Docket Number 50-346
License Number NPF-3
Serial Number 2550
Enclosure 1
Page 1

APPLICATION FOR AMENDMENT

TO

FACILITY OPERATING LICENSE NUMBER NPF-3

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NUMBER 1

Attached are the requested changes to the Davis-Besse Nuclear Power Station, Unit Number 1 Facility Operating License Number NPF-3. The Safety Assessment and Significant Hazards Consideration is included as Attachment 1.

The proposed changes (submitted under cover letter Serial Number 2550) concern Appendix A, Technical Specifications (TS):

Pages	Index
VIII, XIII, and XIV	
3/4.9.7	Refueling Operations - Crane Travel - Fuel Handling Building, and associated Bases
3/4.9.11	Refueling Operations - Storage Pool Water Level
3/4.9.12	Refueling Operations - Storage Pool Ventilation
3/4.9.13	Refueling Operations - Spent Fuel Pool Fuel Assembly Storage, and associated Bases
5.6	Design Features - Fuel Storage

I, James H. Lash, state that (1) I am Plant Manager – Davis-Besse of the FirstEnergy Nuclear Operating Company, (2) I am duly authorized to execute and file this certification on behalf of the Toledo Edison Company and The Cleveland Electric Illuminating Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

For: Guy G. Campbell, Vice President - Nuclear

By: JH Lash
James H. Lash, Plant Manager – Davis-Besse

Affirmed and subscribed before me this 21st day of May, 1999.

Laura A. Jennison
Notary Public, State of Ohio

LAURA A. JENNISON
Notary Public, State of Ohio
My Commission Expires 8-15-2001

Docket Number 50-346
License Number NPF-3
Serial Number 2550
Attachment 1

SAFETY ASSESSMENT AND SIGNIFICANT HAZARDS CONSIDERATION FOR LICENSE AMENDMENT REQUEST NUMBER 98-0007

(38 pages follow)

SAFETY ASSESSMENT AND SIGNIFICANT HAZARDS CONSIDERATION FOR LICENSE AMENDMENT REQUEST NUMBER 98-0007

TITLE:

Proposed Modification to the Davis-Besse Nuclear Power Station (DBNPS) Unit Number 1, Facility Operating License NPF-3, Appendix A Technical Specifications, to Revise Technical Specification (TS) 3/4.9.7, Refueling Operations - Crane Travel - Fuel Handling Building, and Associated Bases; TS 3/4.9.11, Refueling Operations - Storage Pool Water Level; TS 3/4.9.12, Refueling Operations - Storage Pool Ventilation; TS 3/4.9.13, Refueling Operations - Spent Fuel Pool Fuel Assembly Storage, and Associated Bases; and TS 5.6, Design Features - Fuel Storage, to Allow the Use of Expanded Spent Fuel Storage Capability.

DESCRIPTION:

A facility for the long-term storage of spent nuclear fuel assemblies from commercial nuclear power reactors is to be provided by the United States Department of Energy. However, since such a facility is not yet available or expected to be available until at least the year 2010, commercial nuclear power plants, such as the DBNPS, have had to provide for additional spent fuel storage.

The DBNPS began the current operating Cycle 12 with insufficient storage capacity in the spent fuel pool (SFP) to fully offload the entire reactor core (177 fuel assemblies). The current spent fuel storage capacity in the spent fuel pool is 735 fuel assemblies. There are currently only 114 empty storage locations available in the spent fuel pool. A full core offload into the spent fuel pool is required for the performance of the ten-year Inservice Inspection activities required during the Twelfth Refueling Outage (12RFO), which is scheduled to commence in April 2000.

Following the core reload during 12RFO, with 72 fuel assemblies scheduled to be permanently discharged, there would be only 42 empty storage locations available in the spent fuel pool. Refueling of the reactor during the Thirteenth Refueling Outage (13RFO), which is scheduled to commence in Spring 2002, would not be possible since there would be insufficient empty storage locations available to hold the 72 fuel assemblies scheduled to be permanently discharged.

The proposed changes would expand the present spent fuel storage capability to allow the use of spent fuel racks in the cask pit area adjacent to the SFP. The cask pit is accessible from the SFP through a gated opening in the wall dividing the two pool areas. The expansion will include four rack modules in the cask pit, increasing the available spent fuel storage locations by 289 cells.

In order to recover full core offload capability as quickly as possible, the DBNPS has installed two rack modules in the cask pit, containing a total of 153 storage locations. However, this storage capacity will remain unused until the license amendment associated with this license amendment application is approved by the NRC. Prior to installation, a 10 CFR 50.59 Safety Evaluation was completed demonstrating that the installation of the empty racks does not involve an unreviewed safety question. The additional 153 storage locations would allow the core to be fully offloaded for the aforementioned ten-year Inservice Inspection, and would also provide full core offload capability after 12RFO, prior to the planned complete re-racking of the SFP.

Later installation of the remaining two rack modules, after 12RFO, is intended to provide temporary storage for shuffling of fuel to support a complete re-racking of the SFP. Approval for re-racking of the SFP will be requested in a later license amendment submittal. It is planned to relocate all four of the cask pit storage racks into the SFP as part of the final completion of this re-racking project.

Each of the proposed revisions is shown on the attached marked-up Operating License pages. The proposed changes are described in further detail as follows:

<u>TS 3/4.9.7 Refueling Operations - Crane Travel - Fuel Handling Building, and Related Bases</u>

Technical Specification LCO 3.9.7 presently states:

> Loads in excess of 2430 pounds shall be prohibited from travel over fuel assemblies in the spent fuel pool.

It is proposed to revise this LCO to read:

> Loads in excess of 2430 pounds shall be prohibited from travel over fuel assemblies in the spent fuel pool or in the cask pit.

Similarly, the LCO 3.9.7 Applicability statement, Surveillance Requirement 4.9.7, and Bases 3/4.9.7 are also proposed to be revised to provide for storage of fuel assemblies in the cask pit. The Bases would also be revised to clarify that the activity release is consistent with the USAR Chapter 15 accident analyses for a fuel handling accident outside containment. The activity assumed to be released in the USAR Chapter 15 analysis is that contained in the outer rows (56 fuel rods) of a single fuel assembly with 72 hours decay time.

The LCO 3.9.7 Applicability statement would read:

> With fuel assemblies and water in the spent fuel pool or in the cask pit.

Surveillance Requirement 4.9.7 would read:

The weight of each load, other than a fuel assembly, shall be verified to be $\leq$ 2430 pounds prior to moving it over fuel assemblies in the spent fuel pool or cask pit.

Bases 3/4.9.7 would read:

The restriction on movement of loads in excess of the nominal weight of a fuel assembly in a failed fuel container over other fuel assemblies in the spent fuel pool or cask pit ensures that in the event this load is dropped (1) the activity release will not exceed the source term assumed in the design basis fuel handling accident for outside containment, and (2) any possible distortion of fuel in the storage racks will not result in a critical array.

TS 3/4.9.11 Refueling Operations - Storage Pool Water Level

Technical Specification LCO 3.9.11 presently states:

As a minimum, 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated in the storage racks.

It is proposed to revise this LCO to read:

As a minimum, 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated in the storage racks in the spent fuel pool or cask pit.

Similarly, the LCO 3.9.11 Applicability statement and Surveillance Requirement 4.9.11 are also proposed to be revised to provide for storage of fuel assemblies in the cask pit. The LCO 3.9.11 Applicability statement would read:

Whenever irradiated fuel assemblies are in the spent fuel pool or cask pit.

Surveillance Requirement 4.9.11 would read:

The water level in the spent fuel pool and cask pit shall be determined to be at least its minimum required depth at least once per 7 days when irradiated fuel assemblies are in these locations.

TS 3/4.9.12 Refueling Operations - Storage Pool Ventilation

The TS LCO 3.9.12 Applicability statement presently states:

Whenever irradiated fuel is in the storage pool.

It is proposed to revise this Applicability statement to read:

Whenever irradiated fuel is in the spent fuel pool or cask pit.

Similarly, the LCO 3.9.12 Action statement is also proposed to be revised to provide for storage of irradiated fuel assemblies in the cask pit. The LCO 3.9.12 Action statement would read, in part:

a. With one emergency ventilation system servicing the storage pool area inoperable, fuel movement within the spent fuel pool or cask pit, or crane operation with loads over the spent fuel pool or cask pit, may proceed provided the OPERABLE emergency ventilation system servicing the storage pool area is in operation and discharging through at least one train of HEPA filters and charcoal adsorbers.

b. With no emergency ventilation system servicing the storage pool area OPERABLE, suspend all operations involving movement of fuel within the spent fuel pool or cask pit, or crane operation with loads over the spent fuel pool or cask pit, until at least one system is restored to OPERABLE status.

<u>TS 3/4.9.13 Refueling Operations - Spent Fuel Pool Fuel Assembly Storage, and Related Bases</u>

The title of TS Section 3/4.9.13 and associated Bases 3/4.9.13 are proposed to be changed to "Spent Fuel Assembly Storage". Since these titles are listed in the TS Index, pages VIII and XIII of the Index are proposed to be revised accordingly.

It is proposed to renumber the current LCO 3.9.13 to 3.9.13.a and to add an additional LCO 3.9.13.b. The revised LCO would read as follows:

3.9.13 Fuel assemblies shall be placed in the spent fuel storage racks in accordance with the following criteria:

a. Fuel assemblies stored in the spent fuel pool shall be placed in the spent fuel storage racks in accordance with the criteria shown in Figure 3.9-1.

b. Fuel assemblies stored in the cask pit shall be placed in the spent fuel storage racks in accordance with the criteria shown in Figure 3.9-2.

The title of Figure 3.9-1 is proposed to be revised to "Burnup vs. Enrichment Curves For Davis-Besse Spent Fuel Pool Storage Racks" to clarify that this Figure does not apply to the cask pit storage racks. Figure 3.9-2, "Burnup vs. Enrichment Curve For Davis-Besse Cask Pit Storage Racks" is proposed to be added, providing specific burnup/enrichment limitations appropriate for the storage rack configurations to be located in the cask pit.

The LCO Applicability statement is proposed to be revised to provide for storage of fuel assemblies in the cask pit, and would read as follows:

Whenever fuel assemblies are in the spent fuel pool or cask pit.

The current LCO Action statement is proposed to be revised to reference Specifications 3.19.13.a and 3.9.13.b, and new Figure 3.9-2. The proposed Action statement would read as follows:

With the requirements of the above Specifications 3.9.13.a or 3.9.13.b not satisfied, suspend all other fuel movement within the spent fuel pool or cask pit and move the non-complying fuel assemblies to allowable locations in accordance with Figure 3.9-1 for the spent fuel pool, or Figure 3.9-2 for the cask pit, as appropriate. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

Surveillance Requirement 4.9.13.1 is also proposed to be similarly revised to provide for storage of fuel assemblies in the cask pit, and would read as follows:

4.9.13.1 Prior to storing a fuel assembly in the spent fuel pool or cask pit, verify by administrative means that the initial enrichment and burnup of the fuel assembly are in accordance with Figure 3.9-1 for the spent fuel pool, or Figure 3.9-2 for the cask pit, as appropriate.

Bases 3/4.9.13 is also proposed to be revised to provide for storage of fuel assemblies in the cask pit, and would read as follows:

The restrictions on the placement of fuel assemblies within the spent fuel pool and cask pit, as dictated by Figure 3.9-1 and Figure 3.9-2, ensure that the k-effective of the spent fuel pool and cask pit will always remain less than 0.95 assuming the spent fuel pool and cask pit to be flooded with non-borated water. The restrictions delineated in Figure 3.9-1 and Figure 3.9-2, and the action statement, are consistent with the criticality safety analyses performed for the spent fuel pool and cask pit.

TS 5.6 Design Features - Fuel Storage

Technical Specification 5.6.1 describes the criticality design features for fuel storage. Current TS 5.6.1.1 and TS 5.6.1.2 describe criticality design features specific to the spent fuel pool storage racks and the new fuel storage racks, respectively.

It is proposed to revise TS 5.6.1.1 to clarify that it applies to the spent fuel racks located in the spent fuel pool. The revised TS 5.6.1.1 would read, in part, as follows:

5.6.1.1 The spent fuel pool storage racks are designed and shall be maintained with...

A description of the criticality design features for the cask pit racks is proposed to be included in a new TS 5.6.1.3, to read as follows:

5.6.1.3 The cask pit storage racks are designed and shall be maintained with:

a. A K_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance for manufacturing tolerances and calculation uncertainty.

b. A rectangular array of stainless steel cells spaced a nominal 9.22 inches on center in both directions. Boral neutron absorber material is utilized between each cell for criticality considerations. Fuel assemblies stored in the cask pit shall be placed in a stainless steel cell with walls of 0.075 inches nominal thickness.

c. Fuel assemblies stored in the cask pit in accordance with Technical Specification 3.9.13.

Technical Specification 5.6.2 describes design features related to the potential for inadvertent drainage of the water from the fuel storage pool. It is proposed to revise TS 5.6.2 to include the cask pit. The revised TS 5.6.2 would read as follows:

5.6.2 Drainage

The spent fuel storage pool and cask pit are designed and shall be maintained to prevent inadvertent draining below 9 feet above the top of the fuel storage racks.

Technical Specification 5.6.3 describes the storage capacity limit of the fuel storage racks. It is proposed to number the current limit of the spent fuel storage pool racks as TS 5.6.3.a, and to create a new TS 5.6.3.b to provide the cask pit storage limit. The revised TS 5.6.3 would read as follows:

5.6.3 Capacity

a. The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 735 fuel assemblies.

b. The cask pit is designed and shall be maintained with a storage capacity limited to no more than 289 fuel assemblies.

Associated with these changes, page XIV of the TS Index is proposed to be revised accordingly.

SYSTEMS, COMPONENTS, AND ACTIVITIES AFFECTED:

The proposed changes would allow the use of spent fuel racks in the cask pit area. The use of this expanded spent fuel storage capability affects the fuel handling area of the auxiliary building from a seismic/structural standpoint, as well as the spent fuel pool cooling system and decay heat removal system (when used for spent fuel pool cooling) from a thermal-hydraulics standpoint. The fuel handling area ventilation system is also affected, as are activities relating to the proper storage and handling of fuel assemblies.

FUNCTIONS OF THE AFFECTED SYSTEMS, COMPONENTS, AND ACTIVITIES:

The spent fuel storage pool and the cask pit are located within the fuel handling and storage area of the auxiliary building, which is a reinforced concrete structure. The auxiliary building is a Seismic Class I structure which is designed to withstand seismic, tornado, and thermal loads, as discussed in DBNPS Updated Safety Analysis Report (USAR) Sections 3.7, "Seismic Design," and 3.8, "Design of Seismic Class I and Class II Structures". The spent fuel storage racks are also Seismic Class I structures which are designed to withstand seismic loadings.

The functions of the spent fuel pool are to support the spent fuel pool racks and retain the spent fuel pool coolant during normal operations and abnormal conditions. Spent fuel storage is described in USAR Section 9.1.2, "Spent Fuel Storage". The spent fuel pool is a reinforced-concrete pool lined with stainless steel. The pool is currently sized to store 735 irradiated fuel assemblies. The spent fuel storage cells are installed in parallel rows with center-to-center spacing of 12-31/32 inches in one direction, and 13-3/16 inches in the other direction. Each cell consists of a 9 inch square stainless steel can. The water gap between the stainless steel cans produces what is known as a "flux trap." The "flux trap" construction is sufficient to maintain a k_{eff} of 0.95 or less for spent fuel of initial enrichment of 3.56 wt% U-235 or less, assuming the storage racks are flooded with unborated water. Higher enrichment spent fuel assemblies must be stored in a checkerboard pattern, taking into account fuel burnup, to maintain a k_{eff} of 0.95 or less. A hole in the bottom of each spent fuel storage cell allows coolant to flow up through the seated fuel assemblies.

The cask pit is independent of, and separated from, the spent fuel pool by a 3-foot-thick concrete wall. The cask pit currently provides for the transfer of the spent fuel assemblies from storage to a shipping cask or dry fuel storage canister. The only communication between the spent fuel pool and the cask pit is through a 36-inch-wide slot opening. This opening is provided with a watertight bulkhead that can isolate the spent fuel pool when needed. The floor of the cask pit is approximately 6.5 feet lower than the floor of the SFP.

All spent fuel assembly transfer operations are normally conducted under a minimum of 9-1/2 feet of borated water above the top of the active fuel to ensure adequate biological shielding. The SFP and cask pit are protected against inadvertent draining. The spent fuel pool cooling suction is more than 9 feet above the top of fuel assemblies stored in the racks. The spent fuel pool cooling discharge piping continues down to near the bottom of the SFP, after entering the pool at the same elevation as the suction. The discharge piping includes a half-inch diameter anti-siphon hole. Drain lines from the SFP, cask pit, and fuel transfer canal are isolated via locked closed valves. Operation of locked valves is subject to administrative controls. In addition, low SFP level and radiation monitor alarms in the control room provide early warning in the event of a loss of SFP inventory.

The spent fuel pool water is cooled by the spent fuel pool cooling system, as discussed in USAR Section 9.1.3, "Spent Fuel Pool Cooling and Cleanup System". The spent fuel pool cooling system is shown in USAR Figure 9.1-5. It consists of two, half-capacity recirculating pumps and two, half-capacity heat exchangers, associated valves, piping and instruments. The spent fuel pool cooling system is currently designed to maintain the borated spent fuel pool water at 125 °F or less with a partial core discharge heat load of 12.4×10^6 Btu/hr. If it becomes necessary to off-load an entire core into the spent fuel pool, cooling can be provided by the decay heat removal system, which has a higher heat removal capacity. One decay heat removal train alone is capable of maintaining the spent fuel pool temperature at 147 °F or less with a heat load of 30.0×10^6 Btu/hr. The decay heat removal system, which is described in USAR Section 6.3, "Emergency Core Cooling System," also serves as a Seismic Class I backup system to the spent fuel pool cooling system.

The spent fuel pool cooling system components are operated to maintain the pool temperature less than 140 °F. The component cooling water system provides cooling to the spent fuel pool heat exchangers. The combinations of pumps and heat exchangers utilized is dependent on the component cooling water system temperature.

There are alarms provided for the spent fuel pool cooling system to indicate high or low spent fuel pool water level. The low level alarm assures a minimum of 23 feet of water is maintained above the fuel assemblies. The high level alarm is provided to prevent overfill. The spent fuel pool water is maintained at a normal level of Elevation 601 feet 6 inches. The setpoints of the high and low level alarms are Elevations 601 feet 7 inches and 601 feet 2 inches, respectively. The spent fuel pool water temperature is also monitored, and a high temperature alarm is provided. Operator action is required in the event of these alarms. Plant procedures provide guidance to mitigate the condition.

In addition to its primary function, the spent fuel pool cooling and cleanup system provides purification by removing fission and corrosion products in the spent fuel pool water, the fuel transfer canal water, and the contents of the borated water storage tank. The spent fuel pool pumps take suction from the spent fuel pool and recirculate the water back to the pool after it passes through the spent fuel pool heat exchangers, and the demineralizer and/or filter in various combinations, as required.

The fuel handling area ventilation system is described in USAR Section 9.4.2.2, "Fuel-Handling Area." The system is designed to provide an average of 20 air changes per hour over the surface of the spent fuel pool, and to maintain the fuel handling area at between 60 and 110 °F. The ventilation flow for the fuel handling and storage area housing the spent fuel pool and cask pit is normally exhausted to the environment through the station vent stack. Exhaust air from the fuel-handling area is monitored by radiation detectors before it is discharged from the station through the vent stack. In the event of a fuel handling accident, the emergency ventilation system (EVS) is automatically started and charcoal filters are utilized to filter exhaust air from the fuel handling area, via interconnections.

The design of the spent fuel cask crane prevents crane travel over fuel assemblies in the spent fuel pool. Travel of the cask crane is prevented by an electrical interlocking device which restricts crane movement past the cask pit.

EFFECTS ON SAFETY:

The "Design and Licensing Report, Davis-Besse Unit 1 Cask Pit Rack Installation Project," Holtec International (Reference 4), provides the technical basis for the proposed changes to the Technical Specifications.

Summary of Technical Evaluation

General

The cask pit area will ultimately include four spent fuel rack modules, containing a total of 289 storage locations. The rack modules are freestanding and self-supporting. The principle construction materials for the racks are ASME SA240-Type 304 stainless steel and plate stock, and ASME SA564-630 precipitation-hardened stainless steel for the adjustable pedestals. The only non-stainless material utilized in the rack is the neutron absorber material, which is a boron carbide and aluminum-composite sandwich available under the patented product name "Boral™". Boral is chemically inert and has been used in many applications in nuclear unit spent fuel pool environments. Tables 3.3.1 and 3.3.2 of Reference 4 provide a listing of nuclear units that have previously used Boral in spent fuel storage rack applications.

Additional details regarding the design and construction of the cask pit spent fuel racks are provided in Reference 4. Section 2.0 of Reference 4 provides an overview of the new racks, including a detailed description of the rack module geometry and construction. As described in Section 3.0 of Reference 4, all materials used in the construction of the new racks are compatible with the spent fuel pool/cask pit environment.

The installation and use of the cask pit racks will be coordinated in such a way that the ability to unload a dry fuel storage canister will not be unacceptably impaired.

Criticality Safety Evaluation

Section 4.0 of Reference 4 provides details on the criticality safety evaluation. The new racks are designed to maintain the required subcriticality margin when fully loaded with the most reactive fuel authorized to be stored in the racks. The proposed TS Figure 3.9-2 provides the specific burnup/enrichment limitations for the storage rack configurations to be located in the cask pit. As shown by the proposed TS Figure 3.9-2, unirradiated fuel assemblies cannot be stored in spent fuel racks located in the cask pit.

The criticality analyses show that the maximum neutron multiplication factor, K_{eff}, is less than or equal to 0.95, including uncertainties such as the effect of changes in water temperature and density, for all normal and accident conditions.

The criticality analyses utilize conservative assumptions. The cask pit water was assumed to be at a temperature that results in the highest reactivity. In addition, no soluble poison (boron) was assumed to be present in the cask pit water under normal operating conditions. However, the misloaded fuel assembly accident and the mislocated fuel assembly accident credit soluble boron in the cask pit water to ensure that K_{eff} remains less than or equal to 0.95. The misloaded fuel assembly accident assumes that an unirradiated fuel assembly of the highest permissible enrichment is inadvertently misloaded into one of the storage cells intended for burned fuel. The mislocated fuel assembly accident assumes that an unirradiated fuel assembly of the highest permissible enrichment is inadvertently mislocated outside of a storage rack adjacent to other fuel assemblies. Administrative controls will ensure that the spent fuel pool and cask pit boron concentration is maintained at ≥ 1800 ppm during and following fuel movement, until completion of verification that no misloading has occurred.

The effects on criticality due to a dropped fuel assembly that falls across the top of already stored fuel are also described in Section 4.0 of Reference 4. The active fuel of the dropped fuel assembly remains more than 12 inches away from the active fuel in the storage rack, therefore the effect on reactivity will be insignificant and the configuration is assured to remain subcritical.

<u>Thermal-Hydraulics Evaluation</u>

There is no direct, forced cooling of the cask pit. Heat from fuel assemblies to be stored in the cask pit storage racks will be removed via the buoyancy-driven exchange of water with the SFP, through the opening between the SFP and cask pit. Administrative controls described below will ensure that the gate for this opening is open at all times that fuel assemblies are stored in the cask pit.

A comprehensive thermal-hydraulic evaluation of the spent fuel pool and cask pit was performed. The details are provided in Section 5.0 of Reference 4.

The worst case SFP conditions were determined assuming considerably more spent fuel assemblies stored in the SFP than is currently licensed, anticipating the future re-racking of the SFP. Therefore, the starting condition for the cask pit analyses is based on a worst case SFP heat load of 30.15×10^6 BTU/hr and corresponding maximum temperature. Administrative controls described below will ensure that the total decay heat load following a discharge of fuel assemblies to the SFP will not exceed that evaluated by the analyses.

All thermal-hydraulic analyses utilized present USAR-specified capabilities of the spent fuel pool cooling system and its backup, the decay heat removal system. The minimum time-to-boil and maximum boil-off rate were determined based on a loss of SFP forced cooling with the worst-case heat load and the maximum initial water temperature.

The worst-case heat load that must be rejected from the SFP will occur when fuel from the reactor is discharged to the SFP. Four discharge scenarios were analyzed:

> Scenario 1 considered a partial core discharge of 72 fuel assemblies from the reactor into a SFP that already contains 1609 previously discharged fuel assemblies with a minimum decay time of two years. Two spent fuel pool pumps

and two spent fuel pool heat exchangers were assumed to be operating.

Scenario 2 is similar to scenario 1, except that only one spent fuel pool pump and heat exchanger were assumed to be operating.

Scenario 3 considered a full core discharge of 177 fuel assemblies from the reactor into a SFP that already contains 1537 previously discharged fuel assemblies. Regarding the previously discharged fuel assemblies, two cases were run. Scenario 3A considered a minimum decay time of 65 days for the most recent batch of previously discharged fuel, and scenario 3B considered a minimum decay time of two years. Two spent fuel pool pumps and two spent fuel pool heat exchangers were assumed to be operating.

Scenario 4 is similar to scenario 3, including the two cases, except that cooling is provided by the decay heat removal system.

Cooling system alignments for scenarios 2 and 3 would not typically be used during fuel discharge operations under the most adverse conditions. For a partial core discharge, two spent fuel pumps and heat exchangers would normally be available. For a full core discharge, the decay heat removal system is available for SFP cooling, as conditions warrant. Scenarios 2 and 3 were included to demonstrate that in the event of a spent fuel pool cooling system malfunction, the bulk temperature remains below boiling for these scenarios. For scenarios 1 and 4, the acceptance criterion used for the analysis is that the pool bulk temperature remain within the limits of the American Concrete Institute (ACI) "Code Requirements for Nuclear Safety Related Concrete Structures," (Reference 6) to protect the integrity of the structure. The ACI Code permits long-term temperatures of up to 150 °F and short-term temperature excursions in localized areas up to 350 °F.

For scenario 1, the peak bulk pool temperature was determined to be approximately 133 °F, which meets the long-term acceptance criterion of 150 °F. For scenarios 2, 3A, and 3B, the peak bulk pool temperatures were determined to be approximately 169 °F, 166 °F, and 165 °F, respectively. These temperatures are substantially below the boiling point, thereby meeting the analysis acceptance criterion. For scenarios 4A and 4B, the peak bulk pool temperatures were determined to be approximately 151.5 °F and 150.7 °F, respectively. Although these bulk temperatures are slightly above the long-term limit of 150 °F, the time for which the limit will be exceeded is less than 28 hours for both scenarios. Since the ACI Code allows short-term temperature excursions as high as 350 °F, the calculated results are acceptable.

The evaluation of the effects of a complete failure of the forced cooling systems, which is assumed to occur with the SFP bulk temperature at a maximum, shows that there would be at least 10.42 hours available, prior to the beginning of bulk boiling, for corrective actions to restore cooling for the partial core discharge scenario (scenario 1), and at least 3.78 hours for the most limiting full core discharge scenario (scenario 4A). As previously noted, scenarios 2 and 3 were not included in this evaluation. The evaluation also shows that the maximum boil-off rate, should corrective actions not be successful, would be less than 35 gpm for scenario 1, and less than 70 gpm for scenario 4A. Make-up to the SFP can be provided from the borated water storage tank via the decay heat removal system, as shown in USAR Figure 9.1-6, "Spent Fuel Pool Make Up Water From Seismic Class I System." The available makeup rate exceeds the maximum 70 gpm boil-off rate. Make-up to the SFP is also available from the Seismic Class II demineralized water storage tank and clean waste receiver tanks. Low level and high temperature alarms are provided for the SFP. The minimum time of 3.78 hours to reach bulk boiling conditions in the SFP following a loss of all forced cooling is comparable to the time calculated for similar analyses in support of licensing actions for other dockets (see Reference 5, for examples). As the analyses assumed a completely re-racked and filled SFP, the analyses are conservative for the racks in the cask pit.

The maximum SFP local water temperature and maximum fuel cladding temperature were also determined, considering a full core discharge into the SFP. These temperatures were calculated to be approximately 194 °F and 230 °F, respectively. Considering the pressure due to the depth of water, the saturation temperature at the top of the spent fuel storage racks is approximately 239 °F. Therefore, the above results confirm that local boiling will not occur in the SFP.

The cask pit thermal-hydraulic analysis confirmed the adequacy of cooling the cask pit via passive, buoyancy-driven, natural convection water exchange between the cask pit and the SFP. The analysis assumed relatively old (in terms of time since removed from the core) fuel assemblies, each with a maximum heat generation rate of 873 Watts, will be stored in the cask pit. Administrative controls described below will be established to ensure that this heat generation rate limit will not be exceeded. The evaluation determined the maximum temperature of the water in the cask pit to be approximately 155.5 °F for the worst case SFP scenario (scenario 4A), which is well below the saturation temperature at the top of the cask pit racks. As described above, the maximum local water temperature and maximum fuel cladding temperature for the fuel stored in the SFP was calculated to be approximately 194 °F and 230 °F, respectively, for a delta-T of approximately 36 °F. Due to the low assumed heat generation rate of the fuel to be stored in the cask pit compared to the SFP, the delta-T between the fuel cladding temperature and the local water temperature for fuel stored in the cask pit is bounded by that for fuel stored in the SFP, and, therefore the maximum cladding temperature will be no greater than 155.5 + 36 = 191.5 °F, and local boiling will not occur in the cask pit. Although the conservatively determined cask pit water temperature of 155.5 °F exceeds the ACI long-term limit of 150 °F, the time which the limit will be exceeded is about 100 hours. Since the ACI code allows short-term temperature excursions as high as 350 °F, the calculated results are acceptable.

The requirement that the gate between the spent fuel pool and cask pit be open when fuel is stored in the cask pit, the limit on the total decay heat load following a discharge of fuel assemblies to the SFP, and the limit on the maximum heat generation rate per individual fuel assembly stored in the cask pit, will be included in the USAR Technical Requirements Manual (TRM). Future changes to the USAR TRM will be evaluated under the requirements of 10 CFR 50.59, and the NRC will be informed of these changes in accordance with the USAR update requirements of 10 CFR 50.71(e).

Structural and Seismic Evaluation

Sections 6.0 and 8.0 of Reference 4 provide details on the structural and seismic evaluation relative to the use of the spent fuel storage racks located in the cask pit. Separate cases were analyzed considering one, two, or four racks in the cask pit. The evaluation considered the loads from seismic, thermal, and mechanical forces to determine the margin of safety in the structural integrity of the fuel racks, and the structures surrounding the cask pit and pit liners.

Storage Rack Evaluation

The seismic analysis was performed using the vendor's "Whole Pool Multi-Rack" analysis methodology. The analysis was based on simulations of the Safe Shutdown Earthquake (SSE). The rack modules were analyzed as completely full, partially full and nearly empty. The fuel weight conservatively includes the additional mass of control elements considered stored integrally with every assembly.

The results indicate that the maximum seismic displacements do not result in any impacts with the pit walls or between the tops of the storage racks. Some impact forces are predicted between the baseplates of adjacent racks, but this is expected, since the racks are modeled as initially touching along the entire length of the baseplate. The resultant member and weld stresses in the racks are all below the allowable stresses. Therefore, the racks will remain functional during and after a Safe Shutdown Earthquake.

The rack analysis provides pedestal-to-bearing-pad impact loads resulting from lift-off and subsequent resettling during dynamic events. The pool floor stresses were evaluated for these impact loads and determined to remain within allowable limits even when considering the worst case pedestal location with respect to leak chases.

In addition to the seismic evaluations, the storage racks were also analyzed with respect to impact loads due to the accidental drop of a fuel assembly. This analysis is discussed in a separate section below.

In case of a stuck fuel assembly in the rack, an evaluation of the rack's ability to withstand a 500 pound uplift force was performed. The resultant load on the cell walls and welds will not affect the rack structural integrity. For a 500 pound load applied vertically along a cell wall, the resultant stress is well below the yield stress of the material. For a 500 pound load applied at a 45 degree angle to the top of a cell wall, minor tear-out at the top of the cell wall, well above the top edge of the neutron absorber material, will occur.

Pool and Fuel Handling Building Structural Evaluation

The Auxiliary Building consists of cast-in-place, monolithic, reinforced concrete interior and exterior walls, and is designed as a seismic Class I structure. The cask pit represents a small portion of the overall structure and is a cast-in-place, steel-lined, reinforced concrete pit.

The cask pit walls were analyzed using individual loads and load combinations in accordance with the DBNPS USAR, and based on the "ultimate strength" design method. The primary loads considered were:

- dead weight of the concrete structure, fully loaded racks, and the water,

- seismic inertia forces of the surrounding walls and contained water for Operating Basis Earthquake (OBE) and SSE cases,

- hydrostatic pressure force lateral to the walls,

- hydrodynamic rack-wall coupling forces applied to the lower portion of the wall and water slosh pressures on the top portion of the wall,

- thermal loads producing the largest temperature gradient across the thickness of the walls.

In addition to the loads described above, the cask pit structure and liner were also analyzed for mechanical loads under accident conditions. Analyses were also performed to ensure liner integrity. The result of the analyses performed on the cask pit indicate that under all postulated loadings, the floor slabs, cask pit walls, and cask pit liner will be subjected to stresses or strains within acceptable limits.

Fuel Handling Accidents (USAR Chapter 15)

Spent fuel assemblies are handled entirely under water. As described in USAR Section 15.4.7, "Fuel Handling Accident," mechanical damage to the fuel assemblies during fuel handling operations is possible, but improbable. An evaluation of the consequences of a fuel handling accident outside containment is provided in USAR Section 15.4.7.2, "Accident Analysis – Accident Outside Containment." This analysis assumes that the entire outer rows of fuel rods (56 of 208 rods), in a fuel assembly that has undergone 72 hours of decay time, suffers mechanical damage to the cladding. The DBNPS performed an additional calculation (Reference 8) to show that since fuel assemblies must undergo a much longer decay time (for on-site ALARA and thermal-hydraulic considerations) prior to storage in the cask pit, the present accident analysis remains bounding for fuel assemblies stored in the cask pit, even assuming that all rods in a fuel assembly suffer mechanical damage to the cladding. It is also important to note that the consequences of a fuel handling accident outside containment are bounded by the consequences of a fuel handling accident inside containment. An evaluation of the consequences of a fuel handling accident inside containment is provided in USAR

Section 15.4.7.3, "Accident Analysis – Accident Inside Containment." This analysis assumes that all rods in a fuel assembly that has undergone 72 hours of decay time suffer mechanical damage to the cladding.

Rack Structural Performance (Impact Loads)

The rack structural performance has also been analyzed with respect to impact loads due to the accidental drop of a fuel assembly during movement to a storage location. The details of the evaluations are provided in Section 7.0 of Reference 4.

In the evaluation of fuel handling accidents discussed herein, the concern is with the damage to the storage racks, and the cask pit structure. The configuration of the rack cell size, spacing, and neutron absorber material must remain consistent with the configurations used in the criticality and thermal-hydraulic evaluations. Maintaining these design configurations will ensure that the results of the criticality and thermal-hydraulic evaluations remain valid.

Two categories of fuel assembly drop accidents were evaluated, a "shallow drop" and a "deep drop":

Shallow Drop

This evaluation considers a fuel assembly, an inserted control element assembly, and the portion of the handling tool which is severable in the event of a single element failure (inner mast), dropping vertically from the highest elevation that the load can be lifted.

The first scenario considers the load striking the top of a stored fuel assembly and subsequently impacting the top of the rack module (note that the top of a stored fuel assembly extends above the top of the rack module). The results of the evaluation show that the top of the impacted rack undergoes localized deformation, however the maximum gross deformation is limited to 3 inches. Since the top of the neutron absorber begins at approximately 5.25 inches below the top of the rack cell, this is acceptable. The deformation of the fuel assemblies involved will not cause a criticality concern due to the decreased water-to-fuel ratio and associated reduction in reactivity. In addition, the greater than 1800 ppm boron concentration that is always maintained in the SFP coolant provides significant additional criticality margin.

The second scenario considers the load striking the top of an empty rack cell, causing maximum cell wall deformation. Since the rack cell is considered empty, criticality consequences need not be considered. The results of the evaluation show that although local damage to the impacted cell is significantly more extensive than for the first scenario, only approximately 50% of the cell opening in the empty impacted cell is blocked. Since the thermal-hydraulic evaluation conservatively considers 50% blockage, these results confirm that there will be adequate cooling.

Deep Drop

This evaluation also considers a fuel assembly, an inserted control element assembly, and the portion of the handling tool which is severable in the event of a single element failure (inner mast), dropping vertically from the highest elevation that the load can be lifted.

The first scenario considers the load dropping through an empty cell located above a support pedestal, which is located above a leak chase. Since the rack module baseplate is buttressed by the support pedestal and presents a hardened impact surface, this scenario results in a high impact load. The principal design objective is to ensure that the support pedestal does not cause catastrophic damage to the liner and underlying reinforced concrete pool slab, such that rapid loss of pool water occurs. The evaluation shows that the cask pit liner will not be pierced, and although the underlying concrete will experience very localized crushing, the cask pit structure will not suffer catastrophic damage.

The second scenario considers the load dropping through an empty interior cell near the center of the rack. Since the baseplate is not as stiff at cell locations away from the support pedestal, the principal design objective is to ensure that severing of the baseplate, or large deflection of the baseplate, will not cause the liner to be impacted. The distance from the baseplate to the liner is approximately 6 inches. The results of the evaluation show that there is some deformation of the baseplate, as well as localized severing of the baseplate to cell wall welds. The baseplate does not break during the impact. The resulting structural damage has no adverse effect on the coolant flow through the storage cells. Further, the maximum displacement on the baseplate is 3.36 inches, therefore the liner is not impacted. Therefore, the structural consequences are acceptable. Due to the baseplate deformation, adjacent stored fuel assemblies would be lowered, and the active fuel height of those assemblies would no longer be completely covered by the Boral. However, the results of the criticality calculations for this condition show the reactivity effect to be negligible, such that the configuration is assured to remain subcritical. The deformation of the fuel assemblies involved will not cause a criticality concern due to the decreased water-to-fuel ratio and the associated reduction in reactivity. In addition, the greater than 1800 ppm boron concentration that is always maintained in the SFP coolant provides significant additional criticality margin.

Radiological Considerations

The radiation dose rates in accessible rooms adjacent to the cask pit were evaluated, assuming fuel stored in the cask pit racks. Section 9.4 of Reference 4 provides the results of an evaluation assuming the fuel stored in the cask pit has been removed from the reactor for at least 5 years. The DBNPS performed an additional calculation (Reference 7) to further refine the evaluation to show acceptable results considering fuel removed from the reactor for at least a 3 year period. No changes to the radiation zone designations described in the USAR are required.

Administrative controls will be established to ensure that the 3 year age limitation will not be exceeded. This limitation will be included in the USAR Technical Requirements Manual (TRM). Future changes to the USAR TRM will be evaluated under the requirements of 10 CFR 50.59, and the NRC will be informed of these changes in accordance with the USAR update requirements of 10 CFR 50.71(e).

Fuel Handling Area Ventilation System Considerations

As previously discussed, the fuel handling area ventilation system is designed to provide an average of 20 air changes per hour over the surface of the spent fuel pool, and to maintain the fuel handling area between 60 and 110° F. An evaluation of the fuel handling area ventilation was performed for the maximum SFP bulk temperature condition, which is based on the most limiting full core discharge scenario (scenario 4A). The building air temperature in the vicinity of the spent fuel pool and cask pit will be maintained less than or equal to 110° F, therefore the environmental qualification of essential equipment in the fuel handling building will not be affected.

Spent Fuel Cask Crane Travel Considerations

As previously discussed, the spent fuel cask crane is electrically interlocked to prevent travel of the cask crane over fuel assemblies in the spent fuel pool. The spent fuel cask crane interlock to limit crane travel will be modified to prevent crane travel over the cask pit.

Proposed Technical Specification Changes

TS 3/4.9.7 Refueling Operations - Crane Travel - Fuel Handling Building, and Related Bases

The proposed changes to LCO 3.9.7, its Applicability statement, and Surveillance Requirement 4.9.7 provide the cask pit fuel storage configuration with the same crane travel restriction as that currently in place for fuel assemblies stored in the spent fuel pool. As such, these changes will have no adverse effect on nuclear safety.

The proposed Bases change is related to the proposed changes to the associated LCO, and clarifies the accident analyses assumptions, and is an administrative change that will have no adverse effect on nuclear safety.

TS 3/4.9.11 Refueling Operations - Storage Pool Water Level

The proposed changes to LCO 3.9.11, its Applicability statement, and Surveillance Requirement 4.9.11 provide the same storage pool water level restriction for the cask pit as that currently in place for irradiated fuel assemblies stored in the spent fuel pool. As stated in the associated Bases, the water level restriction ensures that sufficient water depth is available to remove 99% of the assumed 10% gap iodine activity released from the rupture of an irradiated fuel assembly.

It is noted that with the gate between the spent fuel pool and cask pit open at all times while fuel is located within the cask pit, the water surface level in the spent fuel pool and cask pit will be the same. In addition, since the floor elevation of the cask pit is lower than that of the spent fuel pool, fuel stored in the cask pit will be at a lower elevation than fuel stored in the spent fuel pool by approximately 6.5 feet, and thus the current water level requirement for the spent fuel pool is more limiting. As such, these changes will have no adverse effect on nuclear safety.

TS 3/4.9.12 Refueling Operations - Storage Pool Ventilation

The proposed changes to LCO 3.9.12, and its Applicability and Action statements extend the same requirements regarding storage pool ventilation to irradiated fuel located within the cask pit. As stated in the associated Bases, the storage pool ventilation requirements ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. As such, these changes will have no adverse effect on nuclear safety.

TS 3/4.9.13 Refueling Operations - Spent Fuel Pool Fuel Assembly Storage, and Related Bases

The proposed changes to the title of TS Section 3/4.9.13 and associated Bases 3/4.9.13, and corresponding changes to TS Index pages VIII and XIII are administrative changes and will have no adverse effect on nuclear safety.

The other proposed changes to LCO 3.9.13, its Applicability and Action statements, and Surveillance Requirement 4.9.13.1 apply the appropriate restrictions to fuel assemblies stored in the cask pit. As stated in the associated Bases, the restrictions regarding fuel assembly storage are consistent with the criticality safety analyses performed for the spent fuel storage racks in the spent fuel pool and cask pit. As such, these changes will have no adverse effect on nuclear safety.

The proposed change to the title of Figure 3.9-1 clarifies that this Figure does not apply to the cask pit storage racks. This is an administrative change that will have no adverse effect on nuclear safety.

The proposed addition of Figure 3.9-2, "Burnup vs. Enrichment Curve For Davis-Besse Cask Pit Storage Racks" provides specific burnup/enrichment limitations appropriate for the spent fuel storage rack configurations located in the cask pit, consistent with the criticality safety analyses performed. As such, this proposed change will have no adverse effect on nuclear safety.

The same rigorous controls presently applied to fuel movements in the spent fuel pool will also be applied to fuel movements in the cask pit, to ensure that the basis for TS 3.9.13 will be preserved. These controls include:

- Preparation and independent review of all fuel movement sheets for compliance with TS 3.9.13 by the Nuclear Engineering Unit.

- Reactor Engineering oversight of Operations during all fuel movements.

- Independent verification of refueling device (bridge, crane, etc.) location prior to fuel assembly placement or retrieval in the spent fuel storage racks.

- Visual verification that the spent fuel storage rack loading pattern for those assemblies moved complies with TS 3.9.13 within 30 days of any fuel movement in the spent fuel storage racks.

- Chemistry verification every 72 hours that the spent fuel pool/cask pit boron concentration is at least 1800 ppm during fuel movements in the spent fuel pool and cask pit, and until the spent fuel storage rack loading pattern verification is performed.

The proposed Bases change is related to the proposed changes to the associated LCO, and is an administrative change that will have no adverse effect on nuclear safety.

<u>TS 5.6 Design Features - Fuel Storage</u>

The proposed revision of TS 5.6.1.1, clarifying that this section applies to the spent fuel racks located in the spent fuel pool, is an administrative change and will have no adverse effect on nuclear safety.

The proposed addition of TS 5.6.1.3, describing the criticality design features for the cask pit racks, places restrictions for the design and maintenance of these racks in the TS. These restrictions ensure that the evaluations in Reference 4 remain valid and, thus, will have no adverse effect on nuclear safety.

The proposed change to TS 5.6.2 to include the cask pit as a fuel storage area, creates a new requirement to ensure the cask pit, similar to the spent fuel storage pool, does not inadvertently drain below 9 feet above the top of the fuel storage racks. This requirement ensures that the evaluations in Reference 4 remain valid and, thus, will have no adverse effect on nuclear safety.

The proposed change to TS 5.6.3 to include a description of the storage capacity of the cask pit fuel storage racks, similar to the spent fuel storage racks, creates a limit on the number of fuel assemblies stored in the cask pit. This requirement ensures that the evaluations in Reference 4 remain valid and, thus, will have no adverse effect on nuclear safety.

The proposed changes to TS Index page XIV are administrative changes related to the above-mentioned proposed changes, and will have no adverse effect on nuclear safety.

Conclusion

Based on the technical basis described in Reference 4, as summarized above, and based on the above evaluation of each individually proposed TS change, it is concluded that the use of the expanded spent fuel storage capacity resulting from installation of four rack modules in the cask pit area adjacent to the spent fuel pool will have no adverse effect on nuclear safety.

SIGNIFICANT HAZARDS CONSIDERATION:

The Nuclear Regulatory Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazard exists due to a proposed amendment to an Operating License for a facility. A proposed amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed changes would: (1) Not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) Not create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Not involve a significant reduction in a margin of safety. The Davis-Besse Nuclear Power Station (DBNPS) has reviewed the proposed changes and determined that a significant hazards consideration does not exist because operation of the Davis-Besse Nuclear Power Station, Unit No. 1, in accordance with these changes would:

1a. Not involve a significant increase in the probability of an accident previously evaluated because the activities performed in and around the spent fuel pool and cask pit will not be significantly changed due to the use of spent fuel racks installed in the cask pit area.

In the analysis of the safety issues concerning the expanded spent fuel storage capacity, the following previously postulated accident scenarios have been considered:

- Misloaded or Mislocated Fuel Assembly
- Seismic Event
- Fuel Handling Accident

In addition, spent fuel cask crane travel and the effects of a loss of spent fuel pool cooling have been evaluated.

The proposed Technical Specification (TS) changes have no bearing on the probability of a seismic event or the probability of a loss of spent fuel pool cooling.

The probability of a fuel handling accident is primarily a function of fuel handling equipment reliability and fuel handling procedures. The probability of inadvertent misloading or mislocation of a fuel assembly is primarily a function of fuel handling procedures. Since the methods and procedures for handling fuel assemblies will not be significantly changed under the proposed TS changes, there will be no significant increase in the probability of these events.

Ib. Not involve a significant increase in the consequences of an accident previously evaluated because evaluations for each postulated accident have shown that the consequences remain bounded by the consequences from the previously evaluated accidents.

In the analysis of the safety issues concerning the expanded spent fuel storage capacity, the following previously postulated accident scenarios have been considered:

- Misloaded or Mislocated Fuel Assembly
- Seismic Event
- Fuel Handling Accident

In addition, spent fuel cask crane travel and the effects of a loss of spent fuel pool cooling have been evaluated.

The criticality analyses for the spent fuel storage racks located in the cask pit require burnup/enrichment limitations similar to those currently in place for the spent fuel pool. These burnup/enrichment limitations are imposed by the proposed changes to TS 3/4.9.13, Refueling Operations – Spent Fuel Pool Fuel Assembly Storage. The criticality evaluation for the cask pit racks shows that if an unirradiated fuel assembly of the highest permissible enrichment is placed in an unauthorized storage cell or mislocated outside a storage rack, K_{eff} will be maintained ≤ 0.95, taking credit for soluble boron in the cask pit water. Therefore, there will be no radiological consequences.

The evaluation of a loss of spent fuel pool cooling shows that sufficient time will be available, before the onset of pool boiling, to restore cooling or to provide a source of makeup water. Therefore, the racks will remain submerged and fuel stored therein will remain sufficiently cooled, and there will be no adverse consequences due to the proposed changes.

The results of the seismic evaluation demonstrate that the cask pit racks will remain intact and that the structural capability of the pool and liner will not be exceeded. The Auxiliary Building structure will remain intact during a seismic event and will continue to adequately support and protect the fuel racks and pool water inventory, therefore, the rack geometry and cooling to the fuel will be maintained. Thus, there will be no adverse consequences due to the proposed changes.

The results of the fuel handling mechanical accident evaluation and criticality evaluation show that the minimum subcriticality margin, K_{eff} less than or equal to 0.95, will be maintained and cooling will remain adequate. In addition, the analyses show that the cask pit liner will not be pierced, and although the underlying concrete could experience local crushing, the cask pit structure will not suffer catastrophic damage. The radiological dose resulting from the release caused by a fuel handling accident will not be increased from that previously considered.

The spent fuel cask crane travel interlocking design features were evaluated.

Modification of the interlocking device to further restrict crane travel from over the cask pit maintains the same restriction of movement of loads over stored fuel that currently exists for the spent fuel pool.

2. Not create the possibility of a new or different kind of accident from any accident previously evaluated because the function and parameters of the components and the associated activities necessary to support safe storage of fuel assemblies in the cask pit are similar to those presently in place. The methods and procedures for handling fuel assemblies would not be significantly changed. Therefore, the list of postulated accidents remains unchanged.

   Any event which would modify parameters important to safe fuel storage 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 a new or different accident. The fuel storage configuration and the existence of the coolant are the parameters that are important to safe fuel storage. The proposed changes do not alter the operating requirements of the plant or of the equipment credited in the mitigation of the design basis accidents, nor do they affect the important parameters required to ensure safe fuel storage. Therefore, the potential for a new or previously unanalyzed accident is not created.

3. Not involve a significant reduction in a margin of safety because for the proposed changes, appropriate evaluations have shown compliance with stipulated safety margins.

   The objective of spent fuel storage is to store the fuel assemblies in a subcritical and coolable configuration through all environmental and abnormal loadings, such as a seismic event or a fuel handling accident. The design of the spent fuel racks located in the cask pit meets all applicable requirements for safe fuel storage. The seismic and structural design of the racks preserves the proper margin of safety during normal and abnormal loads. The methodology used in the criticality analysis meets the applicable regulatory guidance. The thermal-hydraulic evaluation of the pool demonstrates that the cask pit will be maintained below the specified thermal limits under the conditions of the maximum heat load and during all credible malfunction scenarios and seismic events. Upon the unlikely event of a complete loss of spent fuel pool cooling, sufficient time will be available, before the onset of pool boiling, to restore cooling or to provide a source of makeup water. Therefore, the racks will remain submerged and fuel stored therein will remain sufficiently cooled. In addition, the results of the fuel handling accident evaluation show that the minimum subcriticality margin will be maintained, cooling will remain adequate, the cask pit structure will not suffer catastrophic damage, and the radiological dose resulting from the release caused by a fuel handling accident will not be increased from that previously considered.

   Thus, it is concluded that the proposed changes do not involve a significant reduction in the margin of safety.

CONCLUSION:

On the basis of the above, the Davis-Besse Nuclear Power Station has determined that the License Amendment Request does not involve a significant hazards consideration. As this License Amendment Request concerns a proposed change to the Technical Specifications that must be reviewed by the Nuclear Regulatory Commission, this License Amendment Request does not constitute an unreviewed safety question.

ATTACHMENT:

Attached a. , the proposed marked-up changes to the Operating License.

REFERENCES:

1. DBNPS Operating License NPF-3, Appendix A Technical Specifications through Amendment 230.

2. DBNPS Updated Safety Analysis Report through Revision 21.

3. 10 CFR 50.59, "Changes, Tests, and Experiments."

4. "Design and Licensing Report, Davis-Besse Unit 1 Cask Pit Rack Installation Project," Holtec International, Revision 2.

5. "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 167 to Facility Operating License No. DPR-77 and Amendment No. 157 to Facility Operating License No. DPR-79, Tennessee Valley Authority, Sequoyah Nuclear Plant, Units 1 and 2, Docket Nos. 50-327 and 50-328," dated April 28, 1993 (TAC Nos. M83068 and M83069).

6. American Concrete Institute (ACI) 349-85 and 349R-85, "Code Requirements for Nuclear Safety Related Concrete Structures and Commentary."

7. DBNPS Calculation No. C-NRE-062.02.104, "Dose Rates From Cask Pit Rack Inventory," Revision 0.

8. DBNPS Calculation No. C-NRE-062.02.106, "FA Drop-In-Cask-Pit-Rack Dose Consequence," Revision 0.

COMMITMENT LIST

THE FOLLOWING LIST IDENTIFIES THOSE ACTIONS COMMITTED TO BY DAVIS-BESSE NUCLEAR POWER STATION IN THIS DOCUMENT. ANY OTHER ACTIONS DISCUSSED IN THE SUBMITTAL REPRESENT INTENDED OR PLANNED ACTIONS BY DAVIS-BESSE. THEY ARE DESCRIBED ONLY AS INFORMATION AND ARE NOT REGULATORY COMMITMENTS. PLEASE NOTIFY THE MANAGER – REGULATORY AFFAIRS (419-321-8466) AT DAVIS-BESSE OF ANY QUESTIONS REGARDING THIS DOCUMENT OR ANY ASSOCIATED REGULATORY COMMITMENTS.

COMMITMENTS	**DUE DATE**
1. Administrative controls will ensure that the spent fuel pool and cask pit boron concentration is maintained at ≥ 1800 ppm during and following fuel movement, until completion of verification that no misloading has occurred.	1. Prior to storage of spent fuel assemblies in the cask pit.
2. There is no direct, forced cooling of the cask pit. Heat from fuel assemblies to be stored in the cask pit storage racks will be removed via the buoyancy-driven exchange of water with the SFP, through the opening between the SFP and cask pit. Administrative controls described below will ensure that the gate for this opening is open at all times that fuel assemblies are stored in the cask pit.	2. Prior to storage of spent fuel assemblies in the cask pit.
3. Therefore, the starting condition for the cask pit analyses is based on a worst case SFP heat load of 30.15×10^6 BTU/hr and corresponding maximum temperature. Administrative controls described below will ensure that the total decay heat load following a discharge of fuel assemblies to the SFP will not exceed that evaluated by the analyses.	3. Prior to storage of spent fuel assemblies in the cask pit.

COMMITMENTS	DUE DATE
4. The analysis assumed relatively old (in terms of time since removed from the core) fuel assemblies, each with a maximum heat generation rate of 873 Watts, will be stored in the cask pit. Administrative controls described below will be established to ensure that this heat generation rate limit will not be exceeded.	4. Prior to storage of spent fuel assemblies in the cask pit.
5. The requirement that the gate between the spent fuel pool and cask pit be open when fuel is stored in the cask pit, the limit on the total decay heat load following a discharge of fuel assemblies to the SFP, and the limit on the maximum heat generation rate per individual fuel assembly stored in the cask pit, will be included in the USAR Technical Requirements Manual (TRM).	5. Prior to storage of spent fuel assemblies in the cask pit.
6. The DBNPS performed an additional calculation (Reference 7) to further refine the evaluation to show acceptable results considering fuel removed from the reactor for at least a 3 year period…Administrative controls will be established to ensure that the 3 year age limitation will not be exceeded. This limitation will be included in the USAR Technical Requirements Manual (TRM).	6. Prior to storage of spent fuel assemblies in the cask pit.
7. The spent fuel cask crane interlock to limit crane travel will be modified to prevent crane travel over the cask pit.	7. Prior to storage of spent fuel assemblies in the cask pit.

COMMITMENTS	DUE DATE
8. The same rigorous controls presently applied to fuel movements in the spent fuel pool will also be applied to fuel movements in the cask pit, to ensure that the basis for TS 3.9.13 will be preserved. These controls include: - Preparation and independent review of all fuel movement sheets for compliance with TS 3.9.13 by the Nuclear Engineering Unit. - Reactor Engineering oversight of Operations during all fuel movements. - Independent verification of refueling device (bridge, crane, etc.) location prior to fuel assembly placement or retrieval in the spent fuel storage racks. - Visual verification that the spent fuel storage rack loading pattern for those assemblies moved complies with TS 3.9.13 within 30 days of any fuel movement in the spent fuel storage racks. - Chemistry verification every 72 hours that the spent fuel pool/cask pit boron concentration is at least 1800 ppm during fuel movements in the spent fuel pool and cask pit, and until the spent fuel storage rack loading pattern verification is performed.	8. Prior to storage of spent fuel assemblies in the cask pit.