



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

February 2, 2001

Mr. Stephen A. Byrne
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Post Office Box 88
Jenkinsville, South Carolina 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 - ISSUANCE OF
AMENDMENT RE: FUEL STORAGE SYSTEM VOLUME (TAC NO. MB0388B)

Dear Mr. Byrne:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 150 to Facility Operating License No. NPF-12 for the Virgil C. Summer Nuclear Station, Unit No. 1. The amendment changes the Technical Specifications in response to your application dated November 10, 2000.

This amendment will allow: (a) the minimum fuel oil stored in the fuel oil storage tank for each emergency diesel generator (EDG) to be raised from 47,100 gallons to 48,500 gallons for Modes 1-4, and from 33,200 gallons to 42,500 gallons for Modes 5 and 6; and (b) the minimum fuel oil maintained in the day fuel tank for each EDG to be raised from 300 gallons to 360 gallons for Modes 1-6.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice. This completes the staff's efforts on TAC No. MB0388B.

Sincerely,

Karen Cotton, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-395

Enclosures:

1. Amendment No. 150 to NPF-12
2. Safety Evaluation

cc w/enclosures: See next page

NRR-058

February 2, 2001

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Vice President, Nuclear Operations
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/RA/
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Mr. Stephen A. Byrne
South Carolina Electric & Gas Company

VIRGIL C. SUMMER NUCLEAR STATION

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

DOCKET NO. 50-395

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 150
License No. NPF-12

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by South Carolina Electric & Gas Company (the licensee), dated November 10, 2000, 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;
 - 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-12 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. 150, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Richard L. Emch, Jr., Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: February 2, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 150

TO FACILITY OPERATING LICENSE NO. NPF-12

DOCKET NO. 50-395

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

3/4 8-1
3/4 8-8
B 3/4 8-1
B 3/4 8-2

Insert Pages

3/4 8-1
3/4 8-8
B 3/4 8-1
B 3/4 8-2

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
- b. Two separate and independent Emergency Diesel Generators (EDG), each with:
 1. A separate day fuel tank containing a minimum volume of 360 gallons of fuel,
 2. A separate fuel storage system containing a minimum volume of 48,500 gallons of fuel, and
 3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one offsite circuit of 3.8.1.1.a inoperable:
 1. Demonstrate the OPERABILITY of the remaining offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
 2. If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and
 3. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- b. With one EDG of 3.8.1.1.b inoperable:
 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
 2. If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirements 4.8.1.1.2.a.3 within 24 hours*, and

* This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and
- b. One diesel generator* with:
 1. A day fuel tank containing a minimum volume of 360 gallons of fuel,
 2. A fuel storage system containing a minimum volume of 42,500 gallons of fuel, and
 3. A fuel transfer pump,

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool. In addition, when in MODE 5 with the Reactor Coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1 and 4.8.1.1.2 (with the exception of 4.8.1.1.2.a.4).

* ESF load sequencer may be deenergized in Modes 5 and 6 provided that the loss of voltage and degraded voltage relays are disabled.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985, December 6, 1985 and November 10, 2000 amendment requests.

The fuel storage system minimum volume of fuel to demonstrate operability of the diesel generators was based on fuel consumption determined from the development of time dependent loads following a design basis accident and a loss of off-site power utilizing FSAR Table 8.3-3 for seven days.

ELECTRIC POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES, AND ONSITE POWER DISTRIBUTION SYSTEMS

(Continued)

All safety-related portions of the VCSNS diesel engine fuel oil storage and transfer system, are Seismic Category I, Safety Class 2b, and designed to ANSI Standard N195-1976 with the provision listed below:

VCSNS will maintain at least 2% margin above the minimum calculated seven day required volume during Modes 1-4. This is an exception to ANSI N195-1976, "Fuel Oil Systems for Standby Diesel Generators," Section 5.4, during Modes 1-4. EDG fuel replenishment is available from multiple sources, including off-site suppliers, on-site non safety storage in the Auxiliary Boiler Fuel Tank, and the ability to provide fuel from the opposite train EDG Fuel Oil Storage Tank via the fuel oil and transfer system cross-tie.

The 10% fuel margin as recommended in Regulatory Guide 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," position C.1.c.(2) will be met during Modes 5 and 6.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1987, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage and float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and .015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than .020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than .010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than .020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than .040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit, and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By application dated November 10, 2000, South Carolina Electric & Gas Company (SCE&G, the licensee) requested changes to the Technical Specifications (TS) for the Virgil C. Summer Nuclear Station (VCSNS). The proposed changes would allow: (a) the minimum fuel oil stored in the fuel oil storage tank (FOST) for each emergency diesel generator (EDG) to be raised from 47,100 gallons to 48,500 gallons for Modes 1-4, and from 33,200 gallons to 42,500 gallons for Modes 5 and 6; and (b) the minimum fuel oil maintained in the day fuel tank for each EDG to be raised from 300 gallons to 360 gallons for Modes 1-6.

In addition, the licensee proposed to revise the TS Bases section associated with the above TS minimum fuel oil requirements to reflect the available margins in the minimum required fuel oil inventory.

2.0 BACKGROUND

Regulatory Guide (RG) 1.1.37, Revision 1, "Fuel Oil System for Standby Diesel Generator," endorses ANSI N195-1976, "Fuel Oil Systems for Standby Diesel-Generators," which requires that the on-site fuel oil storage be sufficient to operate the minimum number of EDGs required for 7 days following a limiting design basis accident (DBA). The minimum fuel oil required to be maintained in the storage tanks is based on either a 7-day time-dependent load calculation plus 10% margin or a more conservative calculation method that assumes that the EDG operates at continuous rated capacity for 7 days. The calculation shall include an explicit allowance for fuel oil consumption required for periodic EDG testing. Also, ANSI N195-1976 requires that each EDG day tank contain sufficient fuel oil for 60 minutes of operation at 100% of its associated EDG continuous rated load plus a minimum margin of 10%.

There are two EDGs for VCSNS. Each EDG is equipped with a fuel oil storage and transfer system which consists of a day tank, a FOST, a fuel oil transfer pump, and its associated piping, valves, instrumentation, and controls. Each EDG FOST has a usable capacity of 51,082 gallons. Each day tank has a capacity of 550 gallons and is automatically filled from its own EDG FOST by its own EDG fuel oil transfer pump. A cross-tie, with two normally closed valves, is provided between the EDG fuel oil storage and transfer systems to enable the fuel oil transfer pump of either EDG to fill either or both day tanks from either FOST. All portions of the EDG fuel oil storage and transfer systems with the exception of the cross-tie¹ are safety-related and Seismic Category 1 designed.

The current VCSNS TS, which require a minimum of 47,100 gallons of fuel oil to be maintained in the FOST for each EDG, were established² to provide 7 days of operation for each EDG plus 10% margin following a DBA. However, this current TS requirement does not include an explicit allowance for fuel consumption required for periodic testing.

Recently, the licensee performed an engineering evaluation regarding the minimum fuel oil required to be maintained in the FOST for each EDG. Results of the engineering evaluation indicated that: (a) the minimum fuel oil required to be maintained in each FOST in the current TS is only sufficient to operate its associated EDG for 7 days plus approximately 2% margin; and (b) the usable capacity of 51,082 gallons of each FOST is sufficient³ to operate its associated EDG for 7 days plus a 10% margin. In order to allow for thermal expansion, as well as operating margin and prudent precautions to prevent spillage during tank filling, the licensee proposed to raise the current TS limit of 47,100 gallons to 48,500 gallons, instead of 51,082 gallons, for Modes 1 to 4. This proposed TS minimum fuel oil to be maintained in each FOST during Modes 1 to 4 will ensure: (a) a margin of greater than 2% above the minimum calculated fuel oil required for an EDG to operate 7 days following a DBA; and (b) an explicit allowance for fuel consumption required for periodic testing. Results of the engineering evaluation also indicated that the proposed minimum of 42,500 gallons of fuel oil to be stored in the FOST for Modes 5 and 6 will satisfy the guidance described in ANSI N195-1976.

Also, in a separate engineering evaluation conducted as follow-up to the above-cited FOST issues, the licensee determined that the minimum fuel oil inventory in the day tank as recommended by ANSI N195-1976 for Modes 1 to 6 will be satisfied if the current TS limit of 300 gallons is raised to 360 gallons.

-
- ¹ The licensee stated that a Plant Enhancement (ECR-503350) is in progress to upgrade the current non-nuclear safety cross-tie piping to Safety Class 2b, Seismic Category 1, and will be completed prior to Mode 4 entry upon completion of the current refueling outage (RF-12).
 - ² Based on time-dependent loads following a design basis accident and a loss-of-offsite power.
 - ³ Including an explicit allowance for fuel oil consumption required for EDG periodic testing.

Subsequently, the licensee proposed to revise TS Bases 3/4.8.1, 3/4.8.2 and 3/4.8.3, "A.C SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS" to reflect the above proposed TS changes.

3.0 EVALUATION

3.1 EDG FOST Not Having Sufficient 10% Margin

The proposed TS minimum fuel oil to be maintained in each FOST will allow: (a) its associated EDG to operate for 7 days following a DBA plus a margin of greater than 2%; and (b) during or after EDG periodic test runs per the TS Surveillance Requirement, the fuel oil inventory in the FOST to remain above the level necessary for the 7 day EDG operation with at least 2% margin for Modes 1-4 and at least 10% margin for Modes 5 and 6.

As indicated in Section 2.0 above, VCSNS has cross-ties between the two EDG fuel oil storage and transfer systems, which enable either one of the EDGs to be supplied from either one of the EDG FOSTs. With the ability to cross-tie two EDG fuel oil storage and transfer systems, VCSNS will have sufficient fuel oil on-site for one⁴ EDG to operate continuously for a period of well over 7 days plus 10% margin as recommended by ANSI N195-1976.

Also, VCSNS has an auxiliary boiler fuel tank⁵ with 500,000 gallon nominal capacity on-site. The licensee stated that this auxiliary boiler fuel tank contains the same grade fuel as the two EDG FOSTs. The fuel oil stored in this auxiliary boiler tank will be available for replenishing the EDG FOSTs following a loss-of-coolant accident (LOCA) if needed. In addition, there are numerous diesel fuel oil vendors in the vicinity of VCSNS. VCSNS will have fuel oil readily available if there is a need for replenishment.

The licensee concluded that the defense-in-depth to provide the EDG fuel replenishment from established on-site sources is adequate to ensure the VCSNS will have sufficient fuel oil for EDG operation following DBAs well beyond the minimum 7-day requirement.

Based on its review of the licensee's rationale, the staff concludes that the fuel oil inventory maintained in the EDG FOSTs at VCSNS meets the intent of the guidance described in ANSI N195-1976 and that VCSNS will have sufficient fuel oil for EDG operation to power the safety systems required to mitigate DBAs.

In addition, the licensee stated that an analysis was performed to evaluate the impact of the proposed TS Bases change involving FOST capacity on plant risk. The licensee concluded that the increase in risk resulting from the proposed change to the licensing basis is insignificant. Since the staff has concluded, as stated above, that the fuel oil inventory maintained in the

⁴ The minimum number of EDGs required following a DBA.

⁵ The tank was used as a contingency supply during VCSNS's steam generator replacement outage and during Y2K rollover.

EDG FOSTs at VCSNS meets the intent of the guidance described in ANSI N195-1976 and that VCSNS will have sufficient fuel oil on-site for EDG operation to power the safety systems required to mitigate DBAs, the staff did not review the licensee's analysis involving FOST capacity on plant risk.

3.2 Day Tank Fuel Oil Inventory for Modes 1-6

ANSI N195-1976 recommends that each EDG day tank contain sufficient fuel oil for 60 minutes of operations at 100% of the EDG continuous rated load plus a minimum margin of 10%. As follow-up to the above FOST issues, the licensee performed a separate evaluation, which determined that in order to meet the minimum fuel oil as recommended in ANSI N195-1976, to be maintained in the day tank for Modes 1 to 6, the current TS minimum requirement of 300 gallons will be raised to 360 gallons.

Based on its review, the staff concludes that the licensee will have adequate and reliable fuel oil inventory in the day tank for uninterrupted EDG operation following a LOCA at VCSNS.

4.0 SUMMARY

Based on its review and the above evaluation, the staff finds that: (a) the fuel oil storage and transfer system for each EDG at VCSNS has a high level of reliability and availability; (b) the design of the fuel oil storage and transfer system and the EDG fuel oil maintained at VCSNS meet the intent of the guidance described in ANSI N195-1976; and (c) VCSNS has a sufficient quantity of fuel oil, which is the same grade fuel oil as the two EDG FOSTs, on-site to be used as a contingency supply, if needed. Provided that the licensee will have procedures⁶ established to provide guidance to replenish the EDG FOSTs and to transfer fuel oil from the FOST of the idle/inoperable EDG to the operating EDG, the staff concludes that the licensee will have adequate and reliable fuel oil inventory in the day tank and FOST for uninterrupted EDG operation following a LOCA at VCSNS. Therefore, the staff concludes the above proposed TS changes are acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 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. 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

⁶ Procedures should include guidance for performing analyses of the fuel oil prior to replenishing the EDG FOSTs from the on-site auxiliary boiler fuel tank or outside diesel fuel oil vendors.

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 (65 FR 69795). 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.

7.0 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: D. Shum

Date: February 2, 2001