March 12, 1999

Mr. Ted C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer
North Atlantic Energy Service Corporation
c/o Mr. Terry L. Harpster
P.O. Box 300
Seabrook, NH 03874

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. MA1950)

Dear Mr. Feigenbaum:

The Commission has issued the enclosed Amendment No. 60 to Facility Operating License No. NPF-86 for the Seabrook Station, Unit No 1, in response to your application dated May 20, 1998, as supplemented by information contained in your letter dated January 28, 1999.

The amendment would revise Technical Specifications Table 3.3-4 to depict a change to the refueling water storage tank low-low level setpoint.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/s/

John T. Harrison, Project Manager
Project Directorate I-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosures: 1. Amendment No. 60 to NPF-86
2. Safety Evaluation

DF01

cc w/encls: See next page

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DATE		2/26/99	3/12/99	

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

March 12, 1999

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2. Safety Evaluation

cc w/encls: See next page

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

NORTH ATLANTIC ENERGY SERVICE CORPORATION, ET AL.*

DOCKET NO. 50-443

SEABROOK STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 60
License No. NPF-86

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

   A. The application for amendment filed by the North Atlantic Energy Service Corporation, et al. (the licensee), dated May 20, 1998, as supplemented by letter dated January 28, 1999, 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.

*North Atlantic Energy Service Corporation (NAESCO) is authorized to act as agent for the: North Atlantic Energy Corporation, Canal Electric Company, The Connecticut Light and Power Company, Great Bay Power Corporation, Hudson Light & Power Department, Massachusetts Municipal Wholesale Electric Company, Montaup Electric Company, New England Power Company, New Hampshire Electric Cooperative, Inc., Taunton Municipal Light Plant, The United Illuminating Company, and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility.

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-86 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 60 , and the Environmental Protection Plan contained in Appendix B are incorporated into Facility License No. NPF-86. NAESCO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance, to be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam

Elinor G. Adensam, Director
Project Directorate I-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: March 12, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 60

FACILITY OPERATING LICENSE NO. NPF-86

DOCKET NO. 50-443

Replace the following pages of the Appendix A, Technical Specifications, with the attached pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. Overleaf pages have been provided.*

Remove	Insert
3/4 3-27	3/4/3-27
3/4 3-28*	3/4/3-28*
3/4 3-29	3/4/3-29
3/4 3-30*	3/4/3-30*
B 3/4 3-1*	B 3/4 3-1*
B 3/4 3-2	B 3/4 3-2
-	B 3/4 3-2A

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Trip System and the Engineered Safety Features Actuation System instrumentation and interlocks ensures that: (1) the associated ACTION and/or Reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its Setpoint (2) the specified coincidence logic is maintained, (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance, and (4) sufficient system functional capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analyses. The Surveillance Requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System," and supplements to that report. Surveillance intervals and out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System and Engineered Safety Features instrumentation. The NRC Safety Evaluation Reports for WCAP-10271 and its supplements and revisions were provided on February 21, 1985, February 22, 1989 and April 30, 1990.

The Engineered Safety Features Actuation System Instrumentation Trip Setpoints specified in Table 3.3-4 are the nominal values at which the bistables are set for each functional unit. A Setpoint is considered to be adjusted consistent with the nominal value when the "as measured" Setpoint is within the band allowed for calibration accuracy.

To accommodate the instrument drift assumed to occur between operational tests and the accuracy to which Setpoints can be measured and calibrated, Allowable Values for the Setpoints have been specified in Table 3.3-4. Operation with Setpoints less conservative than the Trip Setpoint but within the Allowable Value is acceptable since an allowance has been made in the safety analysis to accommodate this error. An optional provision has been included for determining the OPERABILITY of a channel when its Trip Setpoint is found to exceed the Allowable Value. The methodology of this option utilizes the "as measured" deviation from the specified calibration point for rack and sensor components in conjunction with a statistical combination of the other

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

uncertainties of the instrumentation to measure the process variable and the uncertainties in calibrating the instrumentation. In Equation 2.2-1, $Z + R S \leq TA$, the interactive effects of the errors in the rack and the sensor, and the "as measured" values of the errors are considered. Z, as specified in Table 3.3-4, in percent span, is the statistical summation of errors assumed in the analysis excluding those associated with the sensor and rack drift and the accuracy of their measurement. TA or Total Allowance is the difference, in percent span; R or Rack Error is the "as measured" deviation, in the percent span, for the affected channel from the specified Trip Setpoint. S or Sensor Error is either the "as measured" deviation of the sensor from its calibration point or the value specified in Table 3.3-4, in percent span, from the analysis assumptions. Use of Equation 2.2-1 allows for a sensor drift factor, an increased rack drift factor, and provides a threshold value for REPORTABLE EVENTS.

The methodology to derive the Trip Setpoints is based upon combining all of the uncertainties in the channels. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensor and rack instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes. Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

The measurement of response time at the specified frequencies provides assurance that the Reactor trip and the Engineered Safety Features actuation associated with each channel is completed within the time limit assumed in the safety analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping, or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either: (1) in place, onsite, or offsite test measurements, or (2) utilizing replacement sensors with certified response time.

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sumps. The low head residual heat removal (RHR) pumps and containment spray pumps draw the water from the containment recirculation sumps, the RHR pumps pump the water through the RHR heat exchangers, inject the water back into the RCS, and upon manual alignment supply the cooled water to the other ECCS pumps. Switchover from the RWST to

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TOTAL ALLOWANCE (TA)	Z	SENSOR ERROR (S)	TRIP SETPOINT	ALLOWABLE VALUE
7. Emergency Feedwater					
a. Manual Initiation					
(1) Motor driven pump	N.A.	N.A.	N.A.	N.A.	N.A.
(2) Turbine driven pump	N.A.	N.A.	N.A.	N.A.	N.A.
b. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
c. Steam Generator Water Level--Low-Low Start Motor-Driven Pump and Start Turbine-Driven Pump	14.0	12.53	0.55	≥ 14.0% of narrow range instrument span.	≥ 12.6% of narrow range instrument span.
d. Safety Injection Start Motor-Driven Pump and Turbine-Driven Pump	See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.				
e. Loss-of-Offsite Power Start Motor-Driven Pump and Turbine-Driven Pump	See Item 9. for Loss-of-Offsite Power Setpoints and Allowable Values.				
8. Automatic Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
b. RWST Level--Low-Low Coincident With Safety Injection	4.0*** 2.1****	1.0	2.8	120,478 gals.	≤121,521*** gals. ≥119,435**** gals.
	See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.				

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TOTAL ALLOWANCE (TA)	Z	SENSOR ERROR (S)	TRIP SETPOINT	ALLOWABLE VALUE
9. Loss of Power (Start Emergency Feedwater)					
a. 4.16 kV Bus E5 and E6 Loss of Voltage	N.A.	N.A.	N.A.	≥ 2975 volts with a ≤ 1.20 second time delay.	≥ 2908 volts with a ≤ 1.315 second time delay.
b. 4.16 kV Bus E5 and E6 Degraded Voltage	N.A.	N.A.	N.A.	≥ 3933 volts with a ≤ 10 second time delay.	≥ 3902 volts with a ≤ 10.96 second time delay.
Coincident with: Safety Injection	See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.				
10. Engineered Safety Features Actuation System Interlocks					
a. Pressurizer Pressure, P-11	N.A.	N.A.	N.A.	≤ 1950 psig	≤ 1962 psig
b. Reactor Trip, P-4	N.A.	N.A.	N.A.	N.A.	N.A.
c. Steam Generator Water Level, P-14	See Item 5. above for all Steam Generator Water Level Trip Setpoints and Allowable Values.				

TABLE 3.3-4 (Continued)

TABLE NOTATIONS

* Time constants utilized in the lead-lag controller for Steam Line Pressure-Low are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds. CHANNEL CALIBRATION shall ensure that these time constants are adjusted to these values.

**The time constant utilized in the rate-lag controller for Steam Line Pressure-Negative Rate-High is greater than or equal to 50 seconds. CHANNEL CALIBRATION shall ensure that this time constant is adjusted to this value.

***Value specified applies when "as measured" Trip Setpoint is greater than the specified Trip Setpoint.

****Value specified applies when "as measured" Trip Setpoint is less than the specified Trip Setpoint.

TABLE 3.3-5

(This table number is not used)

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

the containment recirculation sumps must occur before the RWST empties to prevent damage to the ECCS pumps and a loss of core cooling capability. For similar reasons, switchover must not occur before there is sufficient water in the containment sump to provide sufficient net positive suction head (NPSH) to support ECCS pump operation. Furthermore, early switchover must not occur to ensure that sufficient borated water is injected from the RWST. This ensures the reactor remains shut down in the recirculation mode. To satisfy these requirements, the RWST Level Low-Low Allowable Value/Trip Setpoint has both upper and lower limits. The lower limit ensures switchover occurs before the RWST empties to prevent ECCS pump damage while the upper limit ensures the reactor remains shut down and that there is adequate water inventory in the containment recirculation sumps to provide ECCS pump suction.

The Engineered Safety Features Actuation System senses selected plant parameters and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents, events, and transients. Once the required logic combination is completed, the system sends actuation signals to those Engineered Safety Features components whose aggregate function best serves the requirements of the condition. As an example, the following actions may be initiated by the Engineered Safety Features Actuation System to mitigate the consequences of a steam line break or loss-of-coolant accident: (1) Safety

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 60 TO FACILITY OPERATING LICENSE NO. NPF-86

NORTH ATLANTIC ENERGY SERVICE CORPORATION

SEABROOK STATION, UNIT NO. 1

DOCKET NO. 50-443

1.0 INTRODUCTION

By letter dated May 20, 1998, as supplemented by a letter containing clarifying information dated January 28, 1999, the North Atlantic Energy Service Corporation (NAESCO) submitted a request for changes to the Seabrook Station, Technical Specifications (TS). The requested changes would revise the low-low level setpoint of the Refueling Water Storage Tank (RWST) that initiates automatic switchover of the source of borated water for the Emergency Core Cooling System (ECCS) from the RWST to the containment sumps. The January 28, 1999, letter did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

2.1 Background

The RWST is the initial source of borated water for the ECCS pumps following certain accidents. When the water level in the RWST decreases to the low-low setpoint during accident mitigation, the source of borated water for the ECCS pumps is switched to the containment sumps. The RWST low-low level setpoint automatically initiates the transfer and provides an alarm to alert the operators to manually complete the transfer. If the transfer is not completed in sufficient time, an RWST EMPTY alarm alerts the operators to secure the ECCS pumps taking suction from the RWST prior to potential vortexing conditions that could result in ECCS pump damage and subsequent loss of core cooling capability.

Therefore, the design basis for the RWST low-low level setpoint is to ensure that: (1) The transfer does not occur before there is sufficient water in the containment sump to provide the required net positive suction head (NPSH) to support ECCS pump operation, (2) the transfer does not occur before sufficient borated water is injected from the RWST to ensure the reactor remains shut down in the recirculation mode, and (3) the initiation of the transfer occurs while there is still sufficient time for the operators to complete the manual actions necessary to complete the transfer prior to reaching the level in the RWST where vortexing could occur. Consequently, the transfer must occur during the time period after certain events, but also prior to certain other events, thereby requiring the RWST low-low level setpoint to actuate within a given range bounded by upper and lower Allowable Values.

2.2 Setpoint Determination

Currently, Seabrook's RWST low-low level setpoint has an Allowable Value associated only with the lower limit. On May 20, 1998, NAESCO submitted License Amendment Request 97-07 that proposed a change to the RWST low-low setpoint and added an upper Allowable Value limit. This request would require a change to the Seabrook Station TS, Engineered Safety Features Actuation System Instrumentation Trip Setpoints, Table 3.3-4, Functional Unit 8.b, RWST Level--Low-Low, and associated Bases Section 3/4.3.2.

Currently, TS Table 3.3-4, Functional Unit 8.b, specifies the RWST low-low level setpoint as 122,525 gallons with an Allowable Value of $\geq$ 121,609 gallons. The proposed new setpoint would be 120,478 gallons with an Allowable Value band of $\geq$ 119,435 to $\leq$ 121,521 gallons.

The upper Allowable Value is set at the minimum volume of borated water in the RWST that must be injected into the reactor coolant system (RCS) during the injection phase to satisfy design basis requirements prior to initiation of automatic switchover to the containment building recirculation sumps. The upper Allowable Value is based on the TS limit alarm setpoint, minus instrument uncertainty and minimum injection allowance volume. The lower Allowable Value is set at the minimum volume of water in the RWST at which initiation of automatic switchover must occur in order to afford sufficient time for the manual portion of switchover to the recirculation phase prior to reaching the level in the RWST where vortexing could occur. The lower Allowable Value is based on the vortexing level plus an allocated transfer allowance volume to account for the manual transfer to the recirculation mode, plus an allocated ECCS pump shutoff allowance volume to account for securing the ECCS pumps after receipt of the RWST EMPTY alarm, and the instrument uncertainty band for the RWST EMPTY bistable. The lower Allowable Value includes the instrument uncertainty band for the RWST EMPTY bistable since the design basis for the lower limit is to provide adequate time to complete the switchover to the recirculation mode prior to receipt of the RWST EMPTY alarm. The proposed RWST low-low level setpoint accounts for instrument uncertainty and was selected as the mid-point between the upper and lower Allowable Values.

In addition, the new setpoint, along with the associated Total Allowance and Sensor Error were also revised to include a more conservative drift value that would account for drift periods up to 24 months. According to the licensee, Westinghouse specifications for the current RWST level transmitters associated with the RWST low-low level setpoint specify a value of 1% as the limit for drift over a 12-month interval. The 1% value, originally for a 12-month interval, is currently applied to the instrument uncertainty calculation. The new value includes a drift value based on a 24-month drift period. The Westinghouse drift analysis for these transmitters indicates a bias of 0.2% with a random uncertainty of $\pm$ 1.2%. Therefore, the 2% drift value used is conservative as compared with the Westinghouse analysis.

Section 7.1.2.1.i. of the Seabrook Updated Final Safety Analysis Report (UFSAR) states that the methodology used to determine the bistable setpoints complies with the methodology outlined in Regulatory Guide 1.105 (Rev. 1), as supplemented by the information presented in ISA Standard S67.04, Draft F. Based on the information provided, the method used to select the new RWST low-low level bistable setpoint is acceptable.

2.3 Increased Injection Volume

The proposed new RWST low-low level setpoint increases the potential total volume of water injected from the RWST into the reactor coolant system (RCS) and/or containment by approximately 2000 gallons. The licensee determined that the containment flood level assumptions following a LOCA will not be adversely affected by the revised setpoint and that the effect on sump pH and containment spray pH for accident conditions were evaluated with the conclusion that the change in pH is negligible. Therefore, there is no impact on Containment Building Spray (CBS) System performance or the parameters used for Environmental Qualification of electrical equipment. The increased injection volume that could occur as a result of the proposed change is, therefore, acceptable.

2.4 NPSH Changes

NAESCO's 90-day response to Generic Letter (GL) 97-04 dated January 5, 1998, states that the most limiting pump alignment regarding available NPSH for the Safety Injection (SI) and Charging (CS) pumps occurs prior to switchover to ECCS recirculation operation when the pumps are taking suction from the RWST. The proposed change lowers the RWST low-low level setpoint by 1.5 inches which corresponds to an equivalent reduction of NPSH available to the ECCS pumps prior to switchover. However, though this may be the most limiting case, the available NPSH for both the SI and CS pumps is significantly greater than the required NPSH. Per the 90-day response to the Generic Letter, the available NPSH for the SI pumps is 40.5 feet and the required NPSH is only 16 feet. The available NPSH for the CS pumps is 40 feet and the required NPSH is only 28 feet. Therefore, a reduction of 1.5 inches is insignificant. In addition, the supplemental information provided by NAESCO on January 28, 1999, states that a review of the hydraulic calculations confirms that sufficient NPSH continues to remain available for the most limiting pump alignments during the ECCS operational phases and that the assurance of sufficient NPSH for the ECCS pumps provided in NAESCO's 90-day response to GL 97-04 dated January 5, 1998, is still valid. The change to the RWST low-low level setpoint with regard to the available NPSH prior to switchover is, therefore, acceptable.

The most limiting pump alignment regarding available NPSH for the CBS and Residual Heat Removal (RHR) pumps was identified by NAESCO as occurring during ECCS recirculation. However, since the proposed change would lower the RWST low-low level setpoint, a greater inventory would potentially be delivered to the containment sumps which would increase the NPSH available to the CBS and RHR pumps during the recirculation phase. The change to the RWST low-low level setpoint with regard to the available NPSH during recirculation is, therefore, acceptable.

2.5 Operator Action Response Times

The amount of time available to the operator to complete the manual portion of the ECCS transfer from the RWST to the containment sumps is based on the volume of water in the RWST designated as the "Transfer Allowance" along with the flow rate. The amount of time available to the operator to secure the ECCS pumps upon receipt of the RWST EMPTY alarm is based on the volume of water in the RWST designated as the "Shutoff (Single Failure) Allowance" along with the worst case flow rate. During the derivation of the new RWST low-low

level setpoint, the volume of water attributed to the Transfer Allowance and the Shutoff (Single Failure) Allowance were not changed. Since the design basis flow rates from the RWST were also not changed, the operator action response times would not be affected by the proposed RWST low-low level setpoint change and, therefore, are acceptable.

2.6 Summary

Based on the above evaluation, the proposed changes to the RWST low-low level setpoint are acceptable. Appropriate changes have been made to TS Table 3.3-4 to depict the new setpoint and its associated parameters. TS Table 3.3-4 Table Notations were also revised to add notations to account for the new range of acceptable values. In addition, appropriate changes were made to the Bases to explain the necessity of adding an upper Allowable Value.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Hampshire and Massachusetts State officials were notified of the proposed issuance of the amendment. The State officials had no comments.

4.0 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 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 (63 FR 43205). 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.

5.0 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: John Harrison

Date: March 12, 1999