Docket file

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 15, 1994

Docket No. 50-354

Mr. Steven E. Miltenberger
Vice President and Chief Nuclear
Officer
Public Service Electric & Gas
Company
Post Office Box 236
Hancocks Bridge, New Jersey 08038

Dear Mr. Miltenberger:

SUBJECT: ULTIMATE HEAT SINK TEMPERATURE CHANGES, HOPE CREEK GENERATING STATION (TAC NO. M86307)

The Commission has issued the enclosed Amendment No. 68 to Facility Operating License No. NPF-57 for the Hope Creek Generating Station. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 23, 1993, and supplemented by letters dated November 10, 1993 and January 13, 1994.

This amendment request proposes decreasing the maximum allowable value of average river temperature from 90.5°F to 88.6°F; revising the action statement associated with the limiting condition for operation to permit continued normal operation for a period of 6 hours with the average river temperature in excess of 88.6°F, but at or below 89.9°F, provided that both loops of the station service water system (SSWS) and safety auxiliary cooling system (SACS) are verified to be operable; increasing the required frequency of monitoring average river temperature when the river temperature is above 85°F from once every 6 hours to once every 2 hours; and revising the bases associated with the Ultimate Heat Sink TS.

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A copy of our safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

You are requested to inform the NRC, in writing, when this amendment has been implemented.

Sincerely,

/S/

James C. Stone, Senior Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 68 to License No. NPF-57
2. Safety Evaluation

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PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-354

HOPE CREEK GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.68
License No. NPF-57

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for amendment filed by the Public Service Electric & Gas Company (PSE&G) dated April 23, 1993, and supplemented by letters dated November 10, 1993 and January 13, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-57 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 68 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into the license. PSE&G shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Charles L. Miller

Charles L. Miller, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 15, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 68

FACILITY OPERATING LICENSE NO. NPF-57

DOCKET NO. 50-354

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change. Overleaf pages provided to maintain document completeness.*

Remove	Insert
xix	xix*
xx	xx
3/4 7-5	3/4 7-5
3/4 7-6	3/4 7-6*
B 3/4 7-1	B 3/4 7-1
-	B 3/4 7-1a
-	B 3/4 7-1b
B 3/4 7-2	B 3/4 7-2*

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BASES

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BASES

ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.1.3 The ultimate heat sink (Delaware River) shall be OPERABLE with:

a. A minimum river water level at or above elevation -13'0 Mean Sea Level, USGS datum (76'0 PSE&G datum), and

b. An average river water temperature of less than or equal to 88.6°F.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, 5 and *.

ACTION:

With the river water temperature in excess of 88.6°F, but at or below 89.9°F, continued plant operation is permitted for 6 hours provided that both loops of SACS/SSWS are verified to be OPERABLE; otherwise, with the requirements of the above specification not satisfied:

a. In OPERATIONAL CONDITIONS 1, 2 or 3, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

b. In OPERATIONAL CONDITIONS 4 or 5, declare the SACS system and the station service water system inoperable and take the ACTION required by Specification 3.7.1.1 and 3.7.1.2.

c. In Operational Condition *, declare the plant service water system inoperable and take the ACTION required by Specification 3.7.1.2. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.3 The ultimate heat sink shall be determined OPERABLE:

a. By verifying the river water level to be greater than or equal to the minimum limit at least once per 24 hours.

b. By verifying river water temperature to be within its limit:

1) at least once per 24 hours when the river water temperature is less than or equal to 85°F.

2) at least once per 2 hours when the river water temperature is greater than 85°F.

* When handling irradiated fuel in the secondary containment.

3/4.7.2 CONTROL ROOM EMERGENCY FILTRATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2 Two independent control room emergency filtration system subsystems shall be OPERABLE with each subsystem consisting of:

a) One control room supply unit,
b) One filter train, and
c) One control room return air fan.

APPLICABILITY: All OPERATIONAL CONDITIONS and *.

ACTION:

a. In OPERATIONAL CONDITION 1, 2 or 3 with one control room emergency filtration subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION 4, 5 or *:

   1. With one control room emergency filtration subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or initiate and maintain operation of the OPERABLE subsystem in the pressurization/recirculation mode of operation.

   2. With both control room emergency filtration subsystems inoperable, suspend CORE ALTERATIONS, handling of irradiated fuel in the secondary containment and operations with a potential for draining the reactor vessel.

c. The provisions of Specification 3.0.3 are not applicable in Operational Condition *.

SURVEILLANCE REQUIREMENTS

4.7.2 Each control room emergency filtration subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the control room air temperature is less than or equal to 85°F#.

b. At least once per 31 days on a STAGGERED TEST BASIS by initiating, from the control room, the control area chilled water pump, flow

*When irradiated fuel is being handled in the secondary containment.

#This does not require starting the non-running control emergency filtration subsystem.

3/4.7.1 SERVICE WATER SYSTEMS

The OPERABILITY of the station service water and the safety auxiliaries cooling systems ensures that sufficient cooling capacity is available for continued operation of the SACS and its associated safety-related equipment during normal and accident conditions. The redundant cooling capacity of these systems, assuming a single failure, is consistent with the assumptions used in the accident conditions within acceptable limits.

If average river water temperature is greater than 85°F and a Loss of Offsite Power (LOP) concurrent with a loss of a SSWS/SACS loop occurs, operator actions must be taken to increase the heat removal of the SACS heat exchangers and minimize the total heat duty. These actions and the conditions under which they must be taken are contained in approved station operating procedures.

Although the sustained six hour temperature requirement would permit the temperature to rise above the new UHS limit for short durations, this allowance is justified based on the probabilistic risk assessment (PRA) results, transient nature of the UHS temperature excurisons and the conservative nature of the temperature limit calculation.

3/4.7.2 CONTROL ROOM EMERGENCY FILTRATION SYSTEM

The OPERABILITY of the control room emergency filtration system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all design basis accident conditions. Continuous operation of the system with the heaters and humidity control instruments OPERABLE for 10 hours during each 31 day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 19 of Appendix "A", 10 CFR Part 50.

3/4.7.3 FLOOD PROTECTION

The requirement for flood protection ensures that facility flood protection features are in place in the event of flood conditions. The limit of elevation 10.5' Mean Sea Level is based on the elevation at which facility flood protection features provide protection to safety related equipment.

3/4.7.4 REACTOR CORE ISOLATION COOLING SYSTEM

The reactor core isolation cooling (RCIC) system is provided to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel without requiring actuation of any of the Emergency Core Cooling System equipment. The RCIC system is conservatively required to be OPERABLE whenever reactor steam dome pressure exceeds 150 psig. This pressure is substantially below that for which the RCIC system can provide adequate core cooling for events requiring the RCIC system.

The RCIC system specifications are applicable during OPERATIONAL CONDITIONS 1, 2 and 3 when reactor vessel steam dome pressure exceeds 150 psig because RCIC is the primary non-ECCS source of emergency core cooling when the reactor is pressurized.

With the RCIC system inoperable, adequate core cooling is assured by the OPERABILITY of the HPCI system and justifies the specified 14 day out-of-service period.

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REACTOR CORE ISOLATION COOLING SYSTEM (Continued)

The surveillance requirements provide adequate assurance that RCIC will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to start cooling at the earliest possible moment.

3/4.7.5 SNUBBERS

All snubbers are required OPERABLE to ensure that the structural integrity of the reactor coolant system and all other safety related systems is maintained during and following a seismic or other event initiating dynamic loads. Snubbers excluded from this inspection program are those installed on nonsafety-related systems and then only if their failure or failure of the system on which they are installed would have no adverse effect on any safety related system.

Snubbers are classified and grouped by design and manufacturer but not by size. For example, mechanical snubbers utilizing the same design features of the 2-kip, 10-kip, and 100-kip capacity manufactured by Company "A" are of the same type. The same design mechanical snubbers manufactured by Company "B" for the purposes of this Technical Specification would be of a different type, as would hydraulic snubbers from either manufacturer.

A list of individual snubbers with detailed information of snubber location and size and of system affected shall be available at the plant in accordance with Section 50.71(c) of 10 CFR Part 50. The accessibility of each snubber shall be determined and approved by the Plant Operations Review Committee. The determination shall be based upon the existing radiation levels and the expected time to perform a visual inspection in each snubber location as well as other factors associated with accessibility during plant operations (e.g., temperature, atmosphere, location, etc.), and the recommendations of Regulatory Guide 8.8 and 8.10. The addition or deletion of any snubber shall be made in accordance with Section 50.59 of 10 CFR Part 50.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to each safety-related system. Therefore, the required inspection interval is based on the number of unacceptable snubbers found during the previous inspection in proportion to the sizes of the various snubber populations or categories. This inspection schedule is based on the guidance provided in Generic Letter 90-09. In order to establish the inspection frequency for each type of snubber on a safety-related system, it was assumed that the frequency of snubber failures and initiating events is constant with time and that the failure of any snubber on that system could cause the system to be unprotected and to result in failure during an assumed

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 68 TO FACILITY OPERATING LICENSE NO. NPF-57

PUBLIC SERVICE ELECTRIC & GAS COMPANY

ATLANTIC CITY ELECTRIC COMPANY

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By letter dated April 23, 1993, as supplemented by letters dated November 10, 1993, and January 13, 1994, the Public Service Electric and Gas Company (the licensee) submitted a request for changes to the Hope Creek Generating Station (HCGS), Technical Specifications (TS). The requested change would decrease the maximum allowable value of average river temperature from 90.5°F to 88.6°F; revising the action statement associated with the limiting condition for operation to permit continued normal operation for a period of 6 hours with the average river temperature in excess of 88.6°F, but at or below 89.9°F, provided that both loops of the station service water system (SSWS) and safety auxiliary cooling system (SACS) are verified to be operable; increasing the required frequency of monitoring average river temperature when the river temperature is above 85°F from once-every-6-hours to once-every-2-hours; and revising the bases associated with the ultimate heat sink (UHS) TS. The November 10, 1993, and January 13, 1994, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

The SSWS normally provides water from the Delaware River to remove heat from the SACS heat exchangers and the reactor auxiliary cooling system (RACS) heat exchangers. The SSWS consists of two redundant loops for cooling the SACS heat exchangers. Each loop is equipped with two pumps in parallel. The two pumps supply two SACS heat exchangers arranged in parallel in each loop through a common header. The two SSWS loops are normally aligned to supply the two RACS heat exchangers, which are also arranged in parallel, through a common supply header. A loss of coolant accident (LOCA) signal causes motor operated valves to automatically isolate the non-essential RACS heat exchangers from each of the SSWS loops.

The SACS heat exchangers transfer heat from the turbine auxiliary cooling system (TACS) and various safety-related components served by the SACS, including the residual heat removal (RHR) heat exchanger, to the SSWS. The SACS also consists of two redundant loops. Each loop is equipped with two pumps in parallel. Heat is removed from each SACS loop by the two SACS heat

exchangers installed in that loop and transferred to the corresponding SSWS loop. The TACS is normally aligned to one loop of the SACS. Two motor operated valves in the return side headers and two hydraulically operated valves in the discharge side headers of each SACS loop automatically isolate the TACS from each loop of the SACS in the event of a LOCA, a loss of offsite power (LOOP), or low SACS expansion tank level.

The SSWS and the SACS are designed such that a single active failure will not cause a total loss of functional capability for either loop of the SSWS or the SACS. Separate standby diesel generators (SDGs) power each of the four emergency power buses at HCGS. Each of the emergency buses powers one SSWS pump and one SACS pump. As described above, redundant and independent valves isolate the non-essential RACS and TACS from the SSWS and SACS, respectively. Similarly, a single passive failure will not cause a loss of both loops of the SSWS and the SACS.

Although both loops of the SSWS and the SACS are normally available, a single loop is capable of performing many functions. Sections 9.2.1 and 9.2.2 of the Hope Creek Updated Final Safety Analysis Report (UFSAR) state that a single loop of the SSWS, with two operating pumps, and the corresponding SACS loop, also with two operating pumps, provide sufficient cooling to support normal shutdown, safe shutdown following a LOOP, and the long-term primary containment cooling mode of LOCA recovery. However, the UFSAR also states that both SSWS loops, with a single operating pump in each loop, and both SACS loops, also with a single operating pump in each loop, are necessary to satisfy minimum cooling requirements in the emergency core cooling system (ECCS) injection phase of LOCA recovery.

In licensee event report (LER) 90-014-00 dated September 12, 1990, PSE&G reported that the TS minimum operability value for UHS temperature was unconservatively high at 90.5°F. This UHS temperature limit was determined by analysis to provide sufficient heat removal from the SACS heat exchangers to maintain the maximum SACS outlet temperature not greater than 95°F under the highest expected heat loads. However, this analysis did not provide an allowance for SSWS pump degradation. Consequently, given the operating margins of the SSWS pumps, the SSWS pumps could not develop the head necessary to meet the SSWS flow requirements at the 90.5°F river water temperature.

At the time LER 90-014-00 was submitted, the licensee had imposed administrative limits on UHS temperature of 85°F based on the design temperature of the SSWS supply piping. On July 12, 1991, PSE&G submitted LER 90-014-01 to report that the administrative limit had been increased to 87.5°F based on a refined engineering analysis and a 10 CFR 50.59 evaluation. Subsequently, the administrative limit was further increased to 88.1°F based on continued engineering analysis of the SACS heat exchangers. By letter dated August 4, 1992, PSE&G reiterated a commitment to establish a final UHS temperature limit and submit a license amendment to incorporate the new value in TS 3.7.1.3.

3.0 EVALUATION

During the design phase of the SSWS, the architectural engineer (AE) for Hope Creek originally identified the following four bounding modes of system operation: (1) power generation (normal operation), (2) normal shutdown, (3) after a LOOP, and (4) operation greater than 10 minutes after a LOCA. For each operational mode, the AE calculated the resulting SACS heat exchanger loads for both single and two loop SSWS configurations. The AE subsequently determined that, in each mode, single loop operation resulted in the highest heat exchanger heat duty.

The licensee determined that single SSWS loop operation during conduct of normal shutdown procedures is the limiting case for the determination of the UHS maximum allowable temperature. Based on an iterative analysis at the component level of the SSWS and SACS for single SSWS loop normal operation with SACS heat exchanger outlet temperature at or below the SACS design temperature of 95°F, the licensee established a revised UHS temperature limit of 88.6°F. The SACS design temperature is a conservative limit relative to maximum SACS temperatures capable of supporting individual component operation. The iterative analysis that determined this temperature limit was based on the following assumptions: (1) all SSWS pumps are degraded by 15 percent from their nominal performance; (2) 50 tubes in each SACS heat exchanger are plugged; (3) design minimum river water elevation; and (4) operator actions are taken following a LOOP without a LOCA to increase the heat removal capabilities of the SACS heat exchangers when UHS temperature is above 85°F and a single SSWS loop is operating.

The specific operator actions necessary following a LOOP without a LOCA are isolation of SSWS flow to one RACS heat exchanger and reduction of SSWS flow to the remaining RACS heat exchanger to 2200 gpm. The licensee has committed to incorporate these operator actions into an existing station SSWS operating procedure. Also, the licensee has determined that areas of the reactor building where operator action is required are accessible following a LOOP. Operator actions in the reactor building are not required following a LOCA or a LOCA coincident with a LOOP because the SSWS supply to the RACS heat exchangers is automatically isolated in those instances.

Because the design temperature of the SSWS supply piping is 85°F and is below the proposed maximum UHS temperature, the licensee performed a review of applicable stress calculations. The licensee concluded from their review that adequate margin exists to ASME Boiler and Pressure Vessel Code, Section III, allowable stresses to accommodate the minor increase in thermal stress resulting from an increase in SSWS supply temperature from 85°F to 90°F.

Based on the above evaluations, the licensee has adequately demonstrated that the SSWS is capable of performing its design function with a maximum river water temperature of 88.6°F. The proposed change to the TS maximum river water temperature is also conservative. Therefore, the reduction in the maximum allowed average river water temperature in TS 3.7.1.3 from 90.5°F to 88.6°F is acceptable.

The licensee has proposed decreasing the surveillance interval for average river water temperature from once-every-6-hours to once-every-2-hours when river temperature is above 85°F. The average river temperature is indicated in the main control room. Based on a review of 3 years of data, the river temperature exceeds 85°F an average of 14 hours per year. This proposed change supports identification of periods when the average river temperature exceeds the limiting condition for operation without burdening the control room operators. Therefore, the proposed increase in surveillance frequency for average river water temperature when river water temperature is above 85°F is acceptable.

In PSE&G's letter dated November 10, 1993, the licensee modified their original submittal to permit continued operation for a period of 6 hours with river temperature above 88.6°F providing that both loops of the SSWS and SACS are operable and the river temperature is at or below 89.9°F. With both loops of the SSWS and SACS operable, a minimum of 100 percent capacity in one loop and 50 percent capacity in the remaining loop will be retained following any single active failure. With the additional capacity provided by the second loop operating at 50 percent flow, the licensee determined that the plant can continue normal operation and complete a normal shutdown with SSWS supply temperature at or below 89.9°F.

The change permitting continued operation with river water temperature above 88.6°F for 6 hours results in a condition where completion of a normal shutdown has not been determined to be achievable with a single SSWS/SACS loop, contrary to the description in the UFSAR. However, continued operation at an increased river water temperature is acceptable based on the limited period of time operation is permitted to continue at with the increased river water temperature and the extremely low probability of a coincident passive failure of one SSWS or SACS loop.

Based on the above evaluation, the staff concludes that the proposed changes to TS 3.7.1.3 and TS 4.7.1.3 are conservative and acceptable. The proposed changes to the associated TS Bases are consistent with the justification for the changes.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State Official was notified of the proposed issuance of the amendment. By letter dated January 13, 1994, the State official notified the NRC of a concern related to the frequency of monitoring of the river water temperature. The State Official commented that the monitoring frequency of once-per-24-hours would not detect river water temperatures above 85°F caused by an incoming tide during the surveillance interval. A monitoring interval of one-half to 1 hour, after low tide and during the mid-to-late afternoon was recommended by the State Official.

By letter dated March 4, 1994, PSE&G responded to the State Official's concern. PSE&G notes that at Hope Creek, the Control Room Integrated Display System (CRIDS) provides the operator with updated river water temperature every 60 seconds, and a strip chart recorder provides a continuous record of service water pump discharge temperatures. PSE&G believes that existing instrumentation and procedures enables the operator to perform the required surveillances and determine if the ultimate heat sink limiting condition for operation are exceeded at any time. Based on the above, PSE&G concludes that changes to Technical Specification Surveillance Requirement 4.7.1.3.b.1 is not required.

The staff notes that at a river water temperature of above 85°F, the frequency of monitoring the temperature is 2 hours. It should also be noted that 85°F is not the maximum allowable temperature, but that 88.6°F is the maximum allowable temperature. Also, with limitations on the amount of equipment inoperable, operation with temperatures between 88.6°F and 89.9°F is allowed for 6 hours. Because the operators have available essentially continuous indication and recording of river water temperature, the fact that 85°F is not the maximum allowable river water temperature and 2-hour monitoring of river water temperature is required above 85°F; the staff concludes that changing the technical specification to require monitoring every one-half to 1 hour is not necessary.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (58 FR 30200). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Jones

Date: April 15, 1994