30

October ~, 1996

Mr. William J. Cahill, Jr.
Chief Nuclear Officer
Power Authority of the State of New York
123 Main Street
White Plains, NY 10601

SUBJECT: ISSUANCE OF AMENDMENT FOR JAMES A. FITZPATRICK NUCLEAR POWER PLANT (TAC NO. M95097)

Dear Mr. Cahill:

The Commission has issued the enclosed Amendment No. 236 to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated March 22, 1996, as supplemented by letter dated October 11, 1996.

The amendment proposes changes to the TS to establish operability requirements for avoidance and protection from thermal hydraulic instabilities to be consistent with Boiling Water Reactor Owners Group long-term solution Option I-D. Editorial changes are also made to support the revised specifications, improve readability of Bases sections, and enhance the presentation of requirements for single loop operation.

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

Sincerely,

/S/

K. R. Cotton, Acting Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosures: 1. Amendment No. 236 to DPR-59
2. Safety Evaluation

cc w/encls: See next page

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

October 30, 1996

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Chief Nuclear Officer
Power Authority of the State of New York
123 Main Street
White Plains, NY 10601

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Sincerely,

Karen Cotton

K. R. Cotton, Acting Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosures: 1. Amendment No. 236 to DPR-59
2. Safety Evaluation

cc w/encls: See next page

William J. Cahill, Jr.
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DATED: October 30, 1996

AMENDMENT NO. 236 TO FACILITY OPERATING LICENSE NO. DPR-59-FITZPATRICK

Docket File
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DFO1 1/1

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

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.236
License No. DPR-59

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

   A. The application for amendment by Power Authority of the State of New York (the licensee) dated March 22, 1996, as supplemented October 11, 1996, 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. DPR-59 is hereby amended to read as follows:

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(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No.236 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

S. Singh Bajwa, Acting Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 30, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 236

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Revise Appendix A as follows:

Remove Pages	Insert Pages
ii	ii
vii	vii
17	17
18	18
40	40
43a	43a
124a	124a
124b	Delete
124c	Delete
131	131
134	134
254c	254c
254d	254d
254e	254e,f
254f	254e,f

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LIST OF FIGURES

2.1 BASES (Cont'd)

In order to ensure that the IRM provided adequate protection against the single rod withdrawal error, a range of rod withdrawal accidents was analyzed. This analysis included starting the accident at various power levels. The most severe case involves an initial condition in which the reactor is just subcritical and the IRM system is not yet on scale. This condition exists at quarter rod density. Additional conservatism was taken in this analysis by assuming that the IRM channel closest to the withdrawn rod is by-passed. The results of this analysis show that the reactor is scrammed and peak power limited to one percent of rated power, thus maintaining MCPR above the Safety Limit. Based on the above analysis, the IRM provides protection against local control rod withdrawal errors and continuous withdrawal of control rods in sequence and provides backup protection for the APRM.

b. APRM Flux Scram Trip Setting (Refuel or Startup and Hot Standby Mode)

For operation in the startup mode while the reactor is at low pressure, the APRM scram setting of 15 percent of rated power provides adequate thermal margin between the setpoint and the safety limit, 25 percent of rated. The margin is adequate to accommodate anticipated maneuvers associated with power plant startup. Effects of increasing pressure at zero or low void content are minor, cold water from sources available during startup is not much colder than that already in the system, temperature coefficients are small, and control rod patterns are constrained to be uniform by operating procedures backed up by the rod worth minimizer and the Rod Sequence Control System. Worth of individual rods is very low in a uniform rod pattern. Thus, of all possible sources of reactivity input, uniform control rod withdrawal is the most probable cause of significant power rise. Because the flux distribution associated with uniform rod withdrawals does not involve high local peaks, and because several rods must be moved to change power by a significant percentage of rated power, the rate of power rise is very slow. Generally, the heat flux is in near equilibrium with the fission rate. In an assumed uniform rod withdrawal approach to the scram level, the rate of power rise is no more than 5 percent of rated power per minute, and the APRM system would be more than adequate to assure a scram before the power could exceed the safety limit. The 15 percent APRM scram remains active until the mode switch is placed in the RUN position. This switch occurs when reactor pressure is greater than 850 psig.

c. APRM Flux Scram Trip Setting (Run Mode)

The APRM system obtains neutron flux input signals from LPRMs (fission chambers) and is calibrated to indicate percent rated thermal power. The APRM scrams in the run mode are a flow referenced scram and a fixed high neutron flux scram. As power rises during transients, the instantaneous neutron flux (as a percentage of rated) will rise faster than the rate of heat transfer from the fuel (percentage of rated thermal power) due to the thermal time constant of the fuel and core thermal power will be less than the power indicated by the APRMs (neutron flux) at either scram setting.

The APRM flow referenced scram trip setting, nominally varies from 54% power at 0% recirculation flow to 120% power at 100% recirculation flow but is limited to 117% rated power. The flow referenced trip will result in a significantly earlier scram during slow thermal transients, such as the loss of 80°F feedwater heating event, than would result from the 120% fixed high neutron flux scram. The lower flow referenced scram setpoint therefore decreases the severity (ΔCPR) of a slow thermal transient and allows lower MCPR Operating Limits if such a transient

2.1 BASES (Cont'd)

c. APRM Flux Scram Trip Setting (Run Mode) (cont'd)

is the limiting abnormal operational transient during a certain exposure interval in the cycle. The flow referenced trip also provides protection for power oscillations which may result from reactor thermal hydraulic instability.

The APRM fixed high neutron flux scram protects the reactor during fast power increase transients if credit is not taken for a direct (position) scram or flow referenced scram.

The scram trip setting must be adjusted to ensure that the LHGR transient peak is not increased for any combination of maximum fraction of limiting power density (MFLPD) and reactor core thermal power. The scram setting is adjusted as specified in Table 3.1-1 when the MFLPD is greater than the fraction of rated power (FRP). This adjustment may be accomplished by either reducing the APRM scram and rod block settings or adjusting the indicated APRM signal to reflect the high peaking condition.

Analyses of the limiting transients show that no scram adjustment is required to assure that the MCPR will be greater than the Safety Limit when the transient is initiated from the MCPR operating limits specified in the Core Operating Limits Report.

d. APRM Rod Block Trip Setting

Reactor power level may be varied by moving control rods or by varying the recirculation flow rate. The APRM system provides a control rod block to prevent rod withdrawal beyond a given point at constant recirculation flow rate, and thus provides an added level of protection before APRM Scram. This rod block trip setting, which is automatically varied with recirculation loop flow rate, prevents an increase in the reactor power level to excessive values due to control withdrawal. The flow variable trip setting parallels that of the APRM Scram and provides margin to scram, assuming a steady-state operation at the trip setting, over the entire recirculation flow range. The actual power distribution in the core is established by specified control rod sequences and is monitored continuously by the in-core LPRM system. As with the APRM scram trip setting, the APRM rod block trip setting is adjusted downward if the maximum fraction of limiting power density exceeds the fraction of rated power, thus preserving the APRM rod block margin. As with the scram setting, this may be accomplished by adjusting the APRM gain.

2. Reactor Water Low Level Scram Trip Setting

The reactor low water level scram is set at a point which will assure that the water level used in the Bases for the Safety Limit is maintained. The scram setpoint is based on normal operating temperature and pressure conditions because the level instrumentation is density compensated.

TABLE 3.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Mode in Which Function Must Be Operable			Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
			Refuel (Note 7)	Startup	Run		
1	Mode Switch in Shutdown		X	X	X	1 Mode Switch	A
1	Manual Scram		X	X	X	2	A
3	IRM High Flux	≤96% (120/125) of full scale	X	X		8	A
3	IRM Inoperative		X	X		8	A
2	APRM Neutron Flux-Startup (Note 15)	≤15% Power	X	X		6	A
2	APRM Flow Referenced Neutron Flux (Not to exceed 117%) (Note 13)	(Note 12)			X	6	A or B
2	APRM Fixed High Neutron Flux	≤120% Power			X	6	A or B
2	APRM Inoperative	(Note 10)	X	X	X	6	A or B

Amendment No. ~~14, 18, 183, 227~~, 236

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

12. The APRM Flow Referenced Neutron Flux Scram setting shall be less than or equal to the limit specified in the Core Operating Limits Report.

13. The Average Power Range Monitor scram function is varied as a function of recirculation flow (W). The trip setting of this function must be maintained as specified in the Core Operating Limits Report.

14. Deleted.

15. This Average Power Range Monitor scram function is fixed point and is increased when the reactor mode switch is placed in the Run position.

16. Instrumentation common to PCIS.

3.5 (cont'd)

J. Thermal Hydraulic Stability

1. When the reactor is in the run mode:

   a. Under normal operating conditions the reactor shall not be intentionally operated within the Power/Flow Exclusion Region defined in the Core Operating Limits Report (COLR).

   b. If the reactor has entered the Power/Flow Exclusion Region, the operator shall immediately insert control rods and/or increase recirculation flow to establish operation outside the region.

K. Single-Loop Operation

1. The reactor may be started and operated, or reactor operation may continue, with a single Reactor Coolant System recirculation loop in operation. The requirements applicable to single-loop operation in Specifications 1.1.A, 2.1.A, 3.1.A, 3.1.B, 3.2.C, and 3.5.H shall be in effect within 8 hours, or the reactor shall be placed in at least the hot shutdown mode within the following 12 hours.

2. During resumption of two-loop operation following a period of single-loop operation, the discharge valve of the lower speed pump shall not be opened unless the speed of the faster pump is less than 50 percent of its rated speed.

3. With no Reactor Coolant System recirculation loop in service, the reactor shall be placed in at least the hot shutdown mode within 12 hours.

3.5 BASES (cont'd)

J. Thermal Hydraulic Stability

10 CFR 50, Appendix A, General Design Criterion 12 requires that power oscillations are either prevented or can be readily detected and suppressed without exceeding specified fuel design limits. To minimize the likelihood of a thermal hydraulic instability which results in power oscillations, a power/flow exclusion region to be avoided during normal operation is calculated using the approved methodology specified in Technical Specification 6.9(A)4. Since the exclusion region may change each fuel cycle, the limits are contained in the Core Operating Limits Report. Specific directions are provided to avoid operation in the exclusion region and to immediately exit the region if entered. Entries into the exclusion region are not part of normal operation, but may result from an abnormal event, such as a single recirculation pump trip or loss of feedwater heating, or be required to prevent equipment damage. In these events, time spent within the exclusion region is minimized.

Although operator actions can prevent the occurrence of and protect the reactor from an instability, the APRM flow-biased reactor scram will suppress power oscillations prior to exceeding the fuel safety limit (MCPR). Reference 3.5.L.2 demonstrated that this protection is provided at a high statistical confidence level for core-wide mode oscillations and at a nominal statistical confidence level for regional mode oscillations. This reference also demonstrated that the core-wide mode of oscillation is preferred due to the large single-phase channel pressure drop associated with the small fuel inlet orifice diameters.

K. Single-Loop Operation

Requiring the discharge valve of the lower speed loop to remain closed until the speed of the faster pump is below 50 percent of its rated speed provides assurance when going from one to two pump operation that excessive vibration of the jet pump risers will not occur.

L. References

1. "FitzPatrick Nuclear Power Plant Single-Loop Operation", NEDO-24281, August 1980.

2. "Application of the 'Regional Exclusion with Flow-Biased APRM Neutron Flux Scram' Stability Solution (Option I-D) to the James A. FitzPatrick Nuclear Power Plant," GENE-637-044-0295, February 1995

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(A) ROUTINE REPORTS (Continued)

4. CORE OPERATING LIMITS REPORT

a. Core operating limits shall be established prior to startup from each reload cycle, or prior to any remaining portion of a reload cycle for the following:

- The Average Planar Linear Heat Generation Rates (APLHGR) of Specification 3.5.H;
- The Minimum Critical Power Ratio (MCPR) and MCPR low flow adjustment factor, K_f, of Specifications 3.1.B and 4.1.E;
- The Linear Heat Generation Rate (LHGR) of Specification 3.5.I;
- The Reactor Protection System (RPS) APRM flow biased trip settings of Table 3.1-1;
- The flow biased APRM and Rod Block Monitor (RBM) rod block settings of Table 3.2-3; and
- The Power/Flow Exclusion Region of Specification 3.5.J.

and shall be documented in the Core Operating Limits Report (COLR).

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC as described in:

1. "General Electric Standard Application for Reactor Fuel," NEDE-24011-P, latest approved version and amendments.
2. "James A. FitzPatrick Nuclear Power Plant SAFER/GESTR - LOCA Loss-of-Coolant Accident Analysis," NEDC-31317P, October, 1986 including latest errata and addenda.
3. "Loss-of-Coolant Accident Analysis for James A. FitzPatrick Nuclear Power Plant," NEDO-21662-2, July, 1977 including latest errata and addenda.
4. "BWR Owners' Group Long-term Stability Solutions Licensing Methodology," NEDO-31960-A, June 1991.
5. "BWR Owners' Group Long-term Stability Solutions Licensing Methodology," NEDO-31960-A, Supplement 1, March 1992.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid-cycle revisions or supplements thereto, shall be provided, upon issuance for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 236 TO FACILITY OPERATING LICENSE NO. DPR-59

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 INTRODUCTION

By letter dated March 22, 1996, as supplemented October 11, 1996, the Power Authority of the State of New York (the licensee) submitted a request for changes to the James A. FitzPatrick Nuclear Power Plant Technical Specifications (TSs). The requested changes would establish operability requirements for avoidance and protection from thermal hydraulic instabilities to be consistent with Boiling Water Reactor Owners Group (BWROG) long-term solution Option I-D. The proposed changes include: (1) provision of core power/flow operating map restrictions based on a plant and cycle specific thermal hydraulic stability exclusion region to prevent the occurrence of power oscillations, and (2) those associated with the removal of Simulated Thermal Power Monitor time delay from the Average Power Range Monitor (APRM) flow-biased scram to provide protection from postulated power oscillations.

Editorial changes are also made to support the revised specifications, improve readability of Bases sections, and enhance the presentation of requirements for single loop operation. The October 11, 1996, submittal contained supplemental information and does not alter the proposed no significant hazards consideration determination.

2.0 EVALUATION

The proposed changes include modifying the requirements for avoidance and protection from thermal hydraulic instabilities to be consistent with BWROG long term solution Option I-D, adding an exclusion region and its approved supporting methodologies to the Core Operating Limits Report (COLR), and modifying those associated with the removal of the Simulated Thermal Power Monitor time delay from the Average Power Range Monitor flow-biased scram. NRC has evaluated and approved the BWROG Long-Term Stability Solutions Licensing Methodology which includes Option ID in topical reports NEDO-31960 and NEDO-31960, supplement 1. The following TS, Surveillance Requirements (SR) and Bases are proposed changes.

(1) TS 3.5.J - Thermal Hydraulic Stability

(a) The proposed TS 3.5.J.1 is to replace old TS 3.5.J.1, 3.5.J.2 and 3.5.J.3 and to read as follows:

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When the reactor is in the run mode:

a. Under normal operating conditions the reactor shall not be intentionally operated within the Power/Flow Exclusion Region defined in the COLR.

b. If the reactor has entered the Power/Flow Exclusion Region, the operator shall immediately insert control rods and/or increase recirculation flow to establish operation outside the region.

The NRC staff has reviewed the proposed TS and has found them acceptable since NRC-approved methodologies are used to support cycle-specific parameters in the COLR and the operability requirements for avoidance and protection from thermal hydraulic instabilities are consistent with BWROG long-term solution Option I-D implementation criteria.

(b) TS 3.5.J.4 through 3.5.J.6 are renumbered as TS 3.5.K under Single-Loop Operation. It is administrative in nature with minor editorial changes; therefore, the proposed changes are acceptable.

(2) SR 4.5.J.1 of Thermal Hydraulic Stability is deleted. The proposed change is acceptable since its function is taken over by the new limiting condition for operation 3.5.J.1.b.

(3) Bases 2.1.c - APRM Flux Scram Trip Setting (Run Mode)

The Bases is revised to reflect the application of the BWROG stability long-term solution Option I-D by adding the lower flow referenced scram setpoint of 54% power at 0% recirculation flow and 120% power at 100% recirculation flow to the APRM flow referenced scram trip setting and to rearrange the current contents, therefore, the proposed changes are acceptable.

(4) Figure 3.5-1

This figure is deleted since the figure of thermal power and core flow limits is no longer applicable and the power/flow exclusion region will be specified in the COLR.

(5) Bases 3.5.J - Thermal Hydraulic Stability

The proposed changes are to revise the text to reflect the application of the BWROG stability solution Option I-D and the cycle-specific parameter in the COLR. Relocate the last paragraph of Bases Section 3.5.J to a revised Bases 3.5.K which is administrative in nature. Therefore, the proposed changes are acceptable.

(6) Bases 3.5.L - References

The proposed changes are to renumber Bases Section 3.5.K to be Bases Section 3.5.L and add reference 3.5.L.2 which is a plant-specific application of the "Regional Exclusion with Flow-Biased APRM Neutron Flux Scram" Stability Solution (Option 1-D) to the James A. FitzPatrick Nuclear Power Plant to support the TS change request.

(7) Table 3.1-1 - Reactor Protection System (SCRAM) Instrumentation Requirements

The Note 14 is deleted from trip function for APRM flow referenced neutron flux (not to exceed 117%) since it is no longer applicable to this trip function.

(8) TS 6.9(A)4 - COLR

The proposed changes are: (1) to include the Power/Flow Exclusion Region of Specification 3.5.J in TS 6.9(A)4.a; and (2) to add an approved topical report NEDO-31960 and NEDO-31960, Supplement 1, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology." These proposed changes are acceptable since they involve approved methodologies.

On the basis of the staff review, the James A. FitzPatrick Nuclear Power Plant meets the BWROG Long-Term solution I-D implementation criteria which are that out-of-phase oscillations must be highly unlikely and the plant must have an unfiltered flow-biased scram (a commitment was made by licensee to remove the Simulated Thermal Power Monitor time delay from the APRM flow-biased scram). Therefore, the staff concludes that the proposed changes including the application of Long Term Solution I-D to the FitzPatrick plant, relocation of the power/flow exclusion region to the COLR, some editorial corrections and addition of the approved topical report relating to the I-D methodologies are acceptable.

The staff will perform an inspection on power distribution controls and design record files for the calculations reported in Table 4.1 of GENE-637-044-0295 since the calculated exclusion region is unusually small. Full implementation of Long-Term Solution Option I-D in FitzPatrick will occur when: (1) the simulated thermal power time delay is removed from the flow-biased scram system, (2) the plant and cycle-specific exclusion region is included in the COLR, and (3) a power distribution control method (e.g., the SOLOMON system) is available to operate inside the buffer region.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official 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 (61 FR 20854). 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 staff has reviewed the request by Power Authority of the State of New York to revise the TS of the James A. FitzPatrick Nuclear Power Plant to implement BWROG long term solution Option I-D and to remove the power/flow exclusion region from the TS by replacing it with a reference to a COLR. Based on the review, we conclude that these revisions are acceptable for the plant specific applications.

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: Tia Huang

Date: October 30, 1996