

January 17, 1992

Docket Nos. 50-317
and 50-318

DISTRIBUTION:
See attached sheet

Mr. G. C. Creel
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
MD Rts. 2 & 4
P. O. Box 1535
Lusby, Maryland 20657

Dear Mr. Creel:

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT,
UNIT NO. 1 (TAC NO. M71241) AND UNIT NO. 2 (TAC NO. M71242)

The Commission has issued the enclosed Amendment No. 166 to Facility Operating License No. DPR-53 and Amendment No. 146 to Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated July 2, 1991, as supplemented November 15, 1991.

The amendments eliminate restrictions on the movement of heavy loads greater than 1600 pounds over fuel assemblies by the spent fuel cask handling crane which is to be upgraded to a single-failure-proof design. As noted, the amendments will be implemented when the spent fuel cask handling crane modifications are complete prior to July 31, 1992. We request to be informed when the work is completed and the amendments have been implemented.

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,

Original Signed By:

Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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Enclosures:

1. Amendment No. 166 to DPR-53
2. Amendment No. 146 to DPR-69
3. Safety Evaluation

cc w/enclosures:

See next page

*See previous concurrence

OFC	:LA:PDI-1	:PH:PDI-1	:OGC*	:D:PDI-1
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DATE	: 1/14/92	: 1/14/92	: 1/14/92	: 1/15/92

OFFICIAL RECORD COPY
Document Name: AMEND 317/318

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DATED: January 17, 1992

AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. DPR-53-CALVERT CLIFFS UNIT 1
AMENDMENT NO. 146 TO FACILITY OPERATING LICENSE NO. DPR-69-CALVERT CLIFFS UNIT 2

Docket File

NRC & Local PDRs

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OC/LFMB

Plant File

cc: Plant Service list



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555

January 17, 1992

Docket Nos. 50-317
and 50-318

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Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
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Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

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2. Amendment No. 146 to DPR-69
3. Safety Evaluation

cc w/enclosures:
See next page

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QFOL
11

Mr. G. C. Creel
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2

cc:

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 166
License No. DPR-53

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated July 2, 1991, as supplemented November 15, 1991, 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-53 is hereby amended to read as follows: .

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 166, 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 and shall be implemented when the spent fuel cask handling crane modifications are complete prior to July 31, 1992.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Capra

Robert A. Capra, 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: January 17, 1992



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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 146
License No. DPR-69

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated July 2, 1991, as supplemented November 15, 1991, 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-69 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 146, 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 and shall be implemented when the spent fuel cask handling crane modifications are complete prior to July 31, 1992.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Capra, 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: January 17, 1992

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 166 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 146 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

Remove Pages

3/4 9-7
3/4 9-16
B3/4 9-2
B3/4 9-3

Insert Pages

3/4 9-7
3/4 9-16
B3/4 9-2
B3/4 9-3

REFUELING OPERATIONS

CRANE TRAVEL - SPENT FUEL STORAGE POOL BUILDING

LIMITING CONDITION FOR OPERATION

3.9.7 Loads in excess of 1600 pounds shall be prohibited from travel over fuel assemblies in the storage pool unless such loads are handled by the single-failure-proof Spent Fuel Cask Handling Crane.

APPLICABILITY: With fuel assemblies in the storage pool.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.7.1 The weight of each load, other than a fuel assembly and CEA, shall be verified to be \leq 1600 pounds prior to moving it over fuel assemblies unless such loads are handled by the single-failure-proof Spent Fuel Cask Handling Crane.

4.9.7.2 Slings and special lifting devices shall be visually inspected and verified operable within 7 days prior to and at least once per 7 days thereafter during Spent Fuel Cask Handling Crane operation over the spent fuel storage pool.

4.9.7.3 In addition to the requirements of Section 4.9.7.2, pre-operational and periodic tests and preventive maintenance shall be performed per plant procedures.

DELETED

REFUELING OPERATIONS

BASES

3/4.9.6 REFUELING MACHINE OPERABILITY

The **OPERABILITY** requirements for the refueling machine ensure that: (1) the refueling machine will be used for movement of CEAs and fuel assemblies, (2) the refueling machine has sufficient load capacity to lift a CEA or fuel assembly, and (3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel assembly and CEA over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses. The Spent Fuel Cask Handling Crane, which has a critical load capacity of 125/15 ton, meets the "single-failure-proof" criteria of NUREG-0554 and NUREG-0612.

3/4.9.8 COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the **REFUELING MODE**, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

The requirement to have two shutdown cooling loops **OPERABLE** when there is less than 23 feet of water above the core ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

In **MODE 6**, shutdown cooling flow must provide sufficient heat removal to match core decay heat generation rates and maintain the core exit temperature within the **MODE** limit. Thus, as decay heat production is reduced with time, shutdown cooling flow may be proportionally reduced. Pursuant to NRC Generic Letter 88-17, flow reduction is necessary for operations near the mid-point of the hot leg piping to prevent vortex formation at the shutdown cooling suction nozzle. Prevention of vortex formation reduces the potential for a loss of shutdown cooling due to air binding of the low pressure safety injection (LPSI) pump(s) operating to provide shutdown cooling flow. In accordance with the recommendations of NRC Bulletin 88-04, "Safety Related Pump Loss," a minimum flow rate

REFUELING OPERATIONS

BASES

requirement of 1500 gpm is imposed. This protects the vendor-recommended minimum continuous duty flow rate of 1340 gpm for the LPSI pumps. The 1500 gpm minimum flow rate is also more than adequate to preclude a boron dilution event in **MODE 6** operation and in no way restricts the ability to increase flow as necessary to remove decay heat.

3/4.9.9 CONTAINMENT PURGE VALVE ISOLATION SYSTEM

The **OPERABILITY** of this system ensures that the containment purge valves will be automatically isolated upon detection of high radiation levels within the containment. The **OPERABILITY** of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL-REACTOR VESSEL AND SPENT FUEL POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 SPENT FUEL POOL VENTILATION SYSTEM

The limitations on the spent fuel pool ventilation system ensure that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The **OPERABILITY** of this system and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses.

3/4.9.14 CONTAINMENT VENT ISOLATION VALVES

The **OPERABILITY** and closure restrictions on the containment vent isolation valves are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the **REFUELING MODE**.

REFUELING OPERATIONS

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. DPR-53
AND AMENDMENT NO. 146 TO FACILITY OPERATING LICENSE NO. DPR-69
BALTIMORE GAS AND ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-317 AND 50-318

1.0 INTRODUCTION

By letter dated July 2, 1991, as supplemented November 15, 1991, the Baltimore Gas and Electric Company (the licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, Technical Specifications (TS). The November 15, 1991, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

The requested changes would eliminate restrictions on the movement of heavy loads greater than 1600 pounds over fuel assemblies by the spent fuel cask handling crane. The proposed changes would revise TS 3/4.9.7, Crane Travel - Spent Fuel Storage Pool Building, and TS 3/4.9.13, Spent Fuel Cask Handling Crane.

Baltimore Gas & Electric (BG&E) is awaiting NRC's approval of its application for a license to construct and operate a NUHOMS-24P Independent Spent Fuel Pool Storage Installation (ISFSF) pursuant to the provisions of 10 CFR Part 72. NUHOMS-24P is a dry fuel storage system which will provide safe interim storage for irradiated fuel assemblies. The fuel assemblies are confined in a helium atmosphere by stainless steel canister. The canister is protected and shielded by a massive concrete module. The maximum weight (loaded) of the NUHOMS-24P cask is 180 kips which is more than three times the maximum drop weight analyzed (i.e., 50 kips) for the existing crane. Therefore, the licensee decided to upgrade the existing crane. The proposed TS changes support the upgrade of the spent fuel cask handling crane to a single-failure-proof design. A safety evaluation addressing the TS changes is provided in 2.1.

One of the requirements for the upgrade is that a seismic analysis be performed on the bridge structure, the trolley and trucks and the wire ropes. The licensee analyzed the crane components and the auxiliary building structure under the postulated seismic loadings (i.e., Operating Basis Earthquake-OBE, and Design Basis Earthquake-DBE). A seismic analysis for the proposed upgrade is presented in 2.2.

2.0 EVALUATION

2.1 Evaluation of the proposed TS changes and spent fuel cask handling crane upgrade.

The licensee has contracted Ederer Incorporated to upgrade the existing Whiting Corporation 150/15 ton (critical load capacity) Spent Fuel Cask Handling Crane, which has been in use since initial commercial operation. The maximum weight of the transfer cask used for this application could create sufficient punching shear stress in the event of a load drop to compromise the integrity of the spent fuel pool. The upgrade consists of replacement of the trolley and hoist system with an Ederer designed system that meets the "single-failure-proof" criteria specified in NUREG-0554, Single-Failure-Proof Cranes for Nuclear Power Plants, 1979, and NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, 1980. The existing crane bridge and bridge-mounted equipment will be retained with some modifications in order to meet the "single-failure-proof" criteria. The upgraded crane will have a new critical load capacity of 125/15 tons.

The Ederer designed trolley and hoist system that will be installed at Calvert Cliffs is comparable to that described in Ederer Incorporated generic licensing topical report EDR-I(P)-A, entitled, "Ederer's Nuclear Safety-Related Extra Safety and Monitoring (X-SAM) Cranes, Revision 3." The topical report describes the design and testing of the "single-failure-proof" features which are included in Ederer's X-SAM cranes intended for handling spent fuel casks and other safety-related loads at a nuclear power plant.

By letter dated January 2, 1980, the staff concluded that the generic design features described in this topical report are acceptable to assure that a single failure will not result in the loss of capability to retain a critical load. The letter goes on to state that, in the alteration or conversion of an existing crane to provide features found acceptable in the topical report, the licensee must provide relevant site-specific information and demonstrate the acceptability of unreplaced structures and components. Accordingly, this report evaluates the acceptability of site-specific features, and unreplaced components and structures.

The plant-specific crane data was reviewed and found to be consistent with the "single-failure-proof" criteria contained in NUREG-0554 and NUREG-0612. The licensee has committed to use administrative procedures to assure that a minimum of one foot clearance is maintained between the load and surfaces which cannot withstand the maximum kinetic energy associated with a drive train failure. An analysis has demonstrated that the maximum load motion following a drive train failure will be less than one foot. The licensee has also designated safe laydown and repair areas in the event of a crane failure while transporting a heavy load. Ederer has been contracted to provide updated operating procedures and perform operational testing. The staff has found these actions to be acceptable with regard to the "single-failure-proof" criteria contained in NUREG-0554 and NUREG-0612.

The licensee has committed to conduct "cold proof" 125% static load testing in accordance with NUREG-0554. Following the "cold proof" test, the licensee has also committed to perform a nondestructive examination of welds whose failure could result in the drop of a critical load. This testing serves to verify that brittle failure of unreplaced components and structures is unlikely. The testing is consistent with the "single-failure-proof" criteria contained in NUREG-0554 and NUREG-0612, and is, therefore, acceptable.

A seismic analysis of the original bridge structure members performed for the licensee by Bechtel Corporation indicated potential overstress conditions in the bridge girders, trolley rail anchorage clips, and end tie bolted connections under certain seismic loading conditions. The licensee has committed to modify these components in order to eliminate these potential overstress conditions by strengthening the girders, adding additional trolley rail anchorage clips, and using stronger bolts in the end tie bolted connections. The staff has reviewed these commitments and found them to be acceptable with regard to the "single-failure-proof" criteria contained in NUREG-0554 and NUREG-0612.

2.2 Seismic Analysis

This evaluation addresses the seismic adequacy of the proposed upgraded crane and the supporting auxiliary building structure.

The crane consists of the bridge girders (existing) with center-line to center-line of rail span of 56 ft. 5 1/2 in.. The new trolley (proposed) spans 16 ft. 6 in. between the center lines of trolley rails. The rated capacity of the main hook is 150 tons, and that of the auxiliary hook is 15 tons. The new trolley and the hooks will be qualified to the SFP crane criteria of NUREG-0554. With the installation of the proposed new trolley and other associated modifications, the licensee will be able to move loads larger than 1600 lbs. (present limit) over the spent fuel assemblies.

The seismic analysis of the crane consisted of finite elements, response spectrum analysis using the Bechtel Computer program BSAP. In order to accurately define the seismic characteristics of the modified crane assembly, i.e. existing bridge structure and new trolley structure, a three dimensional finite element model was created. The three dimensional model allows for an evaluation of cross directional effects in two perpendicular directions due to an input in a third, orthogonal direction. To include the effects of local building steel (runway girder and building column), the analysis incorporated equivalent springs.

The crane modelling procedure used by the licensee is acceptable to the staff. The required response spectra (RRS) for the analysis were computed from the average of the spectra at elevations 69 ft. 0 in. and 117 ft. 0 in. since the elevation of the top of the bridge is 93 ft. 0 in. The runway girders on east and west side of the building is separated by 1 in. gap for expansion. For the purpose of the seismic analysis, the RRS used was the envelope of the east and

west side of the building. The seismic input for the crane analysis was based on the conservative considerations of RRS and building frequencies. Additionally, the following load and analysis parameters were evaluated: (1) bridge position along runway girders, (2) variation in lifted load from 0 to 300 kips, (3) lifted load position (high hook, low hook), (4) trolley position on the bridge (at end, at 1/4 span and 1/2 span), (5) OBE, DBE load cases, and (6) horizontal and vertical load cases in two directions.

The analysis results indicated that a number of modifications will be required to optimize the crane design and to comply with the UFSAR acceptance criteria. One major modification will consist of welding reinforcing (angles and plates) to the webs of the bridge girders near top and bottom flanges. The reinforcing will be in the middle 374 in. span of the bridge girders. The second modification will consist of welding sufficient number of rail-clips to change the present staggered configuration of clips to the one having symmetrical clips on both sides of the trolley rails. The third modification is to replace the existing ASTM A-325 bolts joining splice plate to the cover plate of the end ties of the bridge girder with ASTM A-490 bolts. The licensee has committed to install these modifications to the crane prior to its proposed use. With the installation of these modifications, the staff considers the proposed SFP crane to be adequate to withstand the postulated seismic loads.

The staff has also reviewed the licensee's evaluation of the existing crane girders and the auxiliary building structure and agrees with the licensee's conclusion that the structures are adequate to withstand the postulated seismic loading.

3.0 SUMMARY

The staff finds the generic design features of the Ederer trolley and hoist acceptable for use as part of a "single-failure-proof" crane in a topical report evaluation promulgated by letter dated January 2, 1980. Site specific crane features were evaluated in this report to be acceptable for a "single-failure-proof" crane. The actions the licensee has committed to perform with regard to testing and modification of unreplaced components and structures are consistent with the "single-failure-proof" criteria of NUREG-0554 and NUREG-0612, and are acceptable. Restrictions on the handling of heavy loads prescribed by NUREG-0612 will no longer be required once the criteria for a "single-failure-proof" crane are satisfied. The staff concludes that the upgraded (modified) crane will be able to withstand the postulated seismic loads without exceeding the acceptance criteria of the plant UFSAR. The staff also reviewed the impact of the upgrade on the auxiliary building structure and concludes that the structure is able to withstand the postulated seismic loads without exceeding the acceptance criteria in the plant UFSAR. The staff therefore concludes that the proposed TS changes are acceptable.

4.0 STATE CONCLUSION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (56 FR 37577). Accordingly, the amendments meet 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 amendments.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: January 17, 1992