

An Exelon Company

AmerGen Energy Company, LLC 4300 Winfield Road Warrenville, IL 60555

RS-05-109

10 CFR 50.90

August 17, 2005

U. S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, D.C. 20555-0001

> Clinton Power Station, Unit 1 Facility Operating License No. NPF-62 NRC Docket No. 50-461

www.exeloncorp.com

Subject: Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

References: (1) Letter from Keith R. Jury (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, "Request for Technical Specification Change to Support Onsite Spent Fuel Storage Expansion," dated August 18, 2004

- (2) Letter from Keith R. Jury (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, "Additional Information Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion," dated May 13, 2005
- (3) Letter from Keith R. Jury (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, "Additional Information Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion," dated June 14, 2005

In Reference 1, AmerGen Energy Company, LLC (AmerGen) requested a change to the Technical Specifications for Clinton Power Station (CPS), Unit 1, to reflect the addition of fuel storage capacity in the fuel cask storage pool and increased fuel storage capacity in the spent fuel pool. Specifically, the proposed expansion will increase the total storage space at CPS from 2,512 to 4,159 fuel assemblies. This extra capacity is expected to allow operation without loss of full core discharge capability until the 15th refueling outage (i.e., C1R15) in the year 2016.

The NRC requested additional information in support of their review of the proposed changes in Reference 1 and AmerGen provided the requested information in References 2 and 3. In the response to the requested information, AmerGen described the use of a

August 17, 2005 U. S. Nuclear Regulatory-Commission---Page 2

temporary crane, which has been redesigned to eliminate the requirement to use the Fuel Building crane to lower every new spent fuel storage rack into the spent fuel pool. As a result of this change, the Fuel Building crane will now be used as an alternate method to initially introduce racks into the pool.

AmerGen has evaluated the changes in the use of the redesigned temporary crane and has determined that the conclusions of the original No Significant Hazards Consideration included in Reference 1 are not affected by this change. However, the description of the Fuel Building crane and the temporary crane usage has changed and therefore, the No Significant Hazards Consideration has been revised. Since the original No Significant Hazards Consideration was published in the Federal Register on December 29, 2004, a revised No Significant Hazards Consideration is included in the Attachment to this letter. The attachment is provided to support the need to republish the No significant Hazards Consideration.

There are no new regulatory commitments contained in this letter.

If you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of August 2005.

Respectfully,

lich R. Jury

Keith R. Jury Director – Licensing and Regulatory Affairs AmerGen Energy Company, LLC

Attachment: Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

<u>ATTACHMENT</u>

Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

No Significant Hazards Consideration

AmerGen Energy Company, LLC (AmerGen) is requesting a revision to the Facility Operating License No. NPF-62 for Clinton Power Station (CPS), Unit 1. The proposed change revises Technical Specification (TS) 4.3, "Fuel Storage," to reflect the addition of fuel storage capacity in the fuel cask storage pool and increased fuel storage capacity in the spent fuel pool.

Current projections, based on expected future spent fuel discharges, indicate that loss of full core discharge capability will occur during the scheduled February 2006 refueling outage (C1R10), when an anticipated 252 fuel assemblies are permanently discharged and new fuel is loaded into the spent fuel pool for Operating Cycle 11. The proposed expansion will increase the total storage space from 2,512 to 4,159 fuel assemblies. This extra capacity is expected to allow operation without loss of full core discharge capability until fuel is loaded to begin Cycle 16 in the year 2016.

AmerGen has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below.

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change involves revising CPS TS 4.3, "Fuel Storage," to reflect the increased storage capacity of the spent fuel pool due to the installation of higher density storage racks and the addition of fuel storage capacity in the fuel cask storage pool.

The method of handling fuel is not significantly changed since the same equipment and procedures will be used. During spent fuel rack removal and installation, all work in the spent fuel pool and cask storage pool area will be controlled and performed in strict accordance with specific written guidance. Any movement of fuel assemblies required to be performed to support the modification (e.g., removal and installation of racks) will be performed in the same manner as during normal refueling operations. Shipping cask movements will not be performed during the modification period. There is no change to the methods or equipment to be used in moving fuel casks. Expanding the spent fuel storage capacity does not have a significant impact on the frequency of occurrence for any accident previously evaluated. Therefore, this change will not significantly increase the probability of occurrence of any event previously analyzed.

The consequences of the dropped spent fuel assembly in the spent fuel pool have been evaluated for the proposed change. The results show that the postulated drop of a spent fuel assembly striking the top of the spent fuel storage racks will not distort the racks sufficiently to impair their functionality. The minimum subcriticality margin (i.e., neutron multiplication factor (k_{eff}) less than or equal to 0.95) will be maintained. The structural damage to the Fuel Building, spent fuel pool liner, and any fuel assembly

ATTACHMENT

Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

resulting from a dropped fuel assembly striking the pool floor or another assembly located in the racks is primarily dependent on the mass of the falling object and drop height. Since these two parameters are not changed by the proposed modification, the postulated structural damage to these items remains unchanged. The radiological dose at the exclusion area boundary will not be increased since no changes are being made to in-core hold time or burnup as a result of the proposed amendment.

The consequences of a loss of spent fuel pool cooling were evaluated and found to not involve a significant increase as a result of the proposed changes. The concern with this event is a reduction of spent fuel pool water inventory from bulk pool boiling resulting in uncovering fuel assemblies. This situation could lead to fuel failure and subsequent significant increase in offsite dose. Loss of spent fuel pool cooling at CPS is mitigated by ensuring that a sufficient time lapse exists between the loss of forced cooling and uncovering fuel. This period of time is compared against a reasonable period to reestablish cooling or supply an alternative water source. Evaluation of this event includes determination of the time to boil. This time period is much less than the onset of any significant increase in offsite dose, since once boiling begins it would have to continue unchecked until the pool surface was lowered to the point of exposing active fuel. The time to boil represents the onset of loss of pool water inventory and is commonly used as a gage for establishing the comparison of consequences before and after a reracking project. The heatup rate in the spent fuel pool is a nearly linear function of the fuel decay heat load. The fuel decay heat load will increase subsequent to the proposed changes because of the increase in the number of assemblies. The thermalhydraulic analysis determined that the minimum time to boil is more than three hours subsequent to complete loss of forced cooling and a minimum of 24 hours between loss of forced cooling and a drop of water level to within 10 feet of the top of the racks. In the unlikely event that all pool cooling is lost, sufficient time will still be available subsequent to the proposed changes for the operators to provide alternate means of cooling before the water shielding above the top of the racks falls below 10 feet.

The consequences of a design basis seismic event are not increased. The consequences of this event were evaluated on the basis of subsequent fuel damage or compromise of the fuel storage or building configurations leading to radiological or criticality concerns. The new racks have been analyzed in their new configuration and were found to be safe during seismic motion. Fuel has been determined to remain intact and the storage racks maintain the fuel and fixed poison configurations subsequent to a seismic event. The structural capability of the pool and liner will not be exceeded under the appropriate combinations of dead weight, thermal, and seismic loads. The Fuel Building structure will remain intact during a seismic event and will continue to adequately support and protect the spent fuel storage racks, storage array, and pool moderator/coolant.

A fuel cask drop accident was previously evaluated as described in the CPS Updated Safety Analysis Report (USAR) Section 15.7.5. Administrative controls will be implemented to ensure that fuel will be removed from storage racks located within the cask storage pool prior to any fuel cask being moved in this area. The presence of any empty racks in this area will not adversely affect the previously evaluated cask drop

ATTACHMENT

Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

scenarios, since any impacted empty racks will tend to absorb the kinetic energy of the dropped cask and thus reduce the impact load and corresponding damage. The thin walled rack cell material poses significantly less threat to puncturing the cask than impact to the floor of the pool area. Thus, the results of the previously evaluated cask drop accident remain unchanged.

Therefore, the proposed change does not result in a significant increase in the consequences of a previously evaluated accident.

In summary, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change involves revising CPS TS 4.3, "Fuel Storage," to reflect the increased storage capacity of the spent fuel pool as a result of the installation of higher density storage racks and addition of fuel storage capacity in the fuel cask storage pool. Due to the proposed changes, an accidental drop of a rack module during construction activity in the pool was considered as the only event that might represent a new or different kind of accident.

A construction accident of a rack dropping onto stored spent fuel or the pool floor liner is not a postulated event due to the defense-in-depth approach to be taken. A new temporary crane, hoist, and rack lifting rig will be introduced to remove the existing racks and install the new racks. The temporary crane will be used to lift the racks from the operating deck and then lower them into the spent fuel pool. The temporary crane will then also be used to position the racks in their final location in the pool. The Fuel Building crane will only be used as an alternative method to initially introduce racks into the pool. The temporary lift items have been designed to meet the requirements of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants, Resolution of Generic Technical Activity A-6." Crane Manufacturer's Association of America (CMAA) Specification #70, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes," and American National Standards Institute (ANSI) Standard N14.6, "Standard for Special Lifting Devices for Shipping Containers Weighing 10000 Pounds (4500 kg) or More for Nuclear Materials." A rack drop event is considered to be a "heavy load drop" over the pools. Racks will not be allowed to be lifted or to travel over any racks containing new or spent fuel assemblies, thus a rack drop onto fuel is precluded. A rack drop to the pool liner is also precluded since all of the lifting components either provide redundancy in load path (i.e., meet the definition of NUREG-0612 as a single failure proof design) or are designed to meet a safety factor of ten (10). The analysis of a rack dropping to the liner has been performed and shown to be acceptable. A drop of a spent fuel rack onto the spent fuel pool liner, while unlikely, would not result in an uncontrollable loss of spent fuel pool water or lead to a catastrophic failure of the reinforced concrete slab. As noted above, the temporary

<u>ATTACHMENT</u>

Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

crane (or the Fuel Building crane as an alternative) will be used to lower racks into the pool and place racks within their range of accessibility and to remove racks from the spent fuel pool. The temporary crane will be used to lift racks from the pool floor and move the racks horizontally with a limited height above the pool floor. All movements of heavy loads over the pool will comply with the applicable administrative controls and guidelines (i.e. plant procedures, NUREG-0612, etc.). A rack drop would not alter the storage configuration or moderator/coolant presence. Therefore, the rack drop does not represent a new or different kind of accident.

The proposed change does not alter the operating requirements of the plant or of the equipment credited in the mitigation of the design basis accidents. The proposed change does not affect any of the important parameters required to ensure safe fuel storage. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The function of the spent fuel pool and fuel cask storage pool is to store the fuel assemblies in a subcritical and coolable configuration through all environmental and abnormal loadings, such as an earthquake or fuel assembly drop. The new rack design must meet all applicable requirements for safe storage and be functionally compatible with the spent fuel pool and fuel cask storage pool.

The mechanical, material, and structural designs of the new racks have been reviewed in accordance with the applicable provisions of the NRC Guidance entitled, "OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications," provided as an enclosure to Generic Letter 78-11. The rack materials used are compatible with the spent fuel assemblies and the spent fuel pool environment. The fixed neutron absorber (i.e., Metamic) has been demonstrated to be acceptable for dry and wet storage applications on a generic basis. In addition, the NRC has approved Metamic for use in both wet and dry storage applications. The design of the new racks preserves the proper margin of safety during abnormal loads such as a dropped assembly and tensile loads from a stuck assembly. It has been shown that such loads will not invalidate the mechanical design and material selection to safely store fuel in a coolable and subcritical configuration.

The methodology used in the criticality analysis of the expanded spent fuel pool meets the appropriate NRC guidelines and the ANSI standards. The margin of safety for subcriticality is maintained by having k_{eff} equal to or less than 0.95 under all normal storage, fuel handling, and accident conditions, including uncertainties.

The criterion of having k_{eff} equal to or less than 0.95 during storage or fuel movement is the same as that used previously to establish criticality safety evaluation acceptance. Therefore, the accepted margin of safety remains the same.

<u>ATTACHMENT</u>

Revised No Significant Hazards Consideration Supporting the Request for License Amendment Related to Onsite Spent Fuel Storage Expansion

The thermal-hydraulic and cooling evaluation of the spent fuel pool demonstrated that the pool could be maintained below the specified thermal limits under the conditions of the maximum heat load and during all credible accident sequences and seismic events. The spent fuel pool temperature will not exceed 150°F during the worst single failure of a cooling pump. The maximum local water temperature in the hot channel will remain below the boiling point. The fuel will not undergo any significant heat up after an accidental drop of a fuel assembly on top of the rack blocking the flow path. A loss of cooling to the pool will allow sufficient time (i.e., 24 hours) for the operators to intervene and line up alternate cooling paths and the means of inventory make-up before the water shielding above the top of the racks falls below 10 feet. The thermal limits specified for the evaluations performed to support the proposed change are the same as those that were used in the previous evaluations.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Conclusion

Based on the above, AmerGen concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92, paragraph (c), and, accordingly, a finding of no significant hazards consideration is justified.