PT as a "payload" is approximately 12 to 18 months, which is a timeframe well before the earliest projected date for the opening of Yucca Mountain.

Because Millstone Unit 2 will lose full core reserve capability following the Spring 2005 refueling outage and it could take as long as 18 months to receive an amendment to the MP197 Transportation Cask license, a condition from the Council requiring that the MP197 Transportation Cask license be amended to add the 32PT DSC as an approved payload prior to DNC being permitted to store any spent fuel in the ISFSI would mean that Millstone Unit 2 would lose full core reserve capability without an alternative location to store the spent fuel. As discussed throughout the Application, full core reserve capability is needed to ensure the safe and continued operation of Millstone Unit 2. Furthermore, such a condition would directly conflict with the NRC-issued general license held by DNC to store spent fuel in the NRC-certified NUHOMS® system.

Question No. 48

Provide external radiation dose calculations confirming HSM surface dose rates and dose rates at site boundary. How many loaded canisters were assumed present for the calculations? Were annual doses calculated at various radial distances from the storage site? If so, provide this data. Was the dose effect of operating and/or shutdown reactors added into dose results for the ISFSI?

Response

The specific calculations of doses from the ISFSI are proprietary to the NUHOMS® vendor. Generally, however, the calculations evaluate two phases of configuration. The first phase assumes 18 loaded HSMs and the second phase assumes the full build-out of the facility to 135 HSMs. Annual doses were calculated for each phase at defined points-of-interest, (e.g., physical boundaries, on-site occupied buildings, site boundary locations, and nearest residences). The doses were not calculated at radial distances from the ISFSI. Further, as described in Response No. 19 to Pre-hearing Questions from the Town of Waterford, dose rates from a loaded HSM decrease as a function of increased distance from the source. An approximation can easily be made by using the "1/R" rule, R being the distance in feet from the surface of the HSM. For example, moving ten (10) feet away from a source such as an HSM will reduce the dose rate by approximately a factor of ten. As described in Response No. 15 to Pre-hearing Interrogatories from the Council, a typical dose rate off of the "back" side of the ISFSI facility (the side facing east), with a fully loaded 32PT DSC, would be <10 millirem/hour on the surface of the back shield wall. This dose rate conservatively is based on an assumed highest projected loading of the DSC within the HSM. The fuel to be loaded in the Millstone ISFSI does not approach the NRC-licensed limits for radiological source strength. Therefore, the Millstone- specific doses calculated for this ISFSI facility are *less than* the values set forth in the NRC-approved ISFSI Technical Specifications. In comparison, the dose rate calculated on the back side of the ISFSI on the surface of the shield wall will be on average <1 millirem/hour. Total accumulated dose for an entire year at the nearest site boundary is shown to be <0.2 millirem/yr. This value is far less than the 25 millirem/yr limit defined in 40 CFR 190 for allowed annual radiation dose to a member of the public at or beyond a nuclear facility's site boundary. This <0.2 millirem value is also comparable to the maximum annual dose for each of the last five years from Millstone operation and effluent releases. Maximum annual dose to an off-site member of the public from Millstone operation in addition to a fully loaded, 135 module ISFSI will be significantly less than the estimated 284 millirem (NCRP94) that a typical Connecticut resident receives annually from all sources (natural and man-made).

Question No. 49

Who is the resident inspector from the NRC assigned to Millstone? Does the inspector circuit ride in the region or is assigned as fulltime, 40 hour a week, at Millstone?

Response

Three NRC Resident Inspectors, Max Schneider, Silas Kennedy and Kevin Mangan, are assigned to Millstone on a full-time basis (e.g., 40 hours/week). In addition, Robert R. Prince is a Regional Inspector from NRC Region I (King of Prussia, Pennsylvania) assigned to Millstone Unit 1 who visits the site quarterly.

Question No. 50

Did DNC file a license amendment for Unit 1 with the NRC? If so, is that amendment for "safe store," essentially a mothball status for up to 60 years? If not identify the status of Unit 1.

Response

On July 21, 1998, Northeast Nuclear Energy Company ("NNECO"), the then operator of Millstone, certified that operations at Millstone Unit 1 permanently ceased and that the fuel had been permanently removed from the reactor vessel in accordance with applicable regulations. The Millstone Unit 1 license was transferred to DNC on March 31, 2001.

The current status of Unit 1 is as described in its license as follows:

> On July 21, 1998, Northeast Nuclear Energy Company (NNECO) certified that operations at Millstone Unit No. 1 would permanently cease and that the fuel had been permanently removed from the reactor vessel in accordance with 10 CFR 50.82(a)(1)(i) and 10 CFR 50.82(a)(1)(ii). As a result, the 10CFR50 license no longer authorizes operation of the reactor, or the emplacement or retention of fuel in the reactor vessel.
>
> This license is effective as of the date of issuance and authorizes ownership and possession of Millstone Unit No. 1 until the Commission notifies the licensee in writing that the license is terminated. The licensee shall:
>
> A. Take actions necessary to decommission the plant and continue to maintain the facility, including, where applicable, the storage, control and maintenance of the spent fuel, in a safe condition; and
>
> B. Conduct activities in accordance with all other restrictions applicable to the facility in accordance with the NRC regulations and the applicable provisions of the 10CFR50 facility license as defined in Section 2 of this license.

Question No. 51

Is there any probability that Millstone Unit 1 could be restarted (as a nuclear plant) in the foreseeable future? If so, how would this affect the waste storage plan being proposed?

Response

As Mr. Weekley testified on January 7, 2004, DNC does not have any current plans to restart Unit 1 as a nuclear facility. 1/7/04 Tr. at 73. Furthermore, as discussed in response to Interrogatory No. 50 above, the license for Unit 1 no longer authorizes its use as a nuclear generating facility.

Question No. 52

If the site layout for the 135 proposed units is approved, the surface area outside of the concrete pad and apron for 20 units is shown as consisting of gravel or crushed stone. (Millstone Power Station Independent Fuel Storage Installation Dominion Nuclear Connecticut Siting Council Application, Aug. 25, 2003, Drawing 2). To what extent do you expect this material require regular maintenance to ensure proper grading and minimize pooling of water in the ISFSI site?

Response

Gravel surfaces within the ISFSI area will require little maintenance. Minor maintenance, similar to that currently performed for the South Access Point ("SAP") parking lot, will be performed for areas adjacent to the concrete aprons of the ISFSI to maintain proper grading and minimize the pooling of water.

Question No. 53

Would soil removed from the ISFSI site be spread uniformly over the soil placement area? If not, how would the material be distributed. What effect would the changes in elevation have on water runoff? What would be the range in elevation change for a) build out for 19 units, b) for 135 units, and c) 234 units?

Response

Soil removed from the ISFSI site will be placed in controlled lifts that match the existing ground contours in the Town-approved Soil Placement Area. Appropriate soil erosion and sedimentation controls will be incorporated before soil placement begins. The Soil Placement Area is relatively flat except along the eastern end of the area where it slopes down to the east. However, since the relative ground contours will be maintained, no changes to existing runoff are expected.

The change in elevation for the Soil Placement Area for a build out of 19 HSMs is approximately 1.25 feet based on 10,000 cubic yards of material; and for 135 HSMs is approximately 2.2 feet, based on 17,000 cubic yards of material. *See* Application, Attachment 9 Page 3, Section 2.2. The elevation change for 234 HSMs was not calculated because that number of HSMs was not proposed in the Application, and the area of excavation for 234 HSMs was not identified.

Question No. 54

Will the 4 foot thick pad for Phase I or other concrete planned for future build out, be in contact with groundwater, or will surface water accumulate at any locations around the pad? Identify existing and proposed Ph (sic) levels in [the] vicinity of the proposed ISFSI. Would any land or aquatic biota be adversely affected by elevated pH levels? Where is the peninsula's groundwater recharge area in relation to the ISFSI proposed site? Will the presence of the proposed concrete pads and aprons have any significant effect on groundwater? Is there a study? If so, provide the study. If not, explain why one was not done.

Response

DNC intends to complete all subsurface work and install associated infrastructure to prepare the ISFSI site for 135 HSMs during the initial construction phase rather than perform the subsurface work in phases. This approach will minimize potential construction impacts on groundwater. As the ISFSI is built out beyond the first 19 HSMs, only the four (4) foot thick pads would need to be added. The pad will not come in contact with groundwater. Surface water will not accumulate at locations around the pad because the areas adjacent to the concrete slab and apron will be graded to divert surface water away from the pad.

With respect to pH data, there are no monitoring wells and consequently no groundwater pH data from locations directly within the footprint of the ISFSI. Some groundwater pH monitoring data exist for areas within the protected area immediately to the west of the proposed ISFSI location and SAP parking lot. Typically, pH in these groundwater wells is on the order of 6 pH standard units. Surface water, in the form of stormwater runoff, has been sampled in the vicinity of the ISFSI from locations near the switchyard that require such monitoring consistent with the Millstone stormwater general permit for industrial activities. These samples indicate that stormwater pH is on the order of 6.5-8.5 pH standard units. In addition, bioassay of these stormwater discharges indicated no effect on aquatic biota. The quality of the stormwater from the ISFSI area is expected to be similar to that observed at these locations. Furthermore, the Wetlands Report (Attachment 7 to the Application) observes no abnormal or "stressed" condition in the wetlands that have historically received stormwater run-off from these locations including that coming directly from the SAP parking lot.

Concerning the location of the peninsula's groundwater recharge area in relation to the ISFSI site, the surficial geological features and groundwater elevations of the Millstone site indicate that groundwater in the vicinity of the ISFSI flows to the south-southeast and that recharge is occurring to the north of the proposed location of the ISFSI.

Finally, the concrete pad and apron are expected to have no significant effect on groundwater, since:

- Apron stormwater will be collected and conveyed to the stormwater system (see Attachment 5, DWG-4 and DWG-5) and will eventually be discharged through the stormwater outlet to the east of the SAP lot and the railroad spur; and
- HSM pad runoff will flow in part towards the apron drainage system, and then towards the existing access road (see Attachment 5, DWG-4 and DWG-5), where it will join existing drainage to the south which eventually flows to the same stormwater outlet as the SAP parking lot.

Since it has been concluded that no significant effects on groundwater would occur, no studies specific to stormwater or groundwater quality associated with operation of the ISFSI have been conducted nor are any planned.

Question No. 55

Are there existing groundwater monitoring wells located in the vicinity of the proposed ISFSI? If not could groundwater monitoring wells be installed around the perimeter of the proposed ISFSI?

Response

As noted in the response to Question No. 54 above, there are no monitoring wells either directly within the footprint of the ISFSI, or anywhere in the SAP parking lot. The closest monitoring wells are located to the west of the SAP parking lot within the existing Protected Area. While monitoring wells could be installed, existing data does not suggest the need for such monitoring.

Further, the historical and proposed uses of the area do not result in any regulatory requirement to install such wells.

Question No. 56

What types of radiation/radioactivity monitoring will be in place for the proposed ISFSI? How will this information be shared with the State?

Response

As discussed in Mr. Eakin's pre-filed testimony, the Radiological Environmental Monitoring Program ("REMP") at Millstone provides a means for monitoring the plant environments for radioactivity that may be released from operations occurring at the facility. The REMP currently includes terrestrial and aquatic sampling like air, soil, grass, goat milk, seawater and fish, as well as direct radiation measuring devices. Three additional Thermoluminescent Dosimeters ("TLDs") have been recently located near the perimeter of the proposed ISFSI. Their purpose is to collect pre-ISFSI operational data (background) against which comparisons can be made once the ISFSI is constructed and loaded.

Other monitoring already performed as part of the REMP, are sufficient to meet regulatory needs and requirements for monitoring all possible radiological pathways to man. Results of DNC's monitoring efforts are published in an annual report filed with the NRC entitled "Annual Radiological Environmental Operating Report." A copy of this report is, as a matter of course, filed with the DEP and the Council. *See* Pre-Filed Testimony of William J. Eakin at 2.

Question No. 57

What volume of low-level radioactive waste may be created as a result of the decommissioning of the proposed ISFSI?

Response

No low-level radioactive waste is expected to be created as a result of the decommissioning of the ISFSI. Since the outside surface of the DSCs are maintained as radiologically non-contaminated, the ISFSI itself will be radiologically non-contaminated. As discussed in response to Siting Council Interrogatory No. 16, once the spent fuel assemblies in DSCs are removed from all of the HSMs and shipped to the federal repository for permanent storage, the reinforced concrete HSM will be verified to be radiologically non-contaminated and disassembled and removed or demolished and disposed of in accordance with applicable laws and requirements. Since the HSMs, concrete pad and ISFSI infrastructure are expected to be radiologically non-contaminated, the ISFSI can be dismantled and site restored with no generation of radioactive waste.

Question No. 58

Is DNC responsible for packaging spent fuel for shipment? If not explain. If DOE did not accept dry storage canisters licensed pre-2010, how would DNC prepare spent fuel for shipping? Is DNC aware of any NRC provisions that prohibit the storage of canisters as an alternative to repackaging and shipping spent fuel to a national repository if established and operating?

Response

DNC will be responsible for packaging and loading the spent fuel for shipment in the transport cask provided by DOE for canisters shipped from the ISFSI or directly from the spent fuel pools. In the unlikely event DOE did not accept dry storage canisters licensed by the NRC prior to 2010, the affected canisters would be returned to the spent fuel pool and the fuel will be loaded back into the pool for later shipment or transferred to canisters acceptable to DOE. DNC notes that the DSCs of the NUHOMS® system will be suitable for transport in a previously-approved transportation cask.

DNC is not aware of any provision that would prohibit the use of a dry storage installation as an alternative to repacking and shipment of spent fuel to an established and operating federal repository. However, under the Nuclear Waste Policy Act and the Standard Contracts, DOE is ultimately responsible for taking the spent nuclear fuel from Millstone to a federal repository.

CERTIFICATE OF SERVICE

I hereby certify that on the 13th day of January, 2004, a copy of the foregoing was mailed, postage prepaid, to:

Party – Town Of Waterford
Robert A. Avena, Esq.
Kepple, Morgan & Avena, P.C.
3A Anguilla Park
20 S. Anguilla Road
Pawcatuck, CT 06379

Mark R. Sussman, Esq.
Andrew W. Lord, Esq.
Murtha Cullina LLP
CityPlace I, 29th Floor
185 Asylum Street
Hartford, CT 06103-3469

Party – Connecticut Coalition Against Millstone And Milton C. Burton, William Honan, Clarence Reynolds And Geralyn Cote Winslow
Nancy Burton, Esq.
147 Cross Highway
Redding Ridge, CT 06876

Party - Southeastern Connecticut Council Of Governments
James S. Butler
Executive Director
Southeastern Connecticut Council of Governments
5 Connecticut Avenue
Norwich, CT 06360

Party – Attorney General Richard Blumenthal
Robert D. Snook, Esq.
Assistant Attorney General
Office of the Attorney General
P.O. Box 120
55 Elm Street
Hartford, CT 06141-0120

Kenneth C. Baldwin