REGULATORY DOCKET FILE COPY

July 31, 1979

Docket Nos. 50-315
and 50-316

Mr. John Dolan, Vice President
Indiana and Michigan Electric Company
Indiana and Michigan Power Company
Post Office Box 18
Bowling Green Station
New York, New York 10004

Dear Mr. Dolan:

In response to your submittals dated January 31, 1977 and March 31, 1977, the Commission has issued the enclosed Amendment Nos. 31 and 12 for the Donald C. Cook Nuclear Plant, Units 1 and 2, respectively. These amendments add to your operating licenses a condition relating to facility modifications for fire protection. We have discussed the contents and conditions of these license amendments with members of your staff and we understand that you have agreed to these license amendments. Nevertheless, you understand that by the provisions of 10 CFR Part 2 paragraph 2.204, you may demand a hearing with respect to all or any part of the amendments within twenty (20) days from the date of this letter. If you do not demand a hearing, these amendments will become effective on the expiration of that twenty (20) day period.

For D. C. Cook, Unit 2, this amendment supercedes condition 2.c.3(o) of Facility Operating License No. DPR-74.

Table 1 of our enclosed Safety Evaluation Report lists facility modifications and completion dates to which you have committed during the fire protection review. All modifications must be completed in accordance with the dates specified in that table.

By Amendment No. 22 to Operating License DPR-58 on Unit No. 1 issued December 12, 1977 and by Operating License DPR-74 on Unit No. 2 issued December 23, 1977, Technical Specifications were incorporated in your licenses specifying limiting conditions for operating and surveillance requirements for existing fire protection systems and administrative controls. You are requested to propose, where appropriate, revised Technical Spedifications related to facility modifications described in the enclosed Safety Evaluation. These specification changes should be provided within 60 days after modifications affecting Technical Specifications are completed.

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OFFICE➤						
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DATE➤				790829	0280	

We have determined that no license amendment fee is required to accompany your response to the aforementioned request for revised Technical Specifications. This determination is limited to those applications to incorporate our recommended Technical Specifications and those to add surveillance and other requirements for operable systems that have been added at our request. Any other unrelated changes or requests that you might choose to include in applications for license amendment related to fire protection would be subjected to amendment fess in accordance with Section 170.22 of 10 CFR Part 170.

Copies of the related Notice of Issuance is also enclosed.

Sincerely,

Original Signed By

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 31 to DPR-58
2. Amendment No. 12 to DPR-74
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

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

July 31, 1979

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and 50-316

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Indiana and Michigan Electric Company
Indiana and Michigan Power Company
Post Office Box 18
Bowling Green Station
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For D. C. Cook, Unit 2, this amendment supercedes condition 2.c.3(o) of Facility Operating License No. DPR-74.

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We have determined that no license amendment fee is required to accompany your response to the aforementioned request for revised Technical Specifications. This determination is limited to those applications to incorporate our recommended Technical Specifications and those to add surveillance and other requirements for operable systems that have been added at our request. Any other unrelated changes or requests that you might choose to include in applications for license amendment related to fire protection would be subjected to amendment fess in accordance with Section 170.22 of 10 CFR Part 170.

Copies of the related Notice of Issuance is also enclosed.

Sincerely,

A. Schwencer

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 31 to DPR-58
2. Amendment No. 12 to DPR-74
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

cc: Mr. Robert W. Jurgensen
Chief Nuclear Engineer
American Electric Power
Service Corporation
2 Broadway
New York, New York 10004

Gerald Charnoff, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Citizens for a Better Environment
59 East Van Buren Street
Chicago, Illinois 60605

Maude Preston Palenske Memorial
Library
500 Market Street
St. Joseph, Michigan 49085

Mr. D. Shaller, Plant Manager
Donald C. Cook Nuclear Plant
P. O. Box 458
Bridgman, Michigan 49106

Mr. R. Masse
Donald C. Cook Nuclear Plant
P. O. Box 458
Bridgman, Michigan 29160

Mr. Wade Schuler, Supervisor
Lake Township
Baroda, Michigan 49101

Mr. William R. Rustem (2)
Office of the Governor
Room 1 - Capitol Building
Lansing, Michigan 48913

Attorney General
Department of Attorney General
525 West Ottawa Street
Lansing, Michigan 48913

Honorable James Bemenek, Mayor
City of Bridgman, Michigan 49106

Director, Technical Assessment Division
Office of Radiation Programs (AW-459)
U. S. Environmental Protection Agency
Crystal Mall #2
Arlington, Virginia 20460

U. S. Environmental Protection Agency
Federal Activities Branch
Region V Office
ATTN: EIS COORDINATOR
230 South Dearborn Street
Chicago, Illinois 60604

Attorney General
State House
Indianapolis, Indiana 46204

State Board of Health
ATTN: Director, Bureau of Engineering
1330 West Michigan Street
Indianapolis, Indiana 46206

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

INDIANA & MICHIGAN ELECTRIC COMPANY

INDIANA & MICHIGAN POWER COMPANY

DOCKET NO. 50-315

DONALD C. COOK NUCLEAR PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 31
License No. DPR-58

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

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

   B. 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;

   C. 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

   D. 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, add paragraph 2.C(4) to Facility Operating License No. DPR-58 to read as follows:

   "2.C(4) The licensees may proceed with and are required to complete the modifications identified in Table 1 of the Fire Protection Safety Evaluation Report for the Donald C. Cook Nuclear Plant dated June 4, 1979. These modifications shall be completed in accordance with the dates contained in Table 1 of that SER or Supplements thereto. Administrative controls for fire protection as described in the licensee's submittals dated January 31, 1977 and October 27, 1977 shall be implemented and maintained."

3. This license amendment becomes effective as of July 31, 1979.*

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Dated at Bethesda, Maryland
this 31st day of July, 1979.

*Provided no hearing is requested under 10 CFR Part 2 paragraph 2.204.

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

INDIANA & MICHIGAN ELECTRIC COMPANY

INDIANA & MICHIGAN POWER COMPANY

DOCKET NO. 50-316

DONALD C. COOK NUCLEAR PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 12
License No. DPR-74

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

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

   B. 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;

   C. 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

   D. 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, Facility Operating License No. DPR-74 is hereby amended by changing paragraph 2.C.3(o) to read as follows:

   "2.C.3(o) The licensees may proceed with and are required to complete the modifications identified in Table 1 of the Fire Protection Safety Evaluation Report for the Donald C. Cook Nuclear Plant dated June 4, 1979. These modifications shall be completed in accordance with the dates contained in Table 1 of that SER or Supplements thereto. Administrative controls for fire protection as described in the licensee's submittals dated January 31, 1977 and October 27, 1977 shall be implemented and maintained."

3. This license amendment becomes effective as of July 31, 1979.*

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Dated at Bethesda, Maryland
this 31st day of July, 1979.

*Provided no hearing is requested under 10 CFR Part 2 paragraph 2.204.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 31 AND 12 TO LICENSE NOS. DPR-58 AND DPR-74

INDIANA AND MICHIGAN ELECTRIC COMPANY

INDIANA AND MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT UNITS NOS. 1 AND 2

DOCKET NOS. 50-315 AND 50-316

Introduction

Following a fire at the Browns Ferry Nuclear Station in March 1975, the Nuclear Regulatory Commission (NRC) initiated an evaluation of the need for improving fire protection programs at all licensed nuclear power plants. As part of this continuing evaluation, the NRC in February 1976, published a report entitled, "Recommendations Related to Browns Ferry Fire," NUREG-0050. This report recommended that improvements in the areas of fire prevention and fire control be made in most existing facilities and that consideration be given to design features that would increase the ability of nuclear facilities to withstand fire without the loss of important safety functions. To implement the report's recommendations, NRC initiated a program for reevaluation of fire protection programs at all licensed nuclear power stations and for a comprehensive review of all new license applications.

The NRC issued new guidelines for fire protection programs in nuclear power plants which reflect the recommendations in NUREG-0050. These guidelines are contained in the following documents:

> Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-75/087, Section 9.5.1, "Fire Protection," May 1976, which includes Guidelines for Fire Protection for Nuclear Power Plants (BTP APCSB 9.5-1 Appendix A), August 23, 1976.

"Guidelines for Fire Protection for Nuclear Power Plants," (Appendix A to BTP APCSB 9.5-1), August 23, 1976.

"Supplementary Guidance on Information Needed for Fire Protection Program Evaluation," September 30, 1976.

"Sample Technical Specifications."

"Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance," August 12, 1977.

All licensees were requested to: (1) compare their fire protection programs with the new guidelines; and (2) analyze the consequences of a postulated fire in each plant area. The results of these actions as applied to D. C. Cook, Units 1 & 2, are discussed below.

We have, with the assistance of our fire protection consultants,* reviewed the licensees' analysis and visited both Units 1 and 2 to examine the relationship of safety related components, systems, and structures to combustible materials and associated fire detection and suppression systems. Our review was based on the licensees' proposed program for fire protection as described in the following docketed information: (1) The licensees' response to Appendix A to Branch Technical Position APCSB 9.5-1, dated January 31, 1977, (2) the D. C. Cook Nuclear Plants, Units 1 and 2 Fire Hazards Analysis, dated March 31, 1977, and (3) the licensees' responses to requests for additional information and staff positions.

The overall objectives of our review of the D. C. Cook Nuclear Plant Fire Protection Program were to ensure that in the event of a fire at either facility, both units would maintain the ability to safely shutdown and remain in a safe shutdown condition and the release of radioactivity to the environment would be minimized.

With these objectives in mind, the licensees installed an alternate shutdown system at local control stations with local shutdown indication panels. Our evaluation of this system is included in a later section of this report.

*Gage & Babcock Associates, Inc. Chicago, Ill.

Our conclusion is that the Fire Protection Program for the D. C. Cook Plant Units 1 and 2 is adequate for the present and meets General Design Criteria 3. However, to further ensure the ability of the plant to withstand the damaging effects of fires that could occur, we are requiring and the licensee has agreed to provide additional fire protection system features. The additional features will be completed by the end of the first scheduled refueling outage of Unit 2. The detailed schedule for the fire protection system modifications is presented in Table 1. This report summarizes the results of our evaluation of the Fire Protection Program for the D. C. Cook Nuclear Plant, Units 1 and 2.

Fire Protection Systems Description and Evaluation

A. Water System

The water fire protection system is designed to provide water in sufficient quantities and at the proper pressure to suppress any fires that could occur at the two units at the Cook Nuclear Plant site. The system is common to both units and consists of six pumps, a yard loop with sectionalizing isolation valves, and double feed headers running through the turbine and auxiliary buildings.

The fire pumps take their suction from the circulating water system tunnels which are supplied with water directly from Lake Michigan. There are a total of six fire pumps in the system. Two of the pumps are electric motor driven and have a design capacity of 2000 gpm and 350 foot head. Two diesel driven fire pumps of 2000 gpm capacity are also provided. One electric driven pump of 500 gpm capacity and a pressure maintenance pump of 50 gpm are also included in this system.

All of the fire pumps except the pressure maintenance pump are controlled by the fire system logic control circuits to start in sequence, thus preventing excessive surge pressure which would occur if all of these pumps were started simultaneously. The electrical controls for one of the two high capacity (2000 gpm) electrically driven pumps and one of the two diesel driven pumps are arranged such that the automatic starting of these two pumps is primarily associated with the actuation of the automatic high demand fire system of one unit. Similarly,

the electrical controls for the automatic starting of the two remaining pumps are arranged in an identical manner and are primarily associated with the other unit. Also, the electrical control for the low capacity (500 gpm) electric motor driven pump is such that this pump starts automatically when a low demand fire system has been actuated in either of the two units. The electrical controls also permit each of the five pumps to start automatically in sequence or individually by signals derived from the water fire system header pressure. In addition, manual controls are provided so that pumps can be controlled locally as well as from the control room. The power necessary to operate these pumps and their associated fire logic control circuits is obtained from either the offsite or the onsite electrical power systems. Control power for each of the diesel-engine driven pumps is derived from two 24-volt batteries which are provided with two battery chargers (one battery charger per battery). The emergency fire system logic control circuits are arranged to allow the operator to retain control over the emergency fire system whenever there is an emergency. In this regard the above pumps cannot be shut down following an automatic start signal until (1) the automatic system, which operated and energized the emergency fire system is reset; and (2) the emergency fire system logic (within the fire system panel, located in their respective control rooms), which actually initiates the fire pump start sequence and the associated interlock, is reset.

The double feed headers, which run through the turbine and auxiliary buildings, supply water to the standpipe systems, the wet pipe automatic sprinkler systems, and the pre-action sprinkler systems, which are located throughout the turbine and auxiliary buildings.

Special protection water systems are provided for fire and explosion hazards which exist in the areas around the plant. Two of the largest of these systems are the water deluge system for the main transformers and for the hydrogen storage tanks, located between the Unit 1 containment building and the auxiliary building, and a second set which is alongside the turbine building.

Eighteen fire hydrants are installed on the outdoor buried loop. Each hydrant has its own buried six inch control valve, two 2-1/2 inch hose connections and a 4-1/2 inch pumper connection. Hose cabinets containing hose, nozzles, and fittings are associated with certain hydrants.

Many pre-action sprinkler systems have been provided for both safety and nonsafety related areas. Examples of pre-action sprinkler systems that have been provided or will be installed include the following:

(1)* Charging pump rooms;
(2)* Safety injection pump rooms;
(3) Diesel fire pump rooms;
(4) Waste drumming storage rooms;
(5) Under the auxiliary building roof;
(6) Over the new fuel receiving areas;
(7)* Fire area 5 & 6 auxiliary building elevation 587'
(8)* Fire area 44 auxiliary building elevation 609'

We have reviewed the design criteria and basis for these systems and conclude that the above Fire Protection Systems are in accordance with the applicable National Fire Protection Association Code, and further, that they satisfy the provisions of Appendix A Branch Technical Position 9.5.1, and are, therefore, acceptable.

The licensees have proposed installing sprinklers and curbs in each charging pump and safety injection pump room to suppress potential oil fires and to limit the spread of oil within each room. The curbs will be installed by the end of the first scheduled refueling of Unit 2; the sprinklers were installed in Unit 1 during the 3rd scheduled refuel of Unit 1. Until this scheduled installation is complete, we find it acceptable to rely on the licensees' administrative controls to prevent an oil fire in these rooms. Fire detectors are installed in these rooms and fire fighting equipment is available. We find this proposed installation acceptable. However, we have requested that additional automatic sprinkler systems be installed as follows:

1. Fire zones 5 and 6 in the Fire Hazards Analysis form the T-shaped section of the auxiliary building at elevation 587 between the waste drumming room and turbine building outside the spray additive tank area and the sampling charging and safety injection room. The ceiling space of the hallway portion of this area is used to run redundant divisions of safety related cable. The licensees have encased the cable trays of one division (where both divisions are in close proximity) with marinite board.

*Sprinkler systems to be installed in these areas.

The licensees have provided information to show that the marinite board will provide at least 10 minutes of fire resistance under ASTM E-119 fire test conditions, increasing the time available for fire brigade response. We are satisfied that the redundant divisions are adequately separated and protected from cable fires that could occur in this particular overhead area; however, we are concerned that an exposure fire occurring near the floor could damage both divisions of safety related cable. At our request, the licensees have agreed to install an automatic sprinkler system to protect the cables from exposure fires which could occur in this hallway area. The sprinkler system will be installed by the end of the first scheduled refueling for Unit 2. We find this proposal acceptable. Until the system is operational we believe the licensees' present administrative procedures for fire brigade and control of combustible materials and ignition sources will provide adequate protection against an exposure fire in these areas. These areas have detection systems to alert the operators in the event of a fire, and manual fire fighting equipment is available.

2. A laundry room is located in the area designated as fire area 44 at elevation 609 of the auxiliary building. Our concern is that a fire which could occur in this area and be fueled by clothing and other combustibles that might accumulate there, could adversely affect the component cooling water pumps for both Units 1 and 2 or their associated power and control cables which run close to the ceiling just outside the laundry room.

   We are requiring and the licensees have agreed to provide an automatic sprinkler protection system to prevent damage to the component cooling water pumps and their power and control cables from any exposure fires that may occur in or around the laundry storage area. The sprinklers will be installed by the end of the first scheduled refueling for Unit 2. We find this proposal acceptable. Until the sprinkler system is installed, we find it acceptable to rely on the licensees' administrative controls to prevent an exposure fire in this area. The area has fire detectors in it to alert the operators to any fires that may occur and manual fire fighting equipment is available.

The standpipe system provides water to hose stations at various locations throughout the facility. The licensees have committed to install additional hose stations and, where necessary, standpipes to satisfy the guidelines of Appendix A to BTP 9.5-1. We have reviewed the proposed additions and find them acceptable.

We have reviewed the design criteria and the basis for the water fire protection system. In certain areas we have required additional protection systems to be installed. We find that the water fire protection system, as modified, meets the guidelines of Appendix A to Branch Technical Position APCSB 9.5-1 and applicable National Fire Protection Association standards and is, therefore, acceptable.

B. Gas Suppression Systems

1. Carbon Dioxide

A low pressure 17-ton capacity carbon dioxide system has been provided for both Units 1 and 2. The following safety related areas are provided with automatically actuated CO_2 flooding systems:

a. Electrical penetration area cable tunnels;
b. Electrical switchgear rooms;
c. Emergency diesel generator rooms;
d. Diesel oil pump rooms, and
e. Electrical switchgear room cable vaults.

Automatic actuation of these systems is obtained by the initiation of ionization or thermistor type detectors which are coupled with actuation control circuits. These control circuits are arranged such that a CO_2 system is actuated, an alarm occurs immediately and, after a time delay, the CO_2 discharge valves are opened for a specific period of time. The Cook Nuclear Plant does not use electrical closing devices for doors and dampers which are associated with areas equipped with CO_2 systems. This function is accomplished mechanically when CO_2 is admitted through the selector valve to the nozzle pipings. Also, all ventilation fans, both intake and exhaust, associated with a specific area that is protected by a CO_2 system, are arranged to shutdown on operation of that CO_2 system. The detectors and control circuits associated with CO_2 systems receive power from the Class IE 250-volt d-c system.

A manually operated carbon dioxide flooding system is also installed in the control room cable vaults for both Units 1 and 2. This system is to be used as a backup to the automatically actuated Halon system that is the primary fire protection system for these cable vaults. The Halon system will be discussed in more detail later in this report .

In addition to the above systems, this facility makes extensive use of manually operated carbon dioxide hose reels in areas such as:

a. At various elevations in the auxiliary building;

b. At entrances to the control rooms, and diesel generator rooms; and

c. In switchgear rooms.

We have reviewed the design criteria and the basis for the carbon dioxide fire protection system. We have reviewed the test data for that portion of the system installed in the control room cable vault area.

We have concluded that these systems satisfy the provision of Appendix A to Branch Technical Position APCSB 9.5-1 and the applicable portions of the National Fire Protection Association Code and are, therefore, acceptable.

2. Halon Systems

The Halon 1301 fire protection system is designed to automatically discharge Halon into the control room cable vault area upon alarm of two zones of the ionization detectors. The automatic actuation circuitry and associated power supplied for the Halon system have been arranged in a manner similar to those for the carbon dioxide systems as discussed previously.

The Halon is discharged through the same piping and nozzle system used for the carbon dioxide flooding system. Check valves prevent backflow of the carbon dioxide into the Halon supply piping and vice versa.

We have reviewed the design criteria and basis for the Halon Fire Protection System including associated test data for this system. We have concluded that this system satisfies the provisions of Appendix A to Branch Technical Position APCSB 9.5-1 and the applicable portions of the National Fire Protection Association and is, therefore, acceptable.

C. Fire Detection Systems

A fire detection system consists of the detectors, associated electrical circuitry, electrical power supplies, and the fire annunciator panel. The three types of detectors used at the Cook Nuclear Plant are ionization (products of combustion), infrared (flame), and thermistor (heat) detectors. Certain fire detection circuits provide automatic initiation of fire protection systems. In addition, upon actuation of water flow devices associated with both the wet pipe and pre-action systems, alarms are provided on the Fire Annunciator Panel and throughout the plant.

All of the Fire detection systems, whether used for protection system automatic initiation or alarm only, provide an alarm on the fire annunciator panel in the control room of the affected unit. The fire annunciator display panels and the associated fire annunciator logic cabinet receive power from a 250 volt d-c annunciator feeder cabinet which is powered by a battery charger and battery. The battery charger's source of electrical power is the offsite electrical power system through step-down transformers, electrical circuit breakers, and a motor control center.

All fire detection and protection functions are displayed on the fire annunciator panel in the control room. An alarm system of motor operated horns is provided throughout the plant to alert personnel that a fire has occurred. The alarms are sounded automatically by actuation of any fixed fire protection system and the alarms can also be manually initiated from the control rooms.

Appendix A to Branch Technical Position 9.5-1 contains guidelines that detectors be provided in control room cabinets so that fires occurring in these cabinets may be detected rapidly. Almost all of the cabinets used in the control rooms at the Cook Nuclear Plant are open on top and at the back, thus permitting direct venting to existing ceiling detectors. We requested that detectors be placed in the remaining cabinets that are closed. The licensees have stated that if detectors are installed in these cabinets, or if the cabinets are modified, the cabinet seismic or Class 1E qualification may be affected.

The licensees will develop and conduct a test program to determine the response of the presently installed ceiling detectors to a fire, simulated by smoke generated, in a closed cabinet. Should additional detectors prove necessary, based on the results of this test, an engineered detector scheme will be provided and implemented by the completion of the first refueling outage of Unit 2. We find this approach to be acceptable.

We have reviewed the fire detection systems to ensure that fire detectors are located to provide detection and timely alarm of fires that could occur. We have also reviewed the fire detection system's design criteria and the basis to ensure that it conforms to the applicable sections of NFPA 72D, for Class B supervised circuits.

We have requested, and the licensees have agreed, to install additional detectors at various locations throughout the plant as identified in the installation schedule in the Conclusions Section of this report. We conclude that the design and installation of the fire detection system with the additional detectors to be installed meets the guidelines of the applicable portions of NFPA 72D, and Branch Technical Position APCSB 9.5-1 and is, therefore, acceptable.

ALTERNATE EMERGENCY SHUTDOWN METHOD

The licensee, in performing the Fire Hazards Analysis, recognized that a fire occurring in the cable vault of Unit 1 or Unit 2 could prevent the unit involved from being brought to a controlled safe shutdown condition. A system of local shutdown stations was installed and the procedures for operating them were developed to ensure that the units could always be brought to a controlled shutdown condition.

A separate control room cable vault is located beneath its respective control room and contains redundant divisions of safety related cable trays. The cable vault also contains a large amount of non-safety related cables which are resting on the floor.

The vault is a congested space with stacked cable trays making access difficult.

An automatically actuated Halon 1301 System and a manually operated carbon-dioxide extinguishing system are installed in the cable vault. Additionally there is an automatic activated sprinkler system in the Unit 2 cable vault. We have provided an evaluation of these systems in another section of this safety evaluation report.

Our concern in this area was that the gas systems might not extinguish a deep seated fire and that manual fire fighting would be difficult, because of the congestion caused by the cable trays and the cables which are lying on the floor. The licensees recognized this potential problem. An alternate method of safe shutdown has been installed using local shutdown instrumentation and/or indication, and various emergency modifications procedures for valves and breakers. These indicators and modification procedures provide the necessary information to permit these nuclear units to be shutdown from locations other than the main control room and hot shutdown panel.

On receipt of the Inspection and Enforcement Bulletin 75-04A in April of 1975, which in part required that plants be brought to a cold shutdown condition upon an incident similar to the Browns Ferry fire, American Electric Power performed a review of the shutdown capability for the Donald C. Cook Nuclear Units. As a result of this review, the idea of incorporating in the design provisions to locally take over control of the essential systems and/or components required for safe shutdown was formulated. To implement this concept, the following assumptions were made:

1. Normal off-site power available;

2. Any component or function required for shutdown must be operated without the use of or reliance on the control room, cable vault area, or hot shutdown panel;

3. Non-interference with protection grade instrumentation; and

4. Return to service of a minimum of system equipment and controls.

To meet these design assumptions, local indicators for pressure, level, and flow for necessary systems were placed in various locations in the Auxiliary Building, Turbine Building, and Containment Instrument Room. The majority of these indicators are bourdon tube or differential diaphragm type measuring elements requiring no source of electrical power to provide local indication (this is especially true for instrumentation located outside the reactor containment buildings). The remaining local indication for systems located inside the reactor containment buildings and which require electrical power are powered from sources which are independent of the main control room. This provision has been included so that in the event of a fire in the control room or cable vault area, the availability of electrical power for the local shutdown indicators will not be jeopardized. In addition, certain indicators are housed in three instrument enclosures (for each nuclear unit) called Local Shutdown Instrumentation Cabinets. Provided on these cabinets are

steam generator level indicators, reactors coolant system charging and letdown indicators, a pressurizer level indicator and a reactor coolant system pressure indicator. These cabinets are also equipped with a remote/local transfer switch which, when placed in the local position, will transfer electrical power for its associated process transmitter from the normal power supply (located in the main control room) to an alternate power supply (located outside the main control room area). In all cases local indicators have been located in close proximity to the equipment and/or components to be operated.

In accordance with the design objectives, provisions for local control of valves have also been included. Valves required to be either fully open or fully closed are motor and pneumatically operated while control valves are only pneumatically operated. Appropriate procedures and/or additional equipment has been provided to permit all valves to be operated locally. The basic approach used to provide local control of other key equipment such as circuit breakers, motor control centers, or solenoid valves is to (1) de-energize control power to avoid spurious operations; and (2) reconnect locally where necessary and re-energize. This approach is possible for the Donald C. Cook design since the general practice for this design is to run control power through the actuated device and have only master control switches and/or automatic actuation contacts (with associated wiring to the switches and contacts) in the main control room. In some instances for key equipment, this practice was not adhered to. Therefore, to accommodate the remote shutdown capability, circuits were modified appropriately. These modifications were rerouting the turbine driven auxiliary feedwater pump control power feed circuit, relocating control relays associated with the air compressors for the control air system as well as rerouting the wiring for pressure switches associated with this air system.

In addition, backup lighting and communication systems will be provided in the areas of the local shutdown instrumentation cabinets. The procedures and control operations which are used for this alternate emergency shutdown method were tested during Unit 2 initial power ascension testing and demonstrated the feasibility of the local control stations and the communication system to achieve and maintain safe hot shutdown. We have reviewed the information, including functional wiring diagrams, concerning the alternate emergency shutdown method. We conclude that this method is adequate for a safe shutdown of the plant if the design assumptions are met. However, we do not agree with the licensees' assumption that offsite power would always be available to achieve safe hot shutdown. Accordingly, to increase the margin of safety, we require an electrical

power network to be available to power the systems and any components associated with achieving and maintaining hot shutdown as part of the alternate emergency shutdown method. We have discussed this matter with the licensees and they have agreed to meet this requirement.

We have concluded that, when the procedure for achieving safe hot shutdown as part of the alternate emergency shutdown method is revised to accommodate loss of offsite electrical power, the combination of the redundant fire protection systems provided for the control room cable vault, and the availability of the alternate emergency shutdown system satisfy the guidelines of Appendix A to Branch Technical Position 9.5-1 and are, therefore, acceptable.

OTHER ITEMS RELATING TO THE STATION FIRE PROTECTION PROGRAM

A. Penetration Fire Stops

The penetration fire stops are provided to prevent the movement of fire from one area to another along the electrical cables which run through these fire areas. Silicone foam poured in and around the cable trays and conduits where they penetrate fire barriers make up the penetration fire stops.

The licensees have cited applicable generic test data for the penetration fire stops which show that the silicone foam material in this application provides a three-hour fire resistance to an ASTM E-119 type fire exposure.

During our site visit we saw many of the penetration fire stops which had been installed in Unit 1. Subsequently, we learned that some penetration fire stops being installed for Unit 2 were idential to those designs that had been tested. To qualify all the penetration fire stops, we determined that two typical cases needed additional testing.

In the first case some of the cable trays that penetrate fire barriers are resting on the barrier so that very little or no silicone foam can be placed between the tray and the barriers. In other cases, parallel cable trays have been bolted together at the side rails and penetrate fire barriers in this confirguration. In this case, a small air gap through the penetration could exist due to the tray side rails not being flat or due to the presence of tray splice plates between trays. This could allow heat or flame to pass through the gap.

At our request, the licensees have conducted a penetration fire stop test to verify in an actual ASTM E-119 type exposure the fire resistance of a penetration fire stop with these design features. The test report shows that the penetration seal passed a 3-hour E-119 type fire exposure test. However, the test included only the Unit 2 penetration design. The licensees have provided a comparison between Unit 1 and Unit 2 penetration seal designs to justify that the Unit 2 design is the "worst case" for fire testing. We agree with this evaluation and conclude that the Unit 2 seal tests are acceptable for the Unit 1 seals.

We conclude that the penetration fire stops which are in place provide sufficient protection from the unbounded spread of fire along electrical cables. We base this conclusion on our knowledge of ASTM E-119 fire tests including those cited by the licensees which substantiate the fire resistive ability of penetration fire stops constructed with silicone foam.

B. Fire Doors and Fire Dampers

We have reviewed the placement of the fire doors to ensure that fire doors of proper fire rating are provided.

The licensees' Fire Hazards Analysis identified a number of fire areas where the doors were non-rated or where no doors had been provided. The licensees have committed to install fire doors of appropriate rating for these areas.

Fire dampers are provided in fire walls and inside ventilation ducts where necessary. At our request the licensees have agreed to install additional fire dampers in the ventilation systems to the auxiliary feed pump rooms and in the ventilation systems to the control room, and to upgrade damper ratings in other areas. The additional or upgraded fire door and dampers will be installed by the end of the first refueling outage of Unit 2.

We conclude that fire doors and dampers are provided or committed where necessary in accordance with the provisions of Appendix A to Branch Technical Position APCSB 9.5-1 and are, therefore, acceptable.

C. Fire Protection Systems Inside Containment

The major fire hazards inside containment are charcoal filters, electrical cables, and lubrication oil contained in the reactors coolant pumps.

The licensees will install an RC pump lube oil collection system to collect oil which could leak or spray from pressurized oil lines, and to install a water suppression system to spray the areas around and below the pumps, including the area to which the oil would be drained. We agree with the concept for the oil collection system and the water suppression system.

The charcoal filters located inside the containment are provided with water spray deluge fire protection systems and meet the guidelines of Appendix A to Branch Technical Position 9.5-1. These systems are automatically initiated by continuous strip thermistor type detectors and associated circuitry. In addition, these detectors coupled with additional circuitry, provide an alarm in the corresponding unit's main control room.

Safety related cables for each division inside containment are run in separate sets of conduit, thus minimizing propagation of electrically initiated fire from one division to the other. Some non-divisional cable is run in trays; thermistor thermal detection is provided in each tray. When containment access is not possible, the lower or upper containment sprays can extinguish a tray fire or a fire to which the conduit might be exposed. When containment access is possible, there are hose stations and portable extinguishers located outside the containment access ways that can be used to extinguish such fires.

We have reviewed the licensees' Fire Hazards Analysis for the areas inside containment and conclude that the fire protection measures meet the guidelines of Appendix A to Branch Technical Position 9.5-1 and are acceptable, subject to the addition of the protection to be provided for the reactor coolant pumps as stated above.

D. Other Plant Areas

The licensees' Fire Hazard Analysis addresses other plant areas not specifically discussed in this report. Upon incorporation of features such as additional detectors, portable extinguishers, hose stations, and some additional emergency lighting as identified in the licensees' installation schedule, we find these areas to be in accordance with the guidelines of Appendix A of BTP 9.5-1, and the applicable sections of the National Fire Protection Association Code and therefore, acceptable.

ADMINISTRATIVE CONTROLS

The administrative controls for fire protection include the fire protection organization, the fire brigade training, the controls over combustibles and ignition sources, the plans and procedures for fighting fires, and the quality assurance provisions for fire protection.

In response to Appendix A to Branch Technical Position APCSB 9.5-1, the licensees described briefly those procedures and controls that were in existence at the time. The licensees submittal was made by letter on January 31, 1977.

Subsequently, the staff issued suplemental guidelines contained in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," and we have asked the licensees to use this as a guide in upgrading their administrative controls. Additional responses by the licensees on administrative controls and quality assurance were made in their letter dated October 27, 1977.

The licensees have revised the administrative controls and training procedures to follow the staff supplemental guidelines for the following activities:

(a) Fire Brigade Training;
(b) Control of Combustibles;
(c) Control of Ignition Source; and
(d) Fire Fighting Procedures.

The plant fire brigade consists of at least five members per shift and is organized to provide immediate response to fires that may occur on the Cook Nuclear Plant site. The fire brigade will use portable extinguishers, water hose lines, carbon dioxide hose lines, or manual operation of fixed, automatic systems, which may be required in its fire fighting operations.

The plant fire brigade will also be equipped with pressure demand breathing apparatus, portable communications equipment, portable lanterns, and other necessary fire fighting equipment. Spare air cyclinders and recharge capability are provided to satisfy the guidelines of Appendix A to Branch Technical Position APCSB 9.5-1 .

A major item of equipment for the brigade is the plant fire truck which is located on the site. The truck carries additional fire fighting equipment including a 400 gallon water storage tank and can provide 500 gpm pumping capability.

The fire brigade participates in periodic drills. Liaison between the plant fire brigade and the local fire departments has been established. The local fire departments have been on plant tours and are involved in training sessions with the plant fire brigade.

We conclude that the administrative controls, fire brigade equipment and training conform to the recommendations of the National Fire Protection Association and Appendix A to Branch Technical Position 9.5-1 and are, therefore, acceptable.

TECHNICAL SPECIFICATIONS

Technical Specifications covering the fire protection systems in use have been approved and issued for both Units of the D. C. Cook Nuclear Plant. Following the implementation of the modifications of fire protection systems and administrative controls resulting from this review, the Technical Specifications will be expanded to provide limiting conditions for operation and surveillance requirements for the fully implemented fire protection program.

SUMMARY

During the course of our review we have evaluated the licensees' submittals and responses to our requests for additional information. In addition, we have made a site visit to evaluate the potential fire hazards that exist in the Cook Nuclear Plant and the design features and protection systems provided to minimize these hazards.

As a result of the fire hazards analysis, the licensees have agreed to make modifications to improve the fire resistance capability of such things as fire doors, dampers, and floor hatches, and fire barrier penetration seals.

The licensees have also agreed to install additional sprinkler systems for areas such as the reciprocating charging pump rooms, safety injection pump rooms, and various other areas. To ensure that fires can be detected rapidly and the plant operators informed promptly, additional ionization and infrared detectors will be installed in various areas of the plant.

The licensees have taken significant steps to assure that safe shutdown and cooldown of the unit can be accomplished by the design and installation of alternate emergency shutdown system. This system gives the units additional flexibility in accomplishing safe shutdown during or following potential fire situations.

In a letter dated February 3, 1978, the licensees submitted a schedule for installing modifications to the D. C. Cook Nuclear Plant fire protection system. The schedule shows that all of the modifications will be completed by the end of the first scheduled refueling outage of Unit 2 with the exception of the RC pump oil collection system which will be installed by the end of the Unit 1 fourth outage. We have reviewed the schedule and find it acceptable with the clarifications and additions to which the licensees have agreed and which we have included in Table 1.

Our conclusion is that a fire occurring in any area of the D. C. Cook Nuclear Plant will not prevent either unit from being brought to a controlled safe shutdown, and further that such a fire would not cause the release of significant amounts of radiation.

We find that the Fire Protection Program for the D. C. Cook Nuclear Plant with the improvements already made by the licensees is adequate for the present and, with the scheduled modifications, will meet the guidelines contained in Appendix A to Branch Technical Position 9.5-1 and meets General Design Criterion 3 and is, therefore, acceptable.

Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statment or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Comission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: July 31, 1979

TABLE 1

DONALD C. COOK NUCLEAR PLANT

UNITS 1 AND 2

FIRE PROTECTION/HVAC

CHANGES/IMPROVEMENTS SCHEDULE

ITEM NO.	DESCRIPTION	COMPLETION DATE UNIT 1	COMPLETION DATE UNIT 2
1	Revise instrumentation on Aux. Bldg. Fire Systems to assure operation of ZMO-10 & 20	1st Refuel Unit 2	1st Refuel Unit 2
2	Install infrared detection - cable tunnels & switchgear areas. Includes fire zones 7, 8, 9, 10, 11, 23, 24, 25, 26, 27, 38, 39, 40, 41, 42, 45, 46, 47, 55, 60	1st Refuel Unit 2	1st Refuel Unit 2
3	Add additional ionization detection to the following zones: A- Auxiliary Building El. 587 1. Spray additive Tank Room 2. Sampling Room 3. Recip. Charging Pump Rooms 4. Cent. Charging Pump Rooms 5. Safety Inject. Pump Rooms B- Auxiliary Building El. 609 1. HVAC Mezz. (Above Access Control Area) 2. Laundry Room C- Auxiliary Building El. 633 1. HVAC Vestibules D- Control Rooms 1. Above suspended Ceilings 2. HVAC rooms above control rooms 3. In supply & return air ducts 4. Hot shutdown panels	1st Refuel Unit 2 (3rd Refuel Unit 1 Items 3.A.3, 3.A.4, 3A.5: Complete) (Item 3.B.2 completed August, 1978)	1st Refuel Unit 2

TABLE 1 (Cont'd.)

ITEM NO.	DESCRIPTION	COMPLETION DATE UNIT 1	UNIT 2
4	Add additional standpipe/hose reels to the following areas: A. Containment Cable Tunnels B. Switchgear Cable Vaults C. Auxiliary Cable Vaults D. Control Room Cable Vaults E. Containment Access El. 609 & El. 650	1st Refuel Unit 2	1st Refuel Unit 2
5	Add sprinkler protection to:	1st Refuel Unit 2	1st Refuel Unit 2
	A. Aux. Bldg. El. 587 - includes "T" hallway of fire zones 5 & 6		
	1. Charging & Safety Inject. Pump Rooms	(3rd Refuel Unit 1 Item 5.A.1)	
	2. Shaft From RHR pump room to RHR HX area	(3rd Refuel Unit 1 Item 5.A.2) (complete)	
	B. Aux. Bldg. El. 609 Laundry Area	1st Refuel Unit 2	1st Refuel Unit 2
	C. Diesel Fire Pump Rooms	1st Refuel Unit 2	1st Refuel Unit 2
6	Add Extinguishers at: A. Containment Cable Tunnels B. Switchgear Cable Vaults C. Auxiliary Cable Vaults D. Control Room Cable Vaults E. Containment Access El. 609 & El. 650 F. Containment Piping Annulus G. Accumulator Enclosures	1st Refuel Unit 2	1st Refuel Unit 2

TABLE 1 (Cont'd.)

ITEM NO.	DESCRIPTION	COMPLETION DATE UNIT 1	COMPLETION DATE UNIT 2
7	A. Provide 14 Pressure/Demand Breathers in Unit 2	1st Refuel Unit 2	1st Refuel Unit 2
	B. Provide 28 Spare Cylinders for above		
	C. Provide cascade recharge station		
8	Fireproof styrofoam - Unit #1 Containment Seismic Gaps	Complete	
9	Fireproof metal hatches as follows:	1st Refuel Unit 2	1st Refuel Unit 2
	A. Control Rm. Floors & Ceilings (2 ea.)		
	B. Switchgear Cable Vault Floor (2 ea.)		
	C. Aux. Cable Vault Unit #1		
	D. Aux. Cable Vault Unit #2		
10	Install Class A Dampers in:	1st Refuel Unit 2	1st Refuel Unit 2
	A. Control Room HVAC Systems		
	B. Aux. Feed Pump Rooms		
11	Install Class A door at Drumming Area	1st Refuel Unit 2	1st Refuel Unit 2
	Upgrade to Class B door - Sampling Rm Zone 4		
	Upgrade to Class A door - Unit 1 Quad 1 Cable Tunnel Zone 7		
	Upgrade to Class A door - hot lab Zone 43		
	Upgrade to Class B door - to corridor and hot maching shop Zone 43		
12	Battery Rooms	1st Refuel Unit 2	1st Refuel Unit 2
	A. Supervise Exhaust fans all rooms		
	B. Revise "CD" Rooms exhaust ductwork		

TABLE 1 (Cont'd.)

ITEM NO.	DESCRIPTION	COMPLETION DATE UNIT 1	COMPLETION DATE UNIT 2
13	Install 8" high block curbs at Charging & Safety Inj. Pump Rooms	1st Refuel Unit 2	1st Refuel Unit 2
14	Provide protective clothing for fire brigade on fire truck	Complete	
15	Provide portable ventilation equipment on fire truck	2nd Refuel Unit 1 (Complete)	
16	Provide portable radios for fire brigade	1st Refuel Unit 2	
17	Provide flame arrestors on emergency diesel generator day tank vents	2nd Refuel Unit 1 (Complete)	
18	A. Test Silicone Foam	Completed	
19	Reactor Coolant Pumps		
	A. Provide Oil Retention System	4th Refuel Unit 1	1st Refuel Unit 2
	B. Provide Water Spray Suppression	3rd Refuel Unit 1 (Complete)	1st Refuel Unit 2
20	Diesel Fire Pump Controllers:	1st Refuel Unit 2	1st Refuel Unit 2

A. Label Controllers as "Fire Pump Controller"
B. Insert wiring diagram in each controller
C. Identify components to agree with wiring diagram
D. Add Battery Failure Lights
E. Add menas for testing starting pressure switches
F. Revise manual control at engine to direct start engine, bypassing auto ckts.

TABLE 1 (Cont'd.)

ITEM NO.	DESCRIPTION	COMPLETION DATE UNIT 1	COMPLETION DATE UNIT 2
21	Install Communication System for Local Shutdown System	1st Refuel Unit 2	1st Refuel Unit 2
22	Install 8 hr. duration battery operated lighting for: A. Local Shutdown System B. Switchgear Areas includes MCC rooms and DC cabinet rooms C. Cable Vaults & Tunnels D. Manual Valve Control Stations	1st Refuel Unit 2	1st Refuel Unit 2
23	Conduct control room detector test	1st Refuel Unit 2	

References

1. Letter from J. Tillinghast, Indiana and Michigan Power Company, to B. C. Rusche, NRC, dated January 31, 1977 transmitting "Response to Appendix A" from D. C. Cook Units 1 and 2 to NRC.

2. Letter from G. P. Maloney, Indiana and Michigan Power Company, to B. C. Rusche, NRC, dated March 31, 1977 transmitting "Fire Hazards Analysis" from D. C. Cook Units 1 and 2 to NRC.

3. Letter from G. P. Maloney, Indiana and Michigan Power Company, to E. G. Case, NRC, dated August 19, 1977 providing responses to NRC request for additional information.

4. Letter from J. Tillinghast, Indiana and Michigan Power Company, to E. G. Case, NRC, dated September 30, 1977 providing additional responses to NRC request for information.

5. Letter from J. Tillinghast, Indiana and Michigan Power Company, to E. G. Case, NRC, dated October 27, 1977 transmitting Administrative Controls and Quality Assurance Fire Protection responses.

6. Letter from J. Tillinghast, Indiana and Michigan Power Company, to E. G. Case, NRC, dated November 22, 1977 providing further responses to questions from November 3 and 4, 1977 meeting.

7. Letter from J. Tillinghast, Indiana and Michigan Power Company, to E. G. Case, NRC, dated February 3, 1978 providing schedule for modifications of fire protection system.

8. Letter from J. Tillinghast, Indiana and Michigan Power Company, to E. G. Case, NRC, dated June 12, 1978 transmitting "Qualification Fire and Hose Stream Tests, Bisco Test No. 1042-01" from D. C. Cook Unit 2 to NRC.

9. Letter from J. Tillinghast, Indiana and Michigan Power Company, to H. R. Denton, NRC, dated August 16, 1978 providing responses to questions on fire tests.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-315 AND 50-316

INDIANA & MICHIGAN ELECTRIC COMPANY

INDIANA & MICHIGAN POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 31 to Facility Operating License No. DPR-58 and Amendment No. 12 to Facility Operating License No. DPR-74, issued to Indiana and Michigan Electric Company and Indiana & Michigan Power Company which revised the licenses for operation of the Donald C. Cook Nuclear Plant Units 1 and 2 (the facilities) located in Berrien County, Michigan. The amendment will become effective twenty (20) days after its issuance, unless a hearing has been requested.

The amendments add a license condition relating to the completion of facility modifications for fire protection.

The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement, negative declaration, or environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the licensee's submittals dated January 31, 1977 and March 31, 1977, (2) Amendment No. 31 to License No. DPR-58, (3) Amendment No. 12 to License No. DPR-74, and (4) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. 20555 and at the Maude Preston Palenske Memorial Library, 500 Market Street, St. Joseph, Michigan. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 31st day of July, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors