November 27, 2001

Mr. J. V. Parrish
Chief Executive Officer
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P.O. Box 968 (Mail Drop 1023)
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION - CORRECTION TO SAFETY EVALUATION FOR AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. NPF-21 (TAC NO. MB0573)

Dear Mr. Parrish:

On October 26, 2001, the Commission issued Amendment No. 174 to Facility Operating License No. NPF-21 for the Columbia Generating Station. The amendment consisted of changes to the Final Safety Analysis Report (FSAR) in response to your application dated October 30, 2000, as supplemented by letter dated September 13, 2001.

The amendment modified the FSAR to reflect analysis of a HI-STORM 100 spent fuel cask system, spent fuel pool description and crane operations. Subsequent to the issuance of the amendment, errors were identified in the safety evaluation (SE) which was issued with the amendment. The errors include the use of "break" versus "brake," K_{eff} identified as ".095" versus “0.95," the Hi STORM spent fuel cask system loaded weight stated as "100 tons" versus "125 tons," and the cask storage capacity as "24" versus "68" fuel bundles, and the description of the cask loading area. Notwithstanding these errors, the conclusion of the SE regarding the acceptability of the proposed changes to the FSAR is unaffected. Accordingly, corrected pages 5, 7 and 8 of the SE are enclosed with this letter. We apologize for any inconvenience this may have caused.

Sincerely,

/RA/

Jack Cushing, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure: Pages 5, 7 and 8 of SE

cc w/encl: See next page

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(2) A 15 percent margin was not added to the loadings for wear susceptible parts as recommended in Section 2.2 of NUREG-0554.

The reason for the 15 percent margin for wear of susceptible parts is to ensure that wear to the crane will not result in the crane capacity dropping below its maximum critical load. The licensee evaluated the wear susceptible components of the main hoist and demonstrated that a 15 percent margin exists. In addition, the crane is subjected to reduced wear due to the crane being located inside. The staff finds this meets the NUREG-0554 criterion and is therefore acceptable.

(3) The maximum load (static and dynamic) exceeds 10 percent of the manufacturer's published breaking strength of each wire rope in the dual reeving system, contrary to what is recommended in Section 4.1 of NUREG-0554.

The maximum load on each wire is approximately 11 percent of the manufacturer's published breaking strength giving a 9 to 1 safety factor. The crane design compensates by limiting the wire line speed to 34.5 feet per minute (fpm) instead of the NUREG-0554 allowed 50 fpm. By reducing the wire speed the inertia forces are reduced on the wire. The staff finds the 11 percent maximum load on the wire in conjunction with the reduction in wire speed meets the intent of the NUREG-0554 criterion and is therefore acceptable.

(4) The hoist design speed is 5.5 fpm, 10 percent faster than the CMAA #70 recommended "slow" speed as required in Section 4.4 of NUREG-0554.

Each of the redundant hoists on the reactor building crane has an internal mechanical load brake to prevent the lifted load from overhauling the motor and to limit the effects from a rope spin off. This internal brake provides defense-in-depth and thereby compensates for the higher hoisting speed. The staff finds the 5.5 fpm along with the defense-in-depth provided by the mechanical load brake meets the intent of the NUREG-0554 criterion and is therefore acceptable.

(5) Safe load paths and administrative controls will be used instead of interlocks as recommended in Section 6.2 of NUREG-0554.

The interlocks recommended in Section 6.2 prevent bridge and trolley movement when a fuel assembly is being hoisted free of the reactor vessel or fuel racks. The purpose of these interlocks are to prevent damage to a fuel assembly when its lateral movement is confined by the fuel racks or other assemblies in the reactor vessel. Since the reactor building crane is lifting casks and not fuel assemblies constrained in lateral movement by fuel racks these interlocks are not necessary. The staff finds this NUREG-0554 criterion does not apply to the reactor building crane and therefore the reactor building crane does not have to meet this criterion.

(6) The equalizer bar was designed to absorb the energy of a load shift should failure of one wire rope or one of the dual reeving systems occur, however, it was not designed to stop the hoisting movement during the failure as required in Section 6.3 of NUREG-0554.

being sufficiently redundant to preclude failure of any single component that could result in a dropped cask, acceptable.

3.2 Limitations on the Reactor Building Crane Travel

The FSAR states that limitations on reactor building crane travel preclude transporting the spent fuel casks over the spent fuel pool. There are no interlocks that prevent crane movement over the spent fuel cask pit loading area, which is part of the spent fuel pool. There are interlocks that prevent movement over the spent fuel racks. The proposed change is to add the statement to the FSAR that "Interlocks on the reactor building crane prevent travel over the spent fuel racks."

In Section 9.1.5 of NUREG-0892, Supplement 4, the staff concluded that the guidelines in NUREG-0612 had been met, indicating that in the event of a cask drop, any resulting consequences would be maintained below the following acceptable limits: (1) damage to spent fuel sufficient to cause a release of radioactive material to produce doses that exceed 1/4 of Part 100 limits; (2) damage to fuel and fuel storage racks does not result in a change in configuration such that the K_{eff} is larger than 0.95; and (3) damage to the spent fuel pool is limited so as to not result in water leakage that uncovers the fuel.

The staff believes that the proposed change to specify that crane travel is restricted from travel over spent fuel racks rather than over the spent fuel pool is less conservative. Therefore, a potential cask drop over the SFP could result in damage to the SFP and lead to water leakage that uncovers the fuel in the pool. However, the licensee states that its use of the crane will preclude a cask drop because the reactor building crane is single failure proof.

The staff finds the proposed change to be acceptable on the basis that the licensee has a highly reliable single-failure-proof crane in the load handling facilities, and therefore, the potential for a cask drop that could result in exceeding the limits discussed above would be precluded.

3.3 Safe Load Path - Movement of Spent Fuel Cask Over Safety-Related Equipment

The FSAR states that the safe load path for the cask does not involve any travel over safety-related equipment. The licensee states that because the actual load path is over safety-related electrical conduit associated with the fuel pool cooling system, the FSAR will be changed to state that "at no time while being transported does the cask pass over any safe shutdown equipment."

The staff evaluated the respective FSAR descriptions and proposed revisions and finds that the proposed change does not alter the objectives of the licensee's heavy loads program which is to assure that accidental dropping of a heavy load will be limited so as not to result in loss of required safe shutdown functions.

3.4 General Electric Cask (GE IF-300) vs. Holtec HI-STORM 100 Spent Fuel Cask System

The licensee plans to use the HI-STORM 100 spent fuel cask system instead of the General Electric (GE IF-300) cask, as analyzed in the FSAR, to remove spent fuel from the pool. The GE IF-300 cask is an NRC-licensed lead-shielded cask used to ship spent fuel from the nuclear power plant to a fuel processing plant. The HI-STORM 100 spent fuel cask is an NRC-approved fuel storage cask under 10 CFR Part 72.214. It is to be used as part of the HI-STORM 100 spent fuel cask system to facilitate onsite transfer and storage of spent fuel. There are significant physical differences between the GE IF-300 and the HI-STORM spent fuel casks. The GE IF-300 cask is 17.5 feet long x 7.5 feet in diameter and has a loaded weight of 80 tons when fully loaded with 18 BWR irradiated fuel bundles. The HI-STORM 100 spent fuel cask system consists of an overpack and a spent fuel storage cask or multipurpose canister (MPC) and is specifically designed to facilitate transfer of spent fuel stored in the MPC to an onsite storage facility such as an independent spent fuel storage installation (ISFSI). The loaded MPC is moved from the spent fuel cask loading area which is separated from the spent fuel racks by a concrete wall. Then the MPC is moved to the ISFSI. The total bounding weight of the HI-STORM spent fuel cask system with the loaded MPC is 125 tons. A fully loaded MPC stores 68 BWR irradiated fuel bundles.

Section 9.1.4.2.1 of the FSAR states that the dry cask storage and cask handling facilities are designed based on a weight of 125 tons and the reactor building crane is designed to a rated load of 125 tons. Accordingly, the reactor building crane is designed to handle all loads up to its 125-ton rated capacity. As a result, for all loads up to and including 125 tons, the stresses on the crane should not exceed the allowable working stresses. Therefore, the crane and other cask handling facilities (i.e., the lifting devices) have the design capacity to handle casks that are larger than the GE IF-300 (approximately 80 tons fully loaded) up to a rated load of 125 tons.

Based on the above discussion, the staff finds the proposed change acceptable because the design of the crane and other cask handling devices enables the licensee to handle casks larger than the GE IF-300 such as the HI-STORM spent fuel cask and still meet the guidelines of NUREG-0612.

Based on the preceding discussions, the staff finds that the aforementioned considerations for the movement of heavy loads to support the proposed changes to the FSAR are acceptable. The proposed changes to the FSAR to (1) better describe the spent fuel pool; (2) limit the restriction on crane travel to over fuel in the SFP racks; and (3) to specify the load path for movement of the spent fuel cask will help to maintain safety during the cask movement operation in accordance with NUREG-0612. The licensee's other change in the FSAR to use the HI-STORM spent fuel cask instead of the GE-IF 300 spent fuel cask is acceptable because the 125-ton reactor building single failure proof crane and other load handling facilities are designed to handle loads up to a rated load of 125 tons and still meet the guidelines of NUREG-0612.