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Enclosure 1 to Serial: HNP-98-188

**SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
SPENT FUEL STORAGE**

BASIS FOR CHANGE REQUEST

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BASIS FOR CHANGE REQUEST

Background:

The Harris Plant was originally planned as a four nuclear unit site (Harris 1, 2, 3 and 4). In order to accommodate four units at Harris, the Fuel Handling Building (FHB) was designed and constructed with four separate pools capable of storing spent fuel. The two pools at the south end of the FHB, now known as Spent Fuel Pools (SFPs) 'A' and 'B', were to support Harris Units 1 and 4. The two pools at the north end of the FHB, now known as Spent Fuel Pools 'C' and 'D', were to support Harris Units 2 and 3. The multi-unit design included a spent fuel pool cooling and cleanup system to service SFPs 'A' and 'B' and a separate cooling and cleanup system to support SFPs 'C' and 'D'.

Harris Units 3 and 4 were canceled in late 1981. Harris Unit 2 was canceled in late 1983. The FHB, all four pools (including liners), and the cooling and cleanup system to support SFPs 'A' and 'B' were completed and turned over. However, construction on the spent fuel pool cooling and cleanup system for SFPs 'C' and 'D' was discontinued after Unit 2 was canceled and the system was not completed. Harris Unit 1 began operation in 1987 with SFPs 'A' and 'B' in service. The need to eventually activate SFPs 'C' and 'D' (depending on the availability of a permanent DOE spent fuel storage facility) was anticipated at the time the operating license for Harris Unit 1 was issued. The spent fuel storage capacity currently identified in Section 5.6.3 of the Harris Plant Technical Specifications (1832 PWR assemblies and 48 interchangeable (7 x 7 cell) PWR or (11 x 11 cell) BWR racks) assumes installation of racks in all four of the spent fuel pools.

Since the time that construction of the spent fuel pool cooling and cleanup system for SFPs 'C' and 'D' was halted, CP&L has implemented a spent fuel shipping program because DOE spent fuel storage facilities are not available and are not expected to be available for the foreseeable future. Spent fuel from Brunswick (2 BWR units) and Robinson (1 PWR unit) is shipped to Harris for storage in the Harris SFPs. Shipment of spent fuel to Harris is necessary in order to maintain full core offload capability at Brunswick and Robinson. As a result of the operation of the Harris Plant, shipping program requirements, and the unavailability of DOE storage, it will be necessary to activate SFPs 'C' and 'D' and the associated cooling and cleanup system by early in the year 2000. Activation of these two pools will provide storage capacity for all four CP&L nuclear units (Harris, Brunswick 1 and 2, and Robinson) through the end of their current licenses.

SFP 'A' now contains six Region 1 flux trap style (6 x 10 cell) PWR racks and three (11 x 11 cell) BWR racks for a total storage capacity of 723 assemblies. SFP 'A' has been, and will continue to be, used to store fresh (unburned) and recently discharged Harris fuel.

SFP 'B' now contains six (7 x 10 cell), five (6 x 10 cell), and one (6 x 8 cell) PWR Region 1 style racks. SFP 'B' also currently contains seventeen (11 x 11 cell) BWR racks. SFP 'B' is licensed to store one more (11 x 11 cell) BWR rack, which would increase the total pool storage capacity to 2946 assemblies. Harris is postponing installation of the last BWR rack and prefers to reserve the pool open area for fuel examination and repair. Therefore, the total installed capacity in SFP 'B' will temporarily remain as 768 PWR cells and 2,057 BWR cells for a total of 2,825 storage cell locations.

Proposed Changes:

The proposed changes will allow CP&L to increase the spent fuel storage capacity at the Harris plant by placing SFPs 'C' and 'D' in service. In order to activate the pools, CP&L requests that the NRC review and approve the following changes:

1. Revised Technical Specification 5.6 to identify PWR burnup restrictions, BWR enrichment limits, pool capacities, heat load limitations and nominal center-to-center distances between fuel assemblies in the racks to be installed in SFPs 'C' and 'D'.

The use of the high density region 2 racks has been shown to be acceptable based on the analysis performed by Holtec International.

2. 10CFR50.55a Alternative Plan to demonstrate acceptable level of quality and safety in the completion of the component cooling water (CCW) and SFP 'C' and 'D' cooling and cleanup system piping.

The cooling system for SFPs 'C' and 'D' cannot be N stamped in accordance with ASME Section III since some installation records are not available, a partial turnover was not performed when construction was halted following the cancellation of Unit 2 and CP&L's N certificate program was discontinued following completion of Unit 1. The Alternative Plan demonstrates that the originally installed equipment is acceptable for use and that the design and construction on the remaining portion of the cooling system piping (estimated at about 20%) maintains the same level of quality and safety through the use of the CP&L Appendix B QA program supplemented by additional QA requirements integrated into the plant modification package which completes the system

3. Unreviewed safety question for additional heat load on the component cooling water (CCW) system.

The acceptability of the 1.0 MBtu/hr heat load from SFPs 'C' and 'D' was demonstrated by the use of thermal-hydraulic analyses of the CCW system under

various operating scenarios. The dynamic modeling used in the thermal-hydraulic analyses identified a decrease in the minimum required CCW system flow rate to the RHR heat exchangers. This change has not been previously reviewed by the NRC and is deemed to constitute an unreviewed safety question.

Basis for Change

Installation of spent fuel storage racks in SFPs 'C' and 'D':

The FHB and SFPs 'C' and 'D' (including pool liners) were fully constructed and turned over as part of the construction and licensing of Harris Unit 1. However, the decision was made to not place SFPs 'C' and 'D' in service until needed (depending on the availability of DOE spent fuel storage). SFPs 'C' and 'D' are flooded but have not been previously used for spent fuel storage. CP&L proposes to expand the storage capacity at Harris by installing Region 2 (non-flux trap style) rack modules in Pools 'C' and 'D' in incremental phases (campaigns), on an as needed basis. SFP 'C' will provide the initial storage expansion for both PWR and BWR fuel. In its fully implemented storage configuration, SFP 'C' can accommodate 927 PWR and 2763 BWR assemblies. Expansion of storage capacity by installing racks in SFP 'D' will occur once SFP 'C' is substantially filled. SFP 'D' will contain only PWR fuel and can accommodate 1025 maximum density storage cells.

Following this proposed change, Spent Fuel Pool capacities will be as follows:

Pool	PWR spaces	BWR spaces	Total
'A'	360	363	723
'B'	768	2178	2946
'C'	927	2763	3690
'D'	1025	0	1025
Total	3080	5304	8384

Racks in SFP 'C' and 'D' will be installed in the following phases:

SFP 'C' - 1st Campaign - install by early 2000

4 PWR racks → 360 PWR spaces

10 BWR racks → 1320 BWR spaces

SFP 'C' - 2nd Campaign - install approximately 2005

4 PWR racks → 324 PWR spaces

6 BWR racks → 936 BWR spaces

SFP 'C' - 3rd Campaign - install approximately 2014

3 PWR racks → 243 PWR spaces

3 BWR racks → 507 BWR spaces

SFP 'D' - 1st Campaign - install approximately 2016

6 PWR racks → 500 PWR spaces

SFP 'D' - 2nd Campaign - installation date to be determined

6 PWR racks → 525 PWR spaces

(Note: The projected rack installation dates listed above are based on the current spent fuel shipping schedule. These dates may change as the shipping schedule is revised).

This configuration represents the mixture of PWR and BWR storage which will accommodate future storage requirements based on currently identified needs. Within SFP 'C', eighteen (18) of the racks are sized to allow interchangeability between BWR and PWR storage if required in the future. The dimensions of the (9 x 9 cell) PWR rack and the (13 x 13 cell) BWR rack are virtually identical. Therefore, rack configurations other than those identified above are possible.

Enclosure 6 of this license amendment request provides a report developed in conjunction with Holtec International which describes the evaluations performed to show the acceptability of the proposed change to install the racks in pools 'C' and 'D'. (Enclosure 7 is a non-proprietary version of enclosure 6). The report includes listings of the applicable regulations, codes and standards, descriptions of the evaluation methodology, acceptance criteria, and evaluation results. The licensing report also includes discussions on the need for the proposed change and considerations of other alternatives. Technical Specification Section 5.6, Fuel Storage, will be revised to identify PWR burnup restrictions, BWR enrichment limits, pool capacities, heat load limitations and nominal center-to-center distances between fuel assemblies in the racks to be installed in SFPs 'C' and 'D' (See Enclosure 5).

Completion of Cooling and Cleanup System for SFPs 'C' and 'D':

In order to activate Spent Fuel Pools 'C' and 'D', it is necessary to complete construction of the cooling and cleanup system for these pools and to install tie-ins to the existing Harris Unit 1 component cooling water system to provide heat removal capabilities. Approximately 80% of the SFP cooling and cleanup system piping and the majority of the CCW piping was installed during the original plant construction. In addition, other major system components such as the SFP cooling heat exchangers and pumps were also installed before original construction was discontinued. The cooling and cleanup system for pools 'C' and 'D' will be completed such that system design and operation is

consistent with the design and operation of the cooling and cleanup system for pools 'A' and 'B'. The spent fuel pool cooling system for pools 'C' and 'D' is nuclear safety related with two fully redundant 100% capacity trains.

At the time that construction on the SFP cooling system was discontinued following cancellation of Harris Unit 2, a formal turnover of the partial system was not performed and CP&L has since discontinued its N certificate program. Also, some of the field installation records for the completed piping are no longer available. As a result, the system when completed will not satisfy ASME Section III code requirements (i.e. will not be N stamped). Therefore, an Alternative Plan in accordance with 10CFR50.55a(a)(3) is provided as Enclosure 8 to demonstrate that the completed system will provide an acceptable level of quality and safety. The majority of the ASME Section III piping was already installed when original construction was discontinued. As identified in the Alternative Plan, that piping to the extent that it was completed, was designed, constructed and inspected to Section III requirements. The remainder of the system will also be designed, constructed, inspected and tested to Section III requirements to the extent practical considering CP&L no longer has an N certificate program. Work will be performed in accordance with CP&L's 10CFR50 Appendix B QA program with any differences between Section III requirements and Appendix B requirements conservatively dispositioned. Supplemental QA requirements will be integrated into the modification package(s) as appropriate.

Calculations have been performed to verify that the existing CCW system is adequate to provide heat removal for near-term pool operation. The Spent Fuel Pool 'C' and 'D' heat loads will be limited to 1.0 MBtu/hr for near-term operation. Technical Specification section 5.6.3 will be revised to identify this heat load limit (Enclosure 5). This heat load limit is being established since additional CCW heat loads resulting from the power uprate project (potential to increase post-accident containment temperature resulting in an increased containment sump temperatures and increased load on RHR during long term recirculation phase) are not quantified at this time. Therefore, it has been determined that the most prudent action is to establish limiting heat loads based on current system loads. Additional heat load analysis will be performed concurrent with the power uprate project to establish the maximum heat loads on the CCW system that will exist at the end of plant licensed life when all spent fuel pools are expected to be full. Any CCW modifications necessary to increase system heat removal capability will be identified and implemented at that time. As part of the licensing required to support the power uprate project (currently planned for implementation concurrent with the steam generator replacement in late 2001), the technical specification heat load limit will either be revised or removed completely.

The plant design change package and supporting analyses for the CCW tie-in demonstrated that adequate capacity exists on the CCW system to add the 1.0 MBtu/hr for the near-term operation of SFPs 'C' and 'D'. The thermal-hydraulic analysis performed in support of this plant design change package modeled the dynamic RHR heat

exchanger performance based on fluid property changes. Previous analyses evaluated RHR heat exchanger performance at a fixed data sheet value. This results in a reduction in the required CCW flow to the RHR heat exchanger. While technically valid, the lower required flow rate has not been previously reviewed by the NRC and, therefore, is deemed to constitute an unreviewed safety question. Included in Enclosure 9 are the results of the 10CFR50.59 evaluation for the unreviewed safety question identified by the tie-in to Unit 1 CCW.

Conclusion:

CP&L has concluded that placing SFPs 'C' and 'D' in service at this time to provide spent fuel storage is the safe and prudent alternative for increasing spent fuel storage capacity in the nuclear generating system. This option has been shown to be safe and in conformance with the appropriate regulations, codes and standards. Expansion of storage capacity by using Pools 'C' and 'D' will support continued operation of the Harris, Brunswick and Robinson facilities until the end of their current operating licenses.

Enclosure 2 to Serial: HNP-98-188

**SHEARON HARRIS NUCLEAR POWER PLANT
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SPENT FUEL STORAGE**

**10CFR50.92 EVALUATION
SIGNIFICANT HAZARDS CONSIDERATION**

10CFR50.92 EVALUATION

The commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists with regard to a proposed license amendment. A change involves no significant hazards consideration if it would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. Carolina Power & Light has reviewed the proposed change and determined that it does not involve a significant hazards consideration. The following safety assessment summarizes the results of this review. Responses to the three significant hazard consideration questions follow at the end of this evaluation.

Safety Assessment

The planned expansion of storage capacity involves installing up to 30 storage rack modules in Pool 'C' and up to 12 storage rack modules in Pool 'D'. The implementation of the storage capacity increase in pools 'C' and 'D' will be performed on an as needed basis through incremental phases (campaigns), as follows:

<u>Pool</u>	<u>Campaign</u>	<u>Number of Racks</u>	<u>Total Storage Locations</u>
'C'	I	14	1680
	II	10	1260
	III	6	750
'D'	I	6	500
	II	6	525

The cells of the new racks will contain a fixed neutron absorber for primary reactivity control. To maximize storage capacity, the new racks will be "Region 2" style racks, which are designed without the usual flux trap design associated with "Region 1" style racks. The effective enrichment of the stored fuel will be controlled administratively to maintain reactivity within acceptable limitations. Acceptable effective enrichment will be ensured prior to placement of spent fuel into the pools.

Rack modules in both pools will be freestanding and self-supporting. The new modules will be separated by a gap of approximately 0.625 inch from one another. Along the pool walls, a nominal gap will also be provided which will vary from approximately 2.5 inches to 6.1 inches.

The proposed cooling system modifications for Pools 'C' and 'D' have been designed to ensure that sufficient heat removal capability exists to maintain the temperature in the pools below the design limit. For the initial installation of racks into Pool 'C', the maximum heat load will be limited to 1.0 MBtu/hr consistent with revised Technical Specification 5.6. In conjunction with the planned implementation of power uprate, additional analyses will be performed and any required system upgrades will be made to ensure the adequacy of the cooling system to dissipate the heat loads associated with the

end of plant life. A comprehensive multi-system thermal-hydraulic analysis was performed in support of the plant design change package for the initial rack installation campaign. This analysis facilitates a reduction in this CCW flow requirement currently stated in the FSAR as being a basis for acceptance of postulated post-LOCA consequences. While the analysis methods are technically valid, this lower flowrate has been deemed to constitute an unreviewed safety question and requires NRC review and approval.

The predominant pool heat load typically develops from the residual heat associated with the most recent reactor core offload. Transient heat loads are not a significant concern for Pools 'C' and 'D' due to the spent fuel cooling time required prior to placement within these two pools. Satisfactory spent fuel cooling time will be ensured through administrative controls of fuel decay time subsequent to reactor discharge.

In order to activate Spent Fuel Pools 'C' and 'D', it is necessary to complete construction of the cooling and cleanup system for these pools and to install tie-ins to the existing Harris Unit 1 component cooling water system (CCW) to provide heat removal capabilities. The majority of the ASME Section III piping was already installed when original construction was discontinued. An alternative plan in accordance with 10CFR50.55a(a)(3)(i) is provided to demonstrate that the completed system will provide an acceptable level of quality and safety.

The Spent Fuel Pool thermal performance, completion of construction, criticality, and seismic response have been analyzed considering the increased storage capacity and fuel enrichment. The results of these analyses have shown that the pool structure and proposed cooling systems (within the limitation of the new technical specifications) are adequate to support storage of spent fuel within Pools 'C' and 'D'.

Significant Hazards Consideration Determination

In accordance with 10CFR50.92, Carolina Power & Light has reviewed the proposed changes and has concluded that they do not involve a Significant Hazards Consideration (SHC). The basis for this conclusion is that the threshold for the three criteria of 10CFR50.92(c) are not reached. The proposed activity does not involve a SHC because it would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

In the analysis of the safety issues concerning the expanded pool storage capacity within Harris' Fuel Handling Building, the following previously postulated accident scenarios have been considered:

- a. A spent fuel assembly drop in a Spent Fuel Pool
- b. Loss of Spent Fuel Pool cooling flow
- c. A seismic event
- d. Misloaded fuel assembly

The probability that any of the accidents in the above list can occur is not significantly increased by the activity itself. The probabilities of a seismic event or loss of Spent Fuel Pool cooling flow are not influenced by the proposed changes. The probabilities of accidental fuel assembly drops or misloadings are primarily influenced by the methods used to lift and move these loads. The method of handling loads during normal plant operations is not significantly changed, since the same equipment (i.e., Spent Fuel Handling Machine and tools) and procedures as those in current use in pools 'A' and 'B' will be used in pools 'C' and 'D'. Since the methods used to move loads during normal operations remain nearly the same as those used previously, there is no significant increase in the probability of an accident. Current shipping activities at the Harris Nuclear Plant will continue as previously licensed. The consequences of an accident involving shipping activities is not changed and there is no significant increase in the probability of an accident.

During rack installation, all work in the pool area will be controlled and performed in strict accordance with specific written procedures. Any movement of fuel assemblies which is required to be performed to support this activity (e.g., installation of racks) will be performed in the same manner as during normal refueling operations.

Accordingly, the proposed activity does not involve a significant increase in the probability of an accident previously evaluated.

The consequences of the previously postulated scenarios for an accidental drop of a fuel assembly in the Spent Fuel Pool have been re-evaluated for the proposed change. The results show that such the postulated accident of a fuel assembly

striking the top of the storage racks will not distort the racks sufficiently to impair their functionality. The minimum subcriticality margin, K_{eff} less than or equal to 0.95, will be maintained. The structural damage to the Fuel Handling Building, pool liner, and fuel assembly resulting from a fuel assembly drop striking the pool floor or another assembly located within the racks is primarily dependent on the mass of the falling object and the drop height. Since these two parameters are not changed by the proposed activity from those considered previously, the structural damage to these items remains unchanged. The radiological dose at the exclusion area boundary will not be increased from those previously considered, since the pertinent fuel parameters remain unchanged. These dose levels remain "well within" the levels required by 10CFR100, paragraph 11, as defined in Section 15.7.4.II.1 of the Standard Review Plan. Thus, the results of the postulated fuel drop accidents remain acceptable and do not represent a significant increase in consequences from any of the same previously evaluated accidents that have been reviewed and found acceptable by the NRC.

The consequences of a loss of Spent Fuel Pool cooling have been evaluated and found to have no increase. The concern with this accident is a reduction of Spent Fuel Pool water inventory from bulk pool boiling resulting in uncovering fuel assemblies. This situation would lead to fuel failure and subsequent significant increase in offsite dose. Loss of spent fuel pool cooling at Harris is mitigated in the usual manner 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 re-establish cooling or supply an alternative water source. Evaluation of this accident usually includes determination of a time to boil, which in the case of pools 'C' and 'D' is in excess of 13 hours based on a consideration of end of plant life heat loads. This evaluation neglects any possible cooling from the connection to pools 'A' and 'B' through the transfer canal. The 13 hour period is much shorter 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 gauge for establishing the comparison of consequences before and after a refueling project. The heatup rate in the Spent Fuel Pool is a nearly linear function of the fuel decay heat load. Subsequent to the proposed changes, the fuel decay heat load will increase because of the increase in the number assemblies from those considered from Pools 'A' and 'B' alone. The methodology used in the thermal-hydraulic analysis determined the maximum fuel decay heat loads. In the unlikely event that pool cooling is lost to pools 'C' and 'D', sufficient time will still be available for the operators to provide alternate means of cooling before the onset of pool boiling. Therefore, the proposed change represents no increase in the consequences of loss of pool cooling.

The consequences of a design basis seismic event are not increased. The consequences of this accident are 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 found safe during seismic motion. The fuel stored in these racks has been determined to remain intact and the 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 Handling Building structure will remain intact during a seismic event and will continue to adequately support and protect the fuel racks, storage array, and pool moderator/coolant. Thus, the consequences of a seismic event are not increased.

Fuel misloading and mislocation accidents were previously credible occurrences, since fuel could be placed at an unintended storage location or could have been lowered outside and adjacent to a storage rack in Pools 'A' or 'B'. However, neither of these two scenarios previously represented any concern because of the flux trap style of the rack designs in these two pools. Similar procedures, equipment and methods of fuel movement will be used for Pools 'C' and 'D' as those used previously for Pools 'A' and 'B'. Therefore, the proposed activity does not represent any increase in the probability of occurrence. The proposed non-flux trap design racks for Pools 'C' and 'D' require administrative controls to ensure that fuel assemblies meet effective enrichment criteria prior to storage. Under these conditions, misloading of a fuel assembly by placement in an unintended storage cell has no significant consequences. Therefore, the only remaining potential mislocation of a fuel assembly is for an assembly to be lowered outside of and directly adjacent to a storage rack. This accident occurring in Pools 'C' or 'D' has been analyzed for the worst possible storage configuration subsequent to the proposed activity and it has been shown that the consequences remain acceptable with respect to the same criteria used previously. Thus, there is no increase in consequences for fuel mislocation or misloading.

Therefore it is concluded that the proposed changes do not significantly increase the probability or consequences of any accident previously evaluated.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

To assess the possibility of new or different kind of accidents, a list of the important parameters required to ensure safe fuel storage was established. Safe fuel storage is defined here as providing an environment, which would not present any significant threats to workers or the general public (i.e., meeting the requirements of 10CFR100 and 10CFR20). Any new events, which would modify these parameters sufficiently to place them outside of the boundaries analyzed for normal conditions and/or outside of the boundaries previously considered for accidents would be considered to create the possibility of a new or different accident. The criticality and radiological safety evaluations were reviewed to establish the list of important parameters. The fuel configuration and the existence of the moderator/coolant were identified as the only two parameters, which were important to safe fuel storage. Significant modification of these two parameters represents the only possibility of an unsafe storage condition. Once the two

important parameters were established, an additional step was taken to determine what events (which were not previously considered) could result in changes to the storage configuration or moderator/coolant presence during or subsequent to the proposed changes. This process was adopted to ensure that the possibility of any new or different accident scenario or event would be identified. Due to the proposed activity, an accidental drop of a rack module during construction activity in the pool was considered as the only event which might represent a new or different kind of accident.

A construction accident resulting in a rack drop is an unlikely event. The proposed activity will utilize the defense-in-depth approach for these heavy loads. The defense-in-depth approach is intended to meet the requirements of NUREG-0612 and preclude the possibility of a rack drop. 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 temporary hoist and rack lifting rig will be introduced to lift and suspend the racks from the bridge of the Auxiliary Crane. These items have been designed in accordance with the requirements of NUREG-0612 and ANSI N14.6 and will be similar to those used recently to install storage rack modules in Pool 'B'.

The postulated rack drop event is commonly referred to as a "heavy load drop" over the pools. Heavy loads will not be allowed to travel over any racks containing fuel assemblies. The danger represented by this event is that the racks will drop to the pool floor and the pool structure will be compromised leading to loss of moderator/coolant, which is one of the two important parameters identified above. Although the analysis of this event has been performed and shown to be acceptable, the question of a new or different type of event is answered by determining whether heavy load drops over the pool have been considered previously. As stated above, heavy loads (storage rack modules) were recently installed in Pool 'B' using similar methods. 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 potential for a new or previously unanalyzed accident is not created.

3. Involve a significant reduction in the margin of safety.

The function of the Spent Fuel 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 Pools 'C' and 'D'.

CP&L has addressed the safety issues related to the expanded pool storage capacity in the following areas:

1. Material, mechanical and structural considerations

The mechanical, material, and structural designs of the new racks have been reviewed in accordance with the applicable provisions of the NRC Guidance entitled, "Review and Acceptance of Spent Fuel Storage and Handling Applications". The rack materials used are compatible with the spent fuel assemblies and the Spent Fuel Pool environment. The design of the new racks preserves the proper margin of safety during normal and abnormal loads. 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.

2. Nuclear criticality

The methodology used in the criticality analysis of the expanded Spent Fuel Pool meets the appropriate NRC guidelines and the ANSI standards (GDC 62, NUREG 0800, Section 9.1.2, the OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications, Reg. Guide 1.13, and ANSI/ANS 8.17). The margin of safety for subcriticality is maintained by having the neutron multiplication factor equal to, or less than, 0.95 under all accident conditions, including uncertainties. This criterion is the same as that used previously to establish criticality safety evaluation acceptance and remains satisfied for all analyzed accidents.

3. Thermal-hydraulic and pool cooling

The thermal-hydraulic and cooling evaluation of the pools demonstrated that the pools can 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 pool temperature will not exceed 137°F during the highest heat load conditions. 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 (>13 hours) for the operators to intervene and line up alternate cooling paths and the means of inventory

make-up before the onset of pool boiling. The thermal limits specified for the evaluations performed to support the proposed activity are the same as those that were used in the previous evaluations. It has also been demonstrated that adequate margin exists in the Unit 1 CCW system to support near term operation of the pools subject to the requirements of the proposed changes to the Technical Specifications.

Based on the preceding discussion it is concluded that this activity does not involve a significant reduction in the margin of safety.

The NRC has provided guidance concerning the application of standards in 10CFR50.92 by providing certain examples (51FR7751, March 6, 1986) of amendments that are considered not likely to involve a SHC. The proposed changes for Harris are similar to Example (x): an expansion of the storage capacity of Spent Fuel Pool when all of the following are satisfied:

- (1) The storage expansion method consists of either replacing existing racks with a design that allows closer spacing between stored spent fuel assemblies or placing additional racks of the original design on the pool floor if space permits.

The Harris storage expansion involves installation of storage racks for PWR and BWR fuel assemblies with a design that allows closer spacing of stored PWR spent fuel assemblies.

- (2) The storage expansion method does not involve rod consolidation or double tiers.

The Harris rack installation does not involve fuel consolidation. The racks will not be double tiered; no fuel assemblies will be stored above other assemblies.

- (3) The K_{eff} of the pool is maintained less than, or equal to, 0.95.

The design of the new racks integrates Boral as a neutron absorber within each rack cell to allow close storage of spent fuel assemblies while ensuring that K_{eff} remains less than 0.95 under all conditions. Additionally, the water in the Spent Fuel Pool does contain boron as further assurance that K_{eff} remains less than 0.95. The boron that is contained in the pool is not credited under normal or accident conditions.

- (4) No new technology or unproven technology is utilized in either the construction process or the analytical techniques necessary to justify the expansion.

The rack vendor has successfully participated in the licensing of numerous other racks of a similar design. The construction process and the analytical techniques of the Harris pool expansion are substantially the same as in the other completed rerack projects. Thus, no new or unproven technology is used in the Harris rack installation.

The similarities of the proposed activity to the above example and the previously discussed satisfaction of the three criteria from 10 CFR 50.92(c) confirm the conclusion stated above that the modification does not represent a Significant Hazards Consideration (SHC).

Enclosure 3 to Serial: HNP-98-188

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
SPENT FUEL STORAGE

ENVIRONMENTAL EVALUATION

ENVIRONMENTAL EVALUATION

CP&L has reviewed activities described in the proposed license amendment for environmental considerations. Each of the proposed changes was evaluated against the criteria of 10CFR51.22 to ascertain whether the criteria for categorical exclusion were satisfied or if formal environmental impact statement would be required.

Significantly, this review identified that the newly activated spent fuel pools will be similar in design with that originally conceived and approved for construction for this portion of the Harris Plant. All four pools were included in the original four unit design of the Harris Nuclear Plant, and the completion and operation of these pools continued to be reflected in plant licensing documentation up to and including the issuance of the operating license for Units 1 & 2 (ref. NUREG-1038, dated Nov. 1983) and the associated environmental report (ref. Shearon Harris Nuclear Power Plant Environmental Report, Amendment 5, dated Dec. 1982). The most notable difference between the previously licensed and currently proposed designs is that, rather than having a separate operating unit to provide auxiliaries such as CCW for cooling and RWST for makeup, the current design will utilize Unit 1 facilities for those functions. Nonetheless, the design of the fuel pools themselves, including cooling and cleanup systems, will be essentially the same as that previously reviewed, and the differences which do exist between the current design and that originally licensed are not of a scope or nature as to have a significant bearing on environmental impact.

Since the design and operation of the 'C' & 'D' Spent Fuel Pools and supporting systems is essentially identical to that originally licensed in NUREG-1038 and the associated environmental report, no increase in occupational exposure is anticipated with regard to new equipment design or operating constraints. On the contrary, the operating experience of the 'A' and 'B' spent fuel pools is being utilized to ensure that the new design is as ALARA friendly as possible. For instance, local flow indicators for the new systems are being located in areas known to have lower dose rates than their counterparts already in operation. In addition to an ALARA friendly design, existing fuel handling and ALARA and procedures will continue to be utilized, and fuel handling equipment reliability is not diminished. Spent fuel pool shielding levels are not decreased, and no appreciable increase in area dose rates is expected. Based on these considerations, it can be concluded that this activity will not result in a significant increase in individual or cumulative occupational exposures.

The issues which were evaluated to reach this determination also include an evaluation of the thermal impact on the plant environs resulting from the additional spent fuel heat load. Calculations assessing the impact of spent fuel pool activation predict that an increase in UHS temperature of less than 0.01 °F would result from an additional 1.0 MBtu/hr heat input. This increase is insignificant relative to the available margin in the UHS to its design temperature and considering the uncertainties existing in the analyses.

Finally, it is easily seen that the thermal impact on the environment of a single operating unit with four spent fuel pools is bounded by that of the two unit - four spent fuel pool configuration which was previously evaluated and licensed by NUREG-1038 and the associated environmental report. It is concluded that no additional assessment is required regarding to thermal impacts on the UHS.

In summary, the licensing activities associated with the activation of the 'C' & 'D' spent fuel pools as described herein do not significantly increase the types and amounts of effluents that may be released offsite, nor significantly increases individual or cumulative occupational exposures nor constitutes any other type of new and appreciable environmental impact. It is concluded that these activities are essentially environmentally benign and that no additional impact studies are necessary in support of this submittal.

AFFIDAVIT PURSUANT TO 10CFR2.790

I, Scott H. Pellet, being duly sworn, depose and state as follows:

- (1) I am the Project Manager for Holtec International and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the document entitled Licensing Report for Expanding Capacity in Harris Spent Fuel Pools C and D, Holtec Report HI-971760, Revision 2. The proprietary material in this document is delineated by proprietary designation on specific pages or by shaded text identified as being proprietary.
- (3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.790(a)(4), and 2.790(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;

AFFIDAVIT PURSUANT TO 10CFR2.790

- b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.
- c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;
- d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;
- e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a, 4.b, 4.d, and 4.e, above.

- (5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.



AFFIDAVIT PURSUANT TO 10CFR2.790

- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed historical data and analytical results not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed using codes developed by Holtec International. Release of this information would improve a competitor's position without the competitor having to expend similar resources for the development of the database. A substantial effort has been expended by Holtec International to develop this information.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

AFFIDAVIT PURSUANT TO 10CFR2.790

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.


The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF NEW JERSEY)
)
COUNTY OF BURLINGTON) ss:

Scott H. Pellet, being duly sworn, deposes and says:


That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Marlton, New Jersey, this 27th day of May 1998.



Scott H. Pellet
Holtec International

Subscribed and sworn before me this 27 day of May, 1998.



MARIA C. PEPE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 25, 2000

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
SPENT FUEL STORAGE

PAGE CHANGE INSTRUCTIONS

<u>Removed Page</u>	<u>Inserted Page</u>
5-7	5-7
	5-7a
	5-7b