Docket No. 50-331

JUNE 1 1978

Iowa Electric Light & Power Company
ATTN: Mr. Duane Arnold
President
P. O. Box 351
Cedar Rapids, Iowa 52406

Gentlemen:

The Commission has issued the enclosed Amendment No. 43 to Facility License No. DPR-49 for the Duane Arnold Energy Center in response to your application for license amendment dated October 26, 1977. This amendment implements the proposed Technical Specifications for fire protection forwarded by our letter dated November 23, 1977 and incorporates comments transmitted by your letter of December 9, 1977.

This amendment adds a license condition relating to the completion of facility modifications for fire protection. It also revises the Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls.

These changes to the Duane Arnold Technical Specifications are supported by the Safety Evaluation issued with our letter of November 23, 1977 as well as the attached Safety Evaluation. As discussed below, the following minor changes proposed in your letter of December 9, 1977 were made in the proposed interim Technical Specifications we issued on November 23, 1977.

1. Paragraphs 4.13.A.1.b and c were changed to delete reference to NFPA Code 72D circuits, since the Duane Arnold system does not meet the requirements of NFPA 72D Class A, and to change the frequency of testing the circuits to once every two months. The wording in the proposed interim Technical Specifications had been taken from the standard Technical Specifications. As part of our overall evaluation of the fire protection program at Duane Arnold, we have determined that the testing you propose on the circuits and channels is acceptable. (Reference: your response to PF.17, "Smoke Detection Systems Test" in your letter of January 12, 1978).

Const. 1
GD

OFFICE ➤						
SURNAME ➤						
DATE ➤						

NRC FORM 318 (9-76) NRCM 0240

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2. The testing frequency of 31 days in paragraph 4.13.B.1.b was changed to "every week" and the length of time that the diesel-driven fire pump is to be operated each week was increased from 20 to 30 minutes as you proposed to be in accordance with NFPA 20, Paragraph 8-6.1 and to be in accordance with your present procedures.

3. The requirement for checking the diesel day tank was made into a separate paragraph (4.13.B.1.i).

4. A requirement was added as paragraph 4.13.B.i.j to visually check the position of each valve in the fire suppression water system on a monthly basis.

5. Paragraphs 3.13.A.1, 3.13.C.1 and 3.13.E.1 were modified to require that the systems be available when safety-related equipment in the area is required to be operable.

6. Paragraph 3.13.D.4 was modified to clarify that during times when personnel are in the cable spreading room, the personnel in the room can constitute the continuous fire watch required by paragraph 3.13.D.2.b as long as they have portable fire extinguishing equipment available.

A copy of the related Notice of Issuance is also enclosed.

Sincerely,

Original signed by

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendment No. 43 to DPR-49
2. Notice

cc w/enclosures:
see next page

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Concurred in legal form by memo from T. Wambach attached. E. Hennen to V/W 3/24/78 5/10/78

*SEE PREVIOUS YELLOW FOR CONCURRENCES

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SURNAME	SSheppard	*RClark	*TWambach		GLear
DATE	4/ /78	3/13/78	3/14/78	4/ /78	5/31/78

NRC FORM 318 (9-76) NRCM 0240

☆ U. S. GOVERNMENT PRINTING OFFICE: 1976 — 626-624

2. The testing frequency of 31 days in paragraph 4.13.B.1.b was changed to "every week" and the length of time that the diesel-driven fire pump is to be operated each week was increased from 20 to 30 minutes as you proposed to be in accordance with NFPA 20, Paragraph 8-6.1 and to be in accordance with your present procedures.

3. The requirement for checking the diesel day tank was made into a separate paragraph (4.13.B.1.1).

4. Paragraphs 3.13.A.1, 3.13.C.1 and 3.13.E.1 were modified to require that the systems be available when safety-related equipment in the area is required to be operable.

5. Paragraph 3.13.D.4 was modified to clarify that during times when personnel are in the cable spreading room; the personnel in the room can constitute the continuous fire watch required by paragraph 3.13.D.2.b as long as they have portable fire extinguishing equipment available.

A copy of the related Notice of Issuance is also enclosed.

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*SEE PREVIOUS YELLOW FOR CONCURRENCES

OFFICE➤	ORB33	ORB#3	ORB#1	OELD	ORB#3	
SURNAME➤	SSheppard	*RClark:acr	TWambach		GLear	
DATE➤	3/ /78	3/ 13 /78	3/ 14 /78	3/ /78	3/ /78	

2. The testing frequency of 31 days in paragraph 4.13.B.1.b was changed to "every week" and the length of time that the diesel-driven fire pump is to be operated each week was increased from 20 to 30 minutes as you proposed.

3. The requirement for checking the diesel day tank was made into a separate paragraph (4.13.B.1.i).

4. As a result of the commitments you made in your letter of January 12, 1978 to install additional ionization smoke detectors and your commitment to reevaluate the control room cable spreading area, the hourly check required by paragraph 3.13.D.2.b is considered acceptable at this time.

A copy of the related Notice of Issuance is also enclosed.

Sincerely,

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

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OFFICE➤	ORB#3	ORB#3	ORB#1	OELD	ORB#3	
SURNAME➤	SSheppard:	RClark:acr	TWambach		GLear	
DATE➤	2/ /78	2/ 28 /78	2/ /78	2/ /78	2/ /78	

2. The testing frequency of 31 days in paragraph 4.13.B.1.b was changed to "every week" and the length of time that the diesel-driven fire pump is to be operated each week was increased from 20 to 30 minutes as you proposed to be in accordance with NFPA 20, Paragraph 8-6.1 and to be in accordance with your present procedures.

3. The requirement for checking the diesel day tank was made into a separate paragraph (4.13.B.1.i).

4. A requirement was added as paragraph 4.13.B.i.j to visually check the position of each valve in the fire suppression water system on a monthly basis.

5. Paragraphs 3.13.A.1, 3.13.C.1 and 3.13.E.1 were modified to require that the systems be available when safety-related equipment in the area is required to be operable.

6. Paragraph 3.13.D.4 was modified to clarify that during times when personnel are in the cable spreading room, the personnel in the room can constitute the continuous fire watch required by paragraph 3.13.D.2.b as long as they have portable fire extinguishing equipment available.

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George Lear

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Operating Reactors Branch #3
Division of Operating Reactors

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cc w/enclosures:
see next page

cc:

Mr. Robert Lowenstein, Esquire
Harold F. Reis, Esquire
Lowenstein, Newman, Reis and Axelrad
1025 Connecticut Avenue, N. W.
Washington, D. C. 20036

Office for Planning and Programming
523 East 12th Street
Des Moines, Iowa 50319

Chairman, Linn County
Board of Supervisors
Cedar Rapids, Iowa 52406

Iowa Electric Light & Power Company
ATTN: Ellery L. Hammond
P. O. Box 351
Cedar Rapids, Iowa 52406

Chief, Energy Systems Analysis Branch (AW-459)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S. W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region VII
ATTN: EIS COORDINATOR
1735 Baltimore Avenue
Kansas City, Missouri 64108

Cedar Rapids Public Library
426 Third Avenue, S. E.
Cedar Rapids, Iowa 52401

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

IOWA ELECTRIC LIGHT AND POWER COMPANY
CENTRAL IOWA POWER COOPERATIVE
CORN BELT POWER COOPERATIVE

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 43
License No. DPR-49

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

   A. The application for amendment by Iowa Electric Light and Power Company, Central Iowa Power Cooperative, and Corn Belt Power Cooperative, (the licensees) dated October 26, 1977 as supplemented by letter dated December 9, 1977, complies with the standards and the requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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, Facility Operating License No. DPR-49 is hereby amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and by the following additional changes:

   A. Change paragraph 2.C(2) to read:

      (2) Technical Specifications

      The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 43, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

   B. Add paragraph 2.C(3) as follows:

      (3) The licensee may proceed with and is required to complete the modifications identified in Paragraphs 3.1.1 through 3.1.18 of the NRC's Fire Protection Safety Evaluation (SE) on the facility dated June 1, 1978. These modifications shall be completed as specified in Table 3.1 of the SE. In addition, the licensee shall submit the additional information identified in Table 3.1 of this SE in accordance with the schedules contained therein. In the event these dates for submittal cannot be met, the licensee shall submit a report, explaining the circumstances, together with a revised schedule.

3. This license amendment becomes effective 30 days after the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 1, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 43

TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-49

DOCKET NO. 50-331

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Replace
iiia	iiia
vi	vi
-	1.0-16
-	3.13-1
-	3.13-2
-	3.13-3
-	3.13-4
-	3.13-5
-	3.13-6
-	3.13-7
-	3.13-8
-	3.13-9
-	3.13-10
-	3.13-11
-	3.13-12
6.1-1	6.1-1
6.2-2	6.2-2
6.4-1	6.4-1
6.5-9	6.5-9
-	6.5-10
6.8-2	6.8-2
6.11-11	6.11-11
Figure 6.2-1	Figure 6.2-1

27. Fire Suppression Water System

A fire suppression water system shall consist of a water source, pumps, and distribution piping with associated sectionalizing control or isolation valves. Such valves include yard hydrant curb valves, the first valve ahead of the water flow alarm device on each sprinkler, hose standpipe or deluge system riser.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.13 FIRE PROTECTION SYSTEMS	4.13 FIRE PROTECTION SYSTEMS
Applicability:	Applicability:
Applies to the operational status of the Fire Protection Systems.	Applies to the surveillance requirements of the Fire Protection Systems.
Objective:	Objective:
To assure the ability of the Fire Protection Systems to protect safety related systems required for safe plant shutdown.	To verify the ability of the Fire Protection Systems to protect safety related systems required for safe plant shutdown.
Specification:	Specification:
A. Fire Detection Instrumentation	A. Fire Detection Instrumentation
1. The fire detection instrumentation for each fire detection zone shown in Table 3.13-1 shall be operable whenever safety-related equipment in that fire detection zone is required to be operable.	1. Fire Detection Instrumentation testing.
	a. Each fire detection instrument listed in Table 3.13-1 shall be demonstrated operable by performance of the manufacturers recommended tests at least once per six months.
	b. The circuitry associated with the detector alarms shall be demonstrated operable at least once every two months.
2. If the number of instruments operable for any zone is less than the minimum required;	
a. Within 1 hour, establish a fire watch to inspect the zone with the inoperable instrument(s) at least once per hour, and	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
b. Restore the inoperable instrument(s) to operable status within 14 days. 3. If Specification 3.13.A.2.b cannot be met, prepare and submit a Special Report to the Commission pursuant to Specification 6.11 within the next 30 days outlining the cause of the malfunction and the plans for restoring the instrument(s) to operable status.	

LIMITING CONDITIO FOR OPERATION	SURVEILLA REQUIREMENTS
B. Fire Suppression Water System	B. Fire Suppression Water System
1. The Fire Suppression Water System shall be operable with:	1. The Fire Suppression Water System shall be demonstrated operable:
a. The river water supply system operable.	a. By verifying that the river water supply system is operable per Specification 3.5.J.
b. Two (2) fire pumps operable and aligned to the fire suppression yard header.	b. At least once every week by starting the diesel-driven fire pump and operating it for at least 30 minutes.
c. Automatic initiation logic for each fire pump.	c. At least once per month by starting the motor-driven fire pump and operating it for at least 15 minutes on recirculation flow.
	d. At least once per six months by a flush of the yard header.
	e. At least once per 12 months by verifying that each pump will develop a flow of at least 3100 gpm with a discharge pressure of 112 psig.
	f. At least once per three years by verifying the hydraulic performance of the system by starting the motor-driven fire pump and directing flow around the yard header. Under this condition the flow and pressure requirements described in Specification 4.13.B.1.e shall be met.
	g. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank, obtained in accordance with ASTM-D270-65, is within the acceptable limits specified in Table 1 of ASTM D975-74 with respect to viscosity, water content and sediment.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENTS
	h. At least once per 18 months, during shutdown, by verifying the diesel starts from ambient conditions on the auto-start signal and operates for ≥30 minutes while loaded with the fire pump.
	i. At least once per 31 days by verifying that the diesel day tank contains fuel for two hours operation.
	J. At least once per month by verifying that each valve in the flow path is in its correct position.
2. When only one pump is operable, restore the second fire pump to operable status within 7 days or prepare and submit a Special Report to the Commission within the next 30 days outlining the plans and procedures to be used to provide for the loss of redundancy in this system.	2. When it is determined that only one pump is operable, that pump shall be demonstrated operable immediately and daily thereafter until Specification 3.13.B.1 can be met.
3. If no Fire Suppression Water System is operable: a. Establish a backup fire suppression water system within 24 hours; and b. Submit a Special Report to the Commission pursuant to Specification 6.11.2.a outlining the cause of the inoperability and the plans for restoring the system to operable status. c. If 3a, above cannot be fulfilled place the reactor in Hot Standby within the next six (6) hours and in Cold Shutdown within the following thirty (30) hours.	
4. When the maintenance on the circulating water/fire water pump pit is performed, the river water supply system will be maintained in a condition to restore fire water supply within one hour and a roving fire watch will be established in all power block buildings.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
C. Deluge and Sprinkler Systems	C. Deluge and Sprinkler Systems
1. The deluge and sprinkler systems located in the following areas shall be operable whenever safety-related equipment in the deluge/sprinkler protected area is required to be operable.	1. The deluge and sprinkler systems shall be demonstrated to be operable;
a. RCIC Room (Deluge System #1)	a. At least once per 12-month cycle:
b. HPCI Room (Deluge System #2)	1) By performing a system functional test which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct positions.
c. Diesel Generator Diesel Fuel Oil Day Tank Rooms (Sprinkler Systems #2 and #3)	2) By visual inspection of sprinkler headers to verify their integrity
d. Control Building air conditioning charcoal beds. (Deluge Systems.)	3) By inspection of each nozzle for obstructions or damage.
e. Gas Treatment System charcoal beds. (Deluge Systems.)	b. At least once per three years by an air flow test of the deluge systems.
2. If any of the above listed deluge and sprinkler systems is found to be inoperable,	
a. Within 1 hour, establish a fire watch with portable fire extinguishing equipment to ensure that each area where protection is lost is checked hourly, and	
b. Restore the system to operable status within fourteen days.	
3. If Specification 3.13.C.2.b cannot be met, prepare and submit a Special Report to the Commission pursuant to Specification 6.11 within 30 days outlining the cause of inoperability and plans for restoring the system to operable status.	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENTS
D. CO_2 System	D. CO_2 System
1. The CO_2 System for the cable spreading room shall be operable with a minimum level of 90% and a minimum pressure of 275 psi in the storage tank.	1. The CO_2 System shall be demonstrated operable:
	a. At least once per seven days by verifying CO_2 storage tank level and pressure.
	b. At least once per 12 months by verifying that the system valves actuate automatically and manually to a simulated actuation signal. A brief air flow test shall be made to verify flow from each nozzle.
2. If Specification 3.13.D.1 cannot be met,	
a. Verify immediately that hose station #35 outside the cable spreading room is operable per Specification 4.13.E.1.a,	
b. Within 1 hour, establish a fire watch with portable fire extinguishing equipment to ensure that the cable spreading room is checked continuously, and	
c. Restore the system to operable status within 14 days.	
3. If Specification 3.13.D.2.c cannot be met, prepare and submit a Special Report to the Commission pursuant to Specification 6.11 within 30 days outlining the cause of inoperability and the plans for restoring the system to operable status.	
4. For personnel safety considerations, the system shall be isolated when personnel occupy the cable spreading room. During this time, the personnel in the cable spreading room constitute a continuous fire watch if they have portable fire extinguishing equipment available.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
E. Fire Hose Stations	**E. Fire Hose Stations**
1. The fire hose stations in the following locations shall be operable whenever safety-related equipment in the areas protected by the fire hose stations is required to be operable. (See Table 3.13-2)	1. Each fire hose station shall be verified to be operable: a. At least once every three months by visual inspection of the station to assure all equipment is available and the pressure in the standpipe is within limits, and that all valves in the flowpath to the hose station are open. b. At least once per 12 months by removing the hose for inspection and repacking and replacing all gaskets in the couplings that are degraded. c. At least once per three years partially open hose station valves to verify valve operability and no blockage.
2. With a hose station inoperable, route an additional hose to the unprotected area from an operable hose station within 1 hour.	d. At least once per three years conduct a hose hydrostatic test at a pressure 50 psig greater than the maximum pressure available at that hose station.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
F. Fire Barrier Penetration Fire Seals	F. Fire Barrier Penetration Fire Seals
1. All fire barrier penetration seals protecting safety related areas shall be intact.	1. Fire barrier penetration seals shall be verified to be functional by:
	a. A visual inspection of at least 20% of the fire barrier penetration seals per operating cycle, with 100% of the fire barrier penetration seals visually inspected within a period not to exceed five years.
2. If Specification 3.13.F.1 cannot be met, a continuous fire watch shall be established within 1 hour on at least one side of the penetration until work is completed and the penetration is resealed.	b. A visual inspection of a fire barrier penetration seal following maintenance to verify that it has been returned to its original design specification.

3.13 BASES

The Fire Protection specifications are provided in order to meet the preestablished levels of operability during a fire. Requiring a patrolling fire watch with portable fire equipment if the automatic initiation is lost will provide (as does the automatic system) for early reporting and immediate fire fighting capability in the event of a fire occurrence. The Fire Protection System is supplied by two pumps aligned to the fire header.

The fire pumps take suction from the circulating water pump pit, which is supplied water from the river via the River Water Supply (RWS) pumps. The capacity of one RWS pump will meet the maximum requirement of the Fire Suppression Water System. However, the Technical Specification for the RWS System does not allow the plant to operate with less than two RWS pumps operable (Specification 3.5.J). Therefore, the limiting conditions for operation for the water supply to the Fire Suppression Water System will be dictated by the limiting conditions for operation of the River Water Supply System.

The fire pump size is based on the largest automatic system demand plus 1000 gpm for hose streams with the shortest portion of the fire loop out of service, per NEL-PIA recommendations. The fire pumps were purchased with a standard rating of 2500 gpm @ 125 psig, but have adequate capacity to meet the following worst requirement:

1.	Sprinkler System #4 (requirement of 0.20 gpm/ft^2 for any 10,000 ft^2 area)	2100 gpm
2.	Hose Streams	1000 gpm
	Total	3100 gpm

The head required at the fire pump discharge nozzle is 112 psig at 3100 gpm assuming the shortest leg of the fire loop to Sprinkler System #4 is out of service.

The CO_2 Fire Protection System is considered operable with a minimum of 9 tons (0.9 tank) CO_2 in storage. Within an hour, a continuous fire watch in the cable spreading room will be established if CO_2 fire protection is lost in this room and will continue until CO_2 fire protection is restored.

Early reporting and immediate fire fighting capability in the event of a fire occurrence will be provided (as with the automatic system) by requiring a patrolling fire watch if the number of detectors for a given protected zone is below the minimum operable required.

Only hose stations and sprinkler/spray systems protecting safety related systems are required to be operable per the requirements of this Technical Specification. All other hose stations and sprinkler/spray systems are maintained per the regular plant maintenance and inspection procedures.

4.13 BASES

Periodic testing of the Fire Protection System will provide positive indication of its operability. If only one of the pumps supplying the Fire Protection System is operable, the pump that is operable will be checked immediately and daily thereafter to demonstrate operability. If the CO_2 System becomes inoperable in the cable spreading room, a continuous fire watch will be established within an hour.

Wet fire header flushing, spray header inspection for blockage, and nozzle inspection for blockage will prevent, detect, and remove buildup of sludge or other material to ensure continued operability.

Semiannual tests of heat and smoke detectors are in accordance with the NFPA code.

One detector in zones 1 or 3 (control auxiliary panel room) may be inoperable without making that fire detection zone inoperable due to the number of adjacent detectors in these zones providing coverage. All the fire detection equipment in zones 15 and 16 (essential switchgear rooms), zones 13, 14 and 17 (battery rooms), zones 21 and 22 (diesel-generator rooms) and zone 2 (control auxiliary panel room) are considered essential for adequate fire detection in these areas and are therefore all required to be operable. Up to three detectors for each zone in the cable spreading room (zones 5, 6, 7 and 8) can be inoperable without making that zone inoperable, as long as there are no adjacent detectors which are also inoperable. Adjacent detectors will provide coverage.

Smoke detectors will be tested "in-place" using inert gas applied by a pyrotronics type applicator which is accepted throughout the industrial fire protection industry for testing products of combustion detectors or by use of the MSA chemical smoke generators.

Circuits checks by initiation of end of the line or end of the branch detectors will more thoroughly test the parallel circuits than testing on a rotating detector basis. This test is not a detector test, but is a test to simulate the effect of electrical supervision as defined in the NFPA Code 72 A-18, Article 240.

TABLE 3.13-1

FIRE DETECTION INSTRUMENTS

INSTRUMENT LOCATION	MINIMUM INSTRUMENTS OPERABLE	
	Infra-Red	Smoke
1. Control Auxiliary Panel Room El. 786'-0"		
a. Zone 1	-	3
b. Zone 2	-	3
c. Zone 3	-	8
2. Cable Spreading Room El. 772'-6"		
a. Zone 5	-	9*
b. Zone 6	-	9*
c. Zone 7	-	9*
d. Zone 8	-	9*
3. Station Battery Rooms El. 757'-6"		
a. 125V DC Zone 13	-	1
b. 125V DC Zone 14	-	1
c. 250V DC Zone 17	-	1
4. Essential Switchgear Rooms El. 757'-6"		
a. Zone 15	-	2
b. Zone 16	-	2
5. Diesel-Generator Rooms El. 757'-6"		
a. 1G-21 Zone 21	4	-
b. 1G-31 Zone 22	4	-

*No two adjacent detectors may be inoperable at the same time. Otherwise that zone is inoperable.

TABLE 3.13-2

REQUIRED FIRE HOSE STATIONS

a.	Hose Station #7	Turbine Building, Column N-13, El. 734'-0"
b.	Hose Station #21	Reactor Building, Column F-5.2 El. 757'-6"
c.	Hose Station #22	Reactor Building, Column E-9.1 El. 757'-6"
d.	Hose Station #23	Reactor Building, Column H-11.1 El. 757'-6"
e.	Hose Station #24	Control Building, Column H-14 El. 757'-6"
f.	Hose Station #25	Reactor Building, Column H-5.2 El. 796'-0"
g.	Hose Station #26	Reactor Building, Column E-7.1 El. 796'-0"
h.	Hose Station #27	Reactor Building, Column G-10.1 El. 796'-0"
i.	Hose Station #28	Reactor Building, Column H-7.1 El. 812'-0"
j.	Hose Station #29	Reactor Building, Column F-10.1 El. 812'-0"
k.	Hose Station #35	Control Building, Column F-14 El. 772'-6"

6.0 ADMINISTRATIVE CONTROLS

6.1 MANAGEMENT - AUTHORITY AND RESPONSIBILITY

6.1.1 The Chief Engineer has primary responsibility for the safe operation of the DAEC-1 plant, and reports, under the Chairman of the Board and President, to the Vice President-Generation.

6.1.2 The overall responsibility for the fire protection program for DAEC is assigned to the Vice President - Generation. The DAEC Maintenance Superintendent is delegated the responsibility of directing the operating plant fire protection program.

e. At least one member of each operating shift crew shall be qualified to implement radiation protection procedures.

f. A fire brigade of five members shall be maintained on site at all times. This excludes two members of the shift crew.

6.4 RETRAINING AND REPLACEMENT TRAINING

6.4.1 A training program shall be established to maintain the overall proficiency of the operating organization. This program shall consist of both retraining and replacement training elements and shall meet or exceed the minimum provisions outlined in ANSI N18.1-1971.

6.4.2 A training program for the fire brigade shall be maintained under the direction of the Maintenance Superintendent and shall meet or exceed the requirements of Section 27 of the NFPA Code, except for Fire Brigade training sessions which shall be held at least quarterly.

g. Any other area of facility operation considered appropriate by the Safety Committee or the President.

h. Design change request safety evaluations.

i. The DAEC Fire Protection Program and implementing procedures at least once per 24 months.

6.5.2.9 Authority

The Safety Committee shall report to and advise the President on those areas of responsibility specified in Specifications 6.5.2.7 and 6.5.2.8.

6.5.2.10 Records

Records of Safety Committee activities shall be prepared, approved and distributed as indicated below:

a. Minutes of each Safety Committee meeting shall be prepared, approved and forwarded to the President within 14 days following each meeting.

b. Reports of reviews encompassed by Specification 6.5.2.7 above, shall be prepared, approved and forwarded to the President within 14 days following completion of the review.

c. Audit reports encompassed by Specification 6.5.2.8 above, shall be forwarded to the President and to the management positions responsible for the areas audited within 30 days after completion of the audit.

6.5.3 Other Review and Audit

6.5.3.1 Fire Protection Inspection

6.5.3.1.1 An independent fire protection and loss prevention inspection and audit shall be performed annually utilizing either qualified off-site licensee personnel or an outside fire protection firm.

6.5.3.1.2 An inspection and audit by an outside qualified fire consultant shall be performed at intervals no greater than three years.

7. Procedures required by the Preparedness Plan.

8. Procedures required by the plant Security Plan.

9. Operation of radioactive waste systems.

10. Fire Protection Program implementation.

6.8.2 Procedures described in 6.8.1 above, and changes thereto, shall be reviewed by the Operations Committee and approved by the Chief Engineer prior to implementation, except as provided in 6.8.3 below.

6.8.3 Temporary minor changes to procedures described in 6.8.1 above which do not change the intent of the original procedure may be made with the concurrence of two members of the plant management staff, at least one of whom shall hold a senior operator license. Such changes shall be documented and promptly reviewed by the Operations Committee and by the Chief Engineer. Subsequent incorporation, if necessary, as a permanent change, shall be in accord with 6.8.2 above.

6.8.4 Selected drills of emergency procedures shall be conducted quarterly in accordance with the provisions of the Preparedness Plan.

a. Reactor vessel base, weld and heat affected zone metal test specimens (Specification 4.6.A.2).

b. I-131 dose equivalent exceeding 50% of equilibrium value (Specification 4.6.B.1.h).

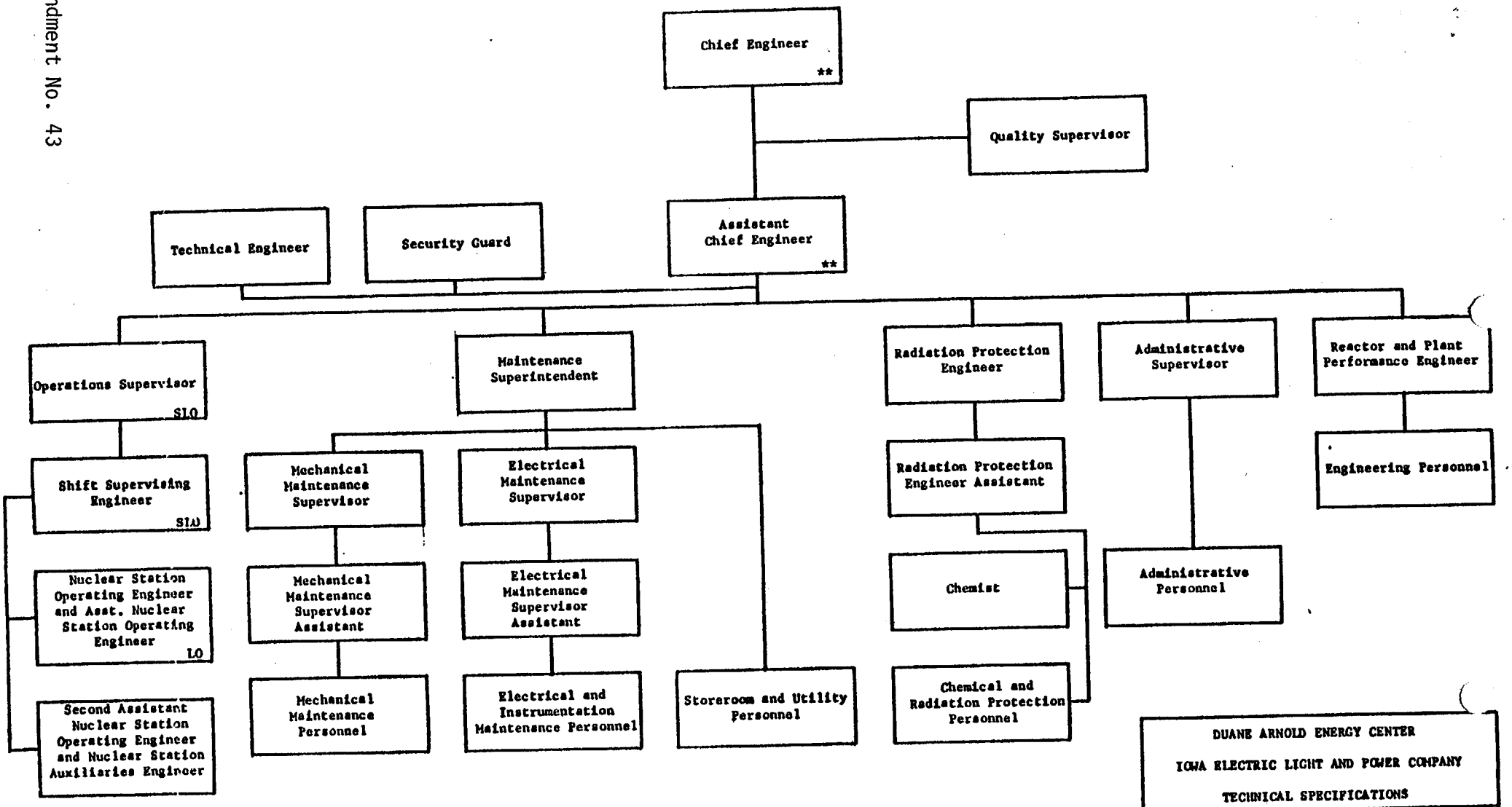
c. Inservice inspection (Specification 4.6.G).

d. Reactor Containment Integrated Leakage Rate Test (Specification 4.7.A.2.f).

e. Auxiliary Electrical System - Operation with inoperable components (Specification 3.8.B.4).

f. Fire Protection Systems (Specifications 3.13.A.3, 3.13.B.3, 3.13.C.3, and 3.13.D.3).

Amendment No. 43



SLO - Senior Licensed Operator.

LO - Licensed Operator.

** - Chief or Assistant Chief to Meet ANSI N.13.1-1971 License Requirements.

DUANE ARNOLD ENERGY CENTER

IOWA ELECTRIC LIGHT AND POWER COMPANY

TECHNICAL SPECIFICATIONS

DAEC NUCLEAR PLANT STAFFING

FIGURE 6.2-1

FIRE PROTECTION

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

IOWA ELECTRIC LIGHT AND POWER COMPANY

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

Dated: June 1, 1978

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1.0 INTRODUCTION

Following a fire at the Browns Ferry Nuclear Station in March 1975, the Nuclear Regulatory Commission initiated an evaluation of the need for improving the fire protection programs at all licensed nuclear power plants. As part of this continuing evaluation the NRC, in February 1976, published a report by a special review group 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 fires without the loss of important functions. To implement the report's recommendations, the NRC initiated a program for reevaluation of the fire protection programs at all licensed nuclear power stations and for a comprehensive review of all new licensee 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), May 1, 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," May 12, 1977.

- "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," June 14, 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.

We have reviewed the licensee's analyses and have visited the plant to examine the relationship of safety-related components, systems and structures with both combustibles and the associated fire detection and suppression systems. Our review was based on the licensee's proposed

program for fire protection as described in the following docketed information:

(1) Licensee's fire protection evaluation dated January 18, 1977;

(2) The fire protection review team's site visit of November 28 to December 2, 1977;

(3) The licensee's response to requests for additional information and staff positions, dated January 11 and 12, 1978.

Our review has been limited to the aspects of fire protection related to the protection of the public from the standpoint of radiological health and safety. We have not considered aspects of fire protection associated with life safety of onsite personnel and with property protection, unless they impact the health and safety of the public due to the release of radioactive material.

This report summarizes the result of our evaluation of the fire protection program at Iowa Electric Light and Power Company's Duane Arnold Energy Center. The chronology of our evaluation is summarized in Appendix A of this report.

2.0 FIRE PROTECTION GUIDELINES

2.1 Overall Objectives

The overall objectives of the fire protection program in a nuclear power plant are to:

(1) Reduce the likelihood of occurrence of fires;

(2) Promptly detect and extinguish fires if they occur;

(3) Maintain the capability to safely shut down the plant if fires occur; and

(4) Prevent the release of a significant amount of radioactive material if fires occur.

2.2 General Design Criterion 3 - "Fire Protection"

The Commission's basic criterion for fire protection is set forth in General Design Criterion 3, Appendix A to 10 CFR Part 50, which states:

> "Structures, systems and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions.
>
> "Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and the control room.
>
> "Fire detection and protection systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems and components important to safety.
>
> "Fire fighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems and components."

Guidance on the implementation of General Design Criterion 3 for existing nuclear power plants is provided in Appendix A of Branch Technical Position 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants." We have used the guidance in Appendix A, where appropriate. We have also evaluated alternatives proposed by the licensee to assure that the overall objectives outlined in Section 2.1 are met for the actual relationship of combustibles, safety-related equipment and fire protection features.

3.0 SUMMARY OF MODIFICATIONS AND INCOMPLETE ITEMS

3.1 Modifications

The licensee plans to make certain plant modifications to improve the fire protection program as a result of the licensee's and the staff's evaluation. Such proposed modifications are summarized below. Further detail is provided in the licensee's submittals. The sections of this report which discuss the modifications are noted in parentheses. The schedule for submittal of additional analyses, tests, evaluations and administrative controls is listed in Table 3.1 along with the schedule for completion of all modifications.

Certain items listed below are marked with an asterisk to indicate that the NRC staff will require additional information in the form of design details to assure that the design is acceptable prior to actual implementation of these modifications. The balance of the other modifications have been described in an acceptable level of detail.

3.1.1 Fire Detection Systems

Ionization smoke detection systems will be provided in the following areas:

(1) In the control room control boards and auxiliary electrical equipment cabinets which contain safety-related systems (5.1).

(2) In the make-up air supply to the control room (5.1).

(3) In the computer area of the control room (5.1).

(4) Reactor building refueling area (5.5).

(5) Reactor building elevation 833 feet (5.6).

(6) Reactor building elevation 812 feet (5.7).

(7) Reactor building elevation 786 feet, cable tray areas and motor generator set room (5.8).

(8) Reactor building elevation 757 feet, cable tray areas (5.9).

(9) Reactor building corner rooms housing residual heat removal, core spray, and control rod drive equipment (5.12).

(10) Turbine building elevation 734 feet, below diesel generator area (5.16).

(11) Pump house safety-related pump area (5.17).

(12) Intake structure pump rooms (5.18).

3.1.2 Fire Detection Power Supply

An emergency power supply will be provided for the fire detection systems for safety related areas (4.2).

3.1.3 Fire Water Supply

A permanent means will be provided to permit offsite fire departments to draft water from the cooling tower basin or pump house wet pit which can be pumped into the fire water mains (4.2).

3.1.4 Hose Stations

Additional hose stations will be provided at the following locations:

(1) At the two entrances to the control room, equipped with fog nozzles suitable for use in this area. One of these hose stations will be a booster hose station with a low flow capacity nozzle with sufficient reach to the electrical cables in the spreading area (5.1).

(2) Outside the southwest entrance to the cable spreading room (5.2).

(3) A live reel booster hose and a low flow capacity nozzle at the outside entrance to each switchgear room (5.3).

(4) Each stairwell on the refueling floor (5.5).

(5) Each stairwell on elevation 833 feet of the reactor building (5.6).

(6) South stairwell on elevation 812 feet of the reactor building (5.7).

(7) Reactor building elevation 747 feet outside high pressure coolant injection system room (5.11).

(8) At the entrance to the pump house (5.17).

Hose stations at the following locations will be provided with 75 feet of hose to provide adequate fire water coverage.

(1) Reactor building elevation 757 feet (5.9).

(2) Turbine building hose station number 14 on the operating floor (5.16).

Spare coils of hose will be provided at hose stations near the containment when it is deinerted (5.13).

Hose nozzles in electrical equipment areas will be checked to insure that the hose nozzle goes from the off mode to the spray mode before the straight stream mode. Suitable nozzles will be provided where required (4.3.1.d).

Protective covers will be provided for hoses on interior hose reels (4.3.1.d).

3.1.5 Hose Cart

* A hose cart will be provided at a central location equipped with 250 feet of 2½ inch hose and other fire fighting tools (4.3.1.c).

3.1.6 Yard Hydrants

The hose cabinet which interferes with the operation of the hydrant will be relocated to remove this obstruction (4.3.1.c).

Hose adaptors will be provided with one compatible with the Cedar Rapids fire department (4.3.1.c).

A hydrant inspection program will be established for winterizing the hydrants in the fall and for insuring proper operation in the spring (5.19).

3.1.7 Water Suppression Systems

* An automatic sprinkler system will be installed in the reactor building railroad air lock area (5.9).

Manual actuation stations for the deluge systems protecting the reactor core isolation cooling system and high pressure coolant injection system will be relocated outside of the fire area (5.10, 5.11).

* The automatic sprinkler system at elevation 734 feet in the turbine building will be extended to provide coverage of the unprotected areas in the vicinity of the turbine lube oil reservoir (5.16).

3.1.8 Portable Extinguisher

A large wheeled Halon extinguisher will be provided for the control room (5.1).

A portable Halon extinguisher will be provided in the computer area of the control room (5.1).

Additional portable extinguishers will be provided at the primary containment when it is deinerted (5.13).

Two additional portable extinguishers will be provided in the intake structure (5.18).

3.1.9 Fire Doors

The fuse link for the fire door between the switchgear rooms wll be replaced with an electro/thermal link actuated by the smoke detectors in either room (5.3).

One of the air lock doors at the entrances to the motor generator set rooms will be replaced with a Class A fire door (5.8).

The fuse links on self closing fire doors at stairwell entrances will be removed (4.12).

3.1.10 Door Supervision

Appropriate controls will be provided to assure the effectiveness of fire doors protecting safety-related areas. Fire doors will be inspected semiannually to verify that self-closing mechanisms and latches are in good working order. Supervision of fire doors will consist of one of the following:

(1) Electrical supervision of the closed position with alarms at a central location.

(2) Locked closed doors will be inspected weekly to verify that the doors are in the closed position. The fire brigade commander will have ready access to keys are all locked doors.

(3) Automatic release mechanism doors will be inspected monthly to verify that doorways are free of obstructions.

(4) Unsupervised and unlocked self-closing fire doors will be inspected daily to verify that they are in the closed position (4.9).

The water tight door to the diesel fire pump area will be electrically supervised (5.17).

3.1.11 Valve Supervision

All post indicator and OS&Y gate valves in the fire water piping systems will be administratively controlled by the use of locks and seals, and periodic inspections will be made to verify that the valves are in the proper position (4.3.1.c).

3.1.12 Smoke and Heat Vents

Louvers will be installed at the floor and ceiling level of the diesel generator day tank rooms (4.4).

3.1.13 Portable Smoke Venting Equipment

* Portable smoke ejectors will be provided for fire brigade use (4.4).

3.1.14 Air Breathing Apparatus

Air breathing apparatus will be provided for the fire brigade and emergency control which is compatible with spare air bottles. Additional spare bottles will be provided such that two spare bottles will exist for each apparatus. Four air bottles will be readily available for two of the apparatus located in the control room. The complement of air breathing apparatus, spare air bottles, and recharge capability will be sufficient for a period of six hours for seven people at a usage rate of three air bottles per hour per person (4.4).

3.1.15 Protection for Structures

The exposed steel column between the switchgear rooms will be coated to provide one hour fire rated protection (5.3).

The fire protective coating on the structural steel in the diesel generator room will be repaired to provide a 3-hour fire rating (5.15).

The fire protective coating on the structural steel in the diesel fire pump room will be repaired to the original fire resistance rating (5.17).

3.1.16 Fire Barrier Penetrations

The conduit penetrations and openings in the wall located between the switchgear rooms will be sealed (5.3).

3.1.17 Control of Combustibles

An air flow alarm will be provided for the exhaust from each battery room (5.4).

Resins stored in the reactor building at elevation 833 feet will be removed from the area. Drums containing radiation protective clothing in this area will be capped (5.6).

Wooden barricades and untreated lumber will be removed from the reactor building and other safety-related areas. Lumber used in safety-related areas will be fire retardant treated lumber (5.7, 5.8).

Curbs will be provided at the fire door for the motor generator set area to limit the spread of an oil spill fire (5.8).

The agitene cleaning fluids used at elevation 786 feet in the reactor building will be removed (5.8).

Curbs will be provided at the entrance of the diesel generator rooms (5.15).

Curbs will be provided at elevation 734 feet in the area below the turbine lube oil systems (5.1.6).

A curb will be provided at the entrance to the diesel fire pump day tank room (5.17).

3.1.18 Emergency Lighting

Emergency lighting consisting of individual seal beam units with self-contained battery power supplies will be provided for all safety-related areas and areas where fires could result in the release of radioactive materials. Access and egress routes to these areas will also be included (4.6).

Ten seal beam, high intensity, battery operated, portable lighting units will be provided for emergency and fire brigade use (4.6).

3.2 Incomplete Items

In addition to the licensee's proposed modifications, several incomplete items remain, as discussed below. The licensee will complete the evaluations necessary to resolve these items in accordance with the schedule contained in Table 3.1. This schedule has been established such that should these evaluations identify the need for additional modifications, they can be implemented on a schedule consistent with completion of the modifications identified in Section 3.1. We will address the resolution of these incomplete items in a supplement to this report.

3.2.1 Shutdown Capability

A fire hazards analysis will be conducted to confirm that the capability exists to safely shutdown in areas where redundant systems could be damaged by fires or an alternate means for safe shutdown will be provided (4.1).

3.2.2 Smoke Detection Systems Tests

In situ tests will be conducted with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly

TABLE 3.1

SCHEDULE OF LICENSEE SUBMITTAL

Item		Schedule
3.2.1	Shutdown Capability Analysis	September 1, 1978
3.2.2	Smoke Detection System Tests	July 1, 1978
3.2.3	Cable Fire Barrier Penetration Test Data	July 1, 1978
3.2.4	Control Room Fire Hazards	July 1, 1978
3.2.5	Radiological Consequences of Fires	September 1, 1978
3.2.6	Diesel Generator Air Intakes	July 1, 1978
3.2.7	Turbine Building Fires	September 1, 1978
3.2.8	Fire Dampers	April 1, 1978
3.2.9	Administrative Controls	April 20, 1978

SCHEDULE FOR COMPLETION OF MODIFICATIONS

3.1.1	Fire Detection Systems	1980 Refueling**
3.1.2	Fire Detection Power Supply	1979 Refueling
3.1.3	Fire Water Supply	1980 Refueling
3.1.4	Hose Stations	1980 Refueling
3.1.5	Hose Cart	1979 Refueling
3.1.6	Yard Hydrants	1979 Refueling
3.1.7	Water Suppression System	1980 Refueling
3.1.8	Portable Extinguisher	1980 Refueling**
3.1.9	Fire Doors	1980 Refueling**
3.1.10	Door Supervision	1979 Refueling
3.1.11	Valve Supervision	1979 Refueling
3.1.12	Smoke and Heat Vents	1979 Refueling
3.1.13	Portable Smoke Venting Equipment	1979 Refueling
3.1.14	Air Breathing Apparatus	1979 Refueling
3.1.15	Protection of Structures	1980 Refueling
3.1.16	Fire Barrier Penetrations	1979 Refueling
3.1.17	Control of Combustibles	1980 Refueling
3.1.18	Emergency Lighting	1980 Refueling

** Also dependent on Security System design completion in accordance with 10 CFR 73.55 requirements.

reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance (4.2).

3.2.3 Cable Fire Barrier Penetrations Test Data

Test data will be provided to demonstrate the adequacy of electrical cable fire barrier penetrations (4.9).

3.2.4 Control Room Fire Hazards

A study will be made to reduce the fire exposure hazard in the control room due to the cable spreading area, computer area and support areas. Proposed modifications will be provided for those areas (5.1).

3.2.5 Radiological Consequences of Fires

A summary of the radiological consequences of fires will be provided (5.14).

3.2.6 Diesel Generator Air Intakes

An evaluation of the need for a barrier between the diesel generator air intakes will be provided (5.15).

3.2.7 Turbine Building Fires

An analysis of turbine building fires and their impact on the diesel generator units will be provided. Consideration will be given to lube oil lines routed near the diesel generator rooms and combustibles in the turbine track way and adjacent areas (5.16).

3.2.8 Fire Dampers

A review will be made to determine the adequacy of fire dampers (5.9).

3.2.9 Administrative Controls

The program description for administrative controls will be revised to indicate conformance to the guidelines, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance," contained in the NRC letter dated August 8, 1977. Those items which do not conform will be identified with a basis therefor (6.0).

4.0 EVALUATION OF PLANT FEATURES

4.1 Safe Shutdown Systems

There are several arrangements of safe shutdown systems which are capable of shutting down the reactor and cooling the core during and subsequent to a fire. The exact arrangement available in a fire situation will depend upon the effects of the fire on such systems, their power supplies, and control stations. To preclude a single event from affecting redundant systems, these systems are separated into two or more safety divisions either of which would be capable of achieving safe shutdown.

The major safety-related components required for safe shutdown are separated to prevent damage to redundant equipment due to a fire. However, there are areas of the plant where the physical separation for essential supporting systems or electrical cables may not provide assurance that redundant systems would not be damaged by a fire. Although modifications have been proposed to improve the fire protection in these areas, we conclude that there is a potential risk for fire damage to redundant systems. The licensee has not determined the consequences of fire damage in such areas and its impact on the capability for safe shutdown. These areas will be reviewed for the consequences of fire damage to redundant systems.

The licensee will conduct a fire hazards analysis which demonstrates that the capability to safely shutdown exists following the consequences of fires in each area of the plant. The fire hazards analysis will provide due consideration to the following items.

(1) The identification of safety-related systems, components, electrical cables, and supporting systems which are required to bring the plant to a cold shutdown condition.

(2) The identification of the consequences of fire in each area where shutdown systems are located. The evaluation will include consideration of fire damage with failures in fire detection and suppression systems.

(3) Access to areas where local manual actions are required, to insure the capability to safely shutdown, will be evaluated to assure that smoke and the products of combustion will not prevent these actions from being performed.

(4) The consequences of fires involving redundant systems will be evaluated for their impact on the availability of essential power sources and for the effects of spurious actions initiated by electrical circuit failures on the capability to safely shutdown.

(5) The adequacy of physical separation, barriers, and fire protection systems to prevent fire damage to redundant shutdown systems.

For areas where it can not be demonstrated that the capability to safely shutdown exists as a consequence of potential fires, corrective modifications will be proposed.

4.2 Fire Detection and Signaling Systems

Several fire detection and signaling systems are provided which transmit alarm and supervisory signals to the control room. Supervisory signals are provided to indicate the locations of the affected areas or units. Detection and actuation for the carbon dioxide system in the cable spreading room is powered by self-contained 125 VDC battery under constant charge by a 120 VAC power source. The remaining fire and smoke detection systems do not have an emergency power supply except for the detection systems on charcoal filters. The licensee will provide an emergency power supply for the fire detection system for safety related areas.

Fire detectors installed include fixed temperature, infrared, rate compensating, smoke and thermostatic. The rate compensating detectors are used to actuate the carbon dioxide system in the cable spreading room. Thermostatic detectors are used for the actuation of deluge systems in various areas. Sprinkler waterflow and deluge actuation annunciate in the control room.

The plant presently does not have complete coverage of areas containing or exposing safety-related systems. To protect these areas the licensee has proposed providing detection systems as summarized in Section 3.1.1 of this report.

In situ tests will be conducted with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do no significantly reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance.

We find that, subject to implementation of the above described modifications, the fire detection systems satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.3 Fire Control System

4.3.1 Water Systems

a. Water Supply

Fire water is obtained from a common wet pit in the pump house which is supplied from the Cedar River and the cooling tower basins. The 400,000 gallon capacity wet pit and cooling tower basin are supplied by four 6,000 gpm pumps taking suction from the Cedar River. Water is released from a reservoir to maintain the river at an acceptable water level. The wet pit has adequate capacity to meet the requirement of the fire water system.

Two automatic vertical fire pumps are provided with each taking suction from a common wet pit. The fire water is pumped from the pump house to the underground mains. The licensee will provide a

permanent means for offsite fire departments to draft water from the cooling tower basin or the wet pit in the pump house to supply the fire water mains.

We find that the water supply satisfies the objectives identified in Section 2.1 of this report and is, therefore acceptable.

b. Fire Pumps

Two vertical shaft, centrifugal fire pumps are provided and are located in two separate rooms in the pump house. Each pump has a design capacity of 2,500 gpm @ 125 psig. One pump is diesel engine driven with right angle drive with an eight-hour fuel supply from a day tank isolated from the remainder of the building by 3-hour fire rated walls and ceiling. The second pump is electrically operated and is supplied power from the normal ac power.

Supervisory pressure in the fire main system is maintained at 120 psig by a small jockey pump taking suction from the service water system. Both fire pumps start automatically when the pressure in the mains drop. The electric fire pump starts at 95 psig and the diesel fire pump starts at 85 psig. Both pumps can be manually controlled at the pump house and both pumps can also be started from the control rooms. The local controllers are approved for fire pump service. Pump supervisory signals are annunciated in the control room. The signals include pump running, pump power, pump failure to start, and low fuel oil level.

A cross connection is provided from the service water system to the fire water system and the service water pumps are connected to buses which can be supplied power from the diesel generators. Although the service water pressure is lower than that provided by the fire water pumps, some measure of backup capability is provided by these features.

We find that the fire pumps satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

c. Fire Water Piping System

Each of the fire pumps has a separate 12 inch discharge line supplying the 12 inch underground loop which encircles the entire plant. Valving is so arranged that a single break in the discharge piping will not remove both pumps from service. Within the pump house, a normally closed 12 inch valve connects the service water and the fire water system.

All yard fire hydrants, automatic and manual water suppression systems and interior fire hose lines are supplied by the fire loop. Sectionalizing valves of the post indicator type are provided on the fire loop to provide flexibility during an impairment of the loop. All hydrant leads have curb box valves for hydrant isolation. Hose stations and automatic systems are fed off separate feeds into the various buildings. All post indicator and OS&Y gate valves in the fire water piping systems will be administratively controlled by the use of locks and seals, and periodic inspections will be made to verify that the valves are in the proper position.

Yard fire hydrants have been provided at approximately 250 foot intervals around the exterior of the plant. An auxiliary gate valve is provided on each lateral to permit hydrant isolation and maintenance without removing a portion of the fire loop from service. Each hydrant has a hose house equipped with 50 feet of 2½ inch hose and other manual fire fighting tools. A hose cart will be provided at a central location and will be equipped with hose, nozzles, adaptors and other fire fighting tools. The hydrant hose threads are compatible with the local fire department but are not compatible with the Cedar Rapids fire department. Hose adaptors will be provided.

A hydrant inspection program will be initiated to insure proper hydrant operation during an emergency. A 2½ inch gated valve will be installed on one outlet of each hydrant throughout the system. The hose cabinet associated with valve 33-36 will be moved to eliminate an obstruction with the operation of the hydrant.

We find, subject to the implementation of the above described modifications, the fire water piping systems satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

d. Interior Hose Stations

A total of 35 interior hose stations, each equipped with 50 or 75 feet of 1½ inch woven jacket rubber lined hose have been provided throughout the plant except in the primary containment and torus areas. Various areas of the reactor building, turbine building and control building cannot be reached by the existing hose stations. The licensee has proposed the addition of hose stations such that sufficient hose reach is provided to protect all areas of the reactor building, turbine building and control building.

Covers will be provided for the interior hose stations throughout the plant to protect the hose from dust, oil, water, and for ease of identification. The licensee will install 1 inch booster reels with low capacity nozzles at the entrance to the control room and the essential switchgear rooms. Hose nozzles in electrical equipment areas will be checked to insure that the hose nozzle goes from the off mode to the spray mode before the straight steam mode. Suitable nozzles will be provided where required.

We find that, subject to implementation of the above described modifications, the interior fire hose stations satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

e. Automatic Water Suppression Systems

A total of seven sprinkler systems and seventeen deluge systems have been provided to cover specific and area hazards. These areas of coverage include portions of the turbine building, shop area,

radwaste, and reactor building. Each deluge system is actuated by a thermostatic release and the actuation of the system sounds an alarm in the control room.

Water suppression systems are supplied by connection to the plant yard main. Manual hose stations have independent connections to the yard main. Automatic sprinkler and deluge systems were installed in accordance with the NFPA standards which were in effect at the time specifications were issued for the systems except for the water suppression system on the charcoal filters. Since installation, annual NEL-PIA inspections and yearly testing of the systems have been performed.

The licensee will install additional water suppression in areas of the turbine building and reactor building as noted in Section 3.1.7 of this report.

We find that, subject to implementation of the above described modifications, the water suppression systems satisfy the objectives identified in Section 2.1 of this report and are, therefore acceptable.

f. Effects of Suppression Systems on Safety Systems

Inadvertent operation of a fire protection system will not adversely affect safety-related equipment. A low flow capacity hose station with hose nozzle shut-off will be provided at the entrance to the control room and switchgear rooms which will minimize the potential for water damage to electrical equipment in these areas.

4.3.2 Gas Fire Suppression Systems

An automatic total flooding low pressure carbon dioxide system protects the cable spreading room. Upon actuation of the system by rate-compensating detectors, the design concentration of 50% is achieved within 3 minutes and 20 seconds. The storage tank of carbon dioxide has sufficient capacity to inject another 50% concentration into the room. The actuation of the second discharge is by manual means. The power for the system is a self contained 125 VDC battery under constant charge by a normal 120 VAC plant circuit. The actuation of system interrupts power to the ventilation system and closes the inlet, balancing, and fire dampers.

We find the gas suppression system satisfies the objectives identified in Section 2.1 of this report, and is therefore, acceptable.

4.3.3 Portable Fire Extinguishers

Portable dry chemical and carbon dioxide fire extinguishers have been distributed throughout the plant. The fire extinguishers meet the requirements of the National Fire Protection Association.

The licensee will provide a wheeled Halon unit for the control room. This extinguisher will provide extended throw and duration for potential fires. Two additional extinguishers will be provided in the intake structure.

We find that the portable fire extinguishers satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.4 Ventilation Systems and Breathing Equipment

Smoke and heat vents are provided in the turbine building roof. The primary coolant recirculation pump motor generator sets are located in a room isolated from the remainder of the reactor building and the exhaust duct from this area provides gravity venting. Louvers in the exterior wall for the diesel generator rooms provide smoke venting for these areas. Other areas of the plant do not have ventilation systems which are designed specifically for smoke and heat removal. The normal air handling systems in most areas can be used for smoke removal; however, their effectiveness may be limited.

The licensee has proposed to provide portable smoke ejectors for fire brigade use. Louvered vents will be provided at the floor and ceiling level of the diesel generator day tank room to provide gravity venting.

Four self-contained air breathing apparatus are located in the control room and ten additional units are located near the access control area. The air breathing apparatus consists of two different types for which spare air bottles are not compatible. A cascade recharging system has been provided which with existing spare air bottles is inadequate to meet the fire brigade and operating personnel emergency needs.

The licensee has proposed to provide air breathing apparatus for use by the fire brigade and emergency control personnel which is compatible with spare air bottles. Additional air bottles will be provided such that two spare bottles will exist for each apparatus. Four air bottles will be readily available for two of the apparatus located in the control room. The complement of air breathing apparatus, spare air bottles, and recharge capability will be sufficient for a period of six hours for seven people at a usage rate of three air bottles per hour per person.

We find that subject to the implementation of the above described modifications, the ventilation systems and breathing equipment satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.5 Floor Drains

Floor drains have been provided in areas protected by automatic water suppression systems. Drains are also provided in all areas where manual hoses are likely to be used with the exception of the control building. The control equipment in cabinets in the control room is elevated 3-4 inches above the floor. In these areas fire water will be drained out through the door openings. Drains from the turbine building are directed to an oil separator. The drains from the diesel generator rooms and the auxiliary boiler room are provided with back flow valves prior to their

connection to the rest of the drainage piping from other spaces. In areas where expected water buildup could cause system damage, the equipment is provided with pedestals which elevate the equipment above the expected buildup.

We find that the floor drains satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.6 Lighting Systems

The normal lighting system receives its power from the station auxiliary transformers. Upon the loss of these power sources, standby sources are made available from the station batteries and the diesel generators to provide an uninterrupted supply of power. These features insure that lighting is continuous for emergency conditions.

The licensee has proposed the addition of fixed emergency lighting consisting of individual seal beam units with self contained battery power supplies for all safety-related areas and areas where fires could result in the release of radioactive materials, including access and egress routes to these areas. Ten seal beam, high intensity, battery operated portable lighting units will be provided for emergency and fire brigade use.

We find that the lighting systems satisfy the objectives indicated in Section 2.1 of this report and are, therefore acceptable.

4.7 Communications Systems

The normal communications within the plant are provided by a direct dial telephone system and a public address system located throughout the plant with page and party channels. The telephone system receives power from batteries maintained by the telephone company. The public address system receives power from the uninterruptible a-c bus. A sound powered headset system with jacks located throughout the plant is provided. Portable walky-talky units are also provided for emergency use. A VHF radio facility provides radio contact with local emergency agencies.

We find that the communication systems satisfy the objectives indicated in Section 2.1 of this report and are, therefore, acceptable.

4.8 Electrical Cables

The electrical cables used in the plant consists mainly of ethylene-proplyene insulation with a neoprene jacket. The flame test standard for cables, IEEE Std. 383, was not in effect at the time cables were purchased and installed at the facility. The fire protection system and proposed modifications gives due consideration to the combustibility of cables.

We find that to retest cables to the current flame test standards would not provide information that would alter our conclusions on the adequacy of the fire protection program. Accordingly, we find that the electrical cables used at the facility are acceptable.

4.9 Fire Barrier Penetrations

Fire barriers such as walls, floors and ceilings are penetrated by ventilation ducts, electrical raceways, mechanical piping systems and doors. Conduit and cable penetrations through major fire barriers are sealed with a six inch minimum thickness of cellular concrete. Tray penetrations through interior walls are sealed using marinite, kaowool and fire retardant coatings. The licensee will provide test data to demonstrate the adequacy of cable penetrations of fire barriers. A review will be made to verify the adequacy of fire dampers.

Appropriate controls will be provided to assure the effectiveness of fire doors protecting safety-related areas. Fire doors will be inspected semiannually to verify that self-closing mechanisms and latches are in good working order. Supervision of fire doors will consist of one of the following:

(1) Electrical supervision of the closed position with alarms at a central location.

(2) Locked closed doors will be inspected weekly to verify that the doors are in the closed position. The fire brigade commander will have ready access to keys for all locked doors.

(3) Automatic release mechanism doors will be inspected monthly to verify that doorways are free of obstructions.

(4) Unsupervised and unlocked self-closing fire doors will be inspected daily to verify that they are in the closed position.

Modifications for fire barrier penetrations in specific plant areas are noted in Section 5 of this report.

We find that, subject to the implementation of the modifications and verification of the adequacy of electrical penetration and fire dampers as described above, the fire barrier penetrations satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.10 Separation Criteria - Control Room Cable Spreading Area

Cable trays are separated by a minimum horizontal distance of three feet. Redundant trays are not routed in vertical stacks. Nonsafety-related cables are permitted to share raceways with a single division of safety-related cables. Within the control room separate cabinets and metal barriers within the control boards are used to separate redundant systems and wiring.

As noted in Section 4.1 of this report, the licensee will evaluate the consequences of fires and verify the capability to shutdown. We conclude that the physical separation criteria in itself is not adequate to provide protection for redundant safety-related systems from the standpoint of potential fires. Subsequent sections of this report address existing fire protection measures and proposed modifications for specific areas.

We find that, subject to the implementation of the modification identified in Section 3 of this report and the action to be taken as noted in Section 4.1, adequate measures have and are being taken to compensate for any weakness in physical separation. This satisfies the objectives identified in Section 2.1 of this report, and is, therefore, acceptable.

4.11 Fire Barriers

Fire areas are generally enclosed by floors, walls and ceilings which have a 3-hour rating. Protection of structural steel will be provided as noted in Section 3.1.15. Areas not having a 3-hour rating are acceptable on the basis of the combustible loading exposing the barrier.

We find that, subject to the implementation of the above described modifications, fire barriers satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.12 Access and Egress

Access to the upper areas of the reactor building above grade elevation is provided by two stairwells at opposite sides of the building. Both stairwells are enclosed in at least two hour fire rated construction and the doors are self-closing 1½ hour rated fire doors. Lower elevations of the reactor building are accessible by open stairwells in the north corners and by one enclosed and one open stairwell in the south corners. There are two separate entrances to the reactor building.

Access to the control building is from the administrative building or turbine building. There are no stairways in the control building except from the control room to the heating and ventilating room above. The control room has one normal use entrance and one emergency exit both from the administration building. The cable spreading area has two entrances from the administrative building. The switchgear rooms are normally accessible from the turbine building with emergency access from the administration building. Access to the battery rooms is via the same access as the switchgear rooms with a single entrance to the various battery rooms. Each diesel generator room has a single access which is from the turbine building. Access to the pump house is through an outside door into the emergency service water pump and the residual service water pump areas.

Fuse links will be removed from self closing fire doors at stairwell entrances to remove reliance upon fuse links to prevent the spread of smoke into these access and egress routes.

We find that the access and egress provided for manual fire fighting and evacuation in all safety-related areas satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

4.13 Toxic and Corrosive Combustion Products

The products of combustion for many plastic materials, most common being cable insulation and jacket materials are toxic to humans and corrosive to metals. Prompt fire detection and extinguishment are relied upon to

minimize the quantities of such products. Additional means of smoke removal will be provided as an aid in fire fighting access as noted in Section 4.4. The fire brigade is provided with and trained in the use of emergency breathing apparatus for fighting fires involving such materials.

We find that the precautions taken to minimize the effects of toxic and corrosive products satisfy the objectives identified in Section 2.1 of this report and are, therefore, acceptable.

5.0 EVALUATION OF SPECIFIC PLANT AREAS

The licensee has performed a fire hazards analysis of the facility to determine the fire loading of various plant areas and to evaluate the adequacy of existing and proposed fire protection systems. The results of the fire hazards analysis, other docketed information and site visit observations were used in the staff's evaluation of specific plant areas. The staff's evaluation of specific areas is discussed in the following sections.

5.1 Control Room

5.1.1 Safety-Related Equipment

The control room contains the controls for normal station operation and for shutdown of the plant under abnormal conditions. Operating indicators, controls, and alarms are mounted on an L-shaped walk through control board. Auxiliary electrical equipment cabinets are located in the area behind the control boards.

5.1.2 Combustibles

The combustibles in this area include electrical cable and wire insulation, and a small quantity of Class A combustibles such as log books and operating procedures. The area behind the control room control board contains the cable spreading area for one division of safety-related cables which are located above auxiliary electrical equipment cabinets. The plant computer, kitchen and office areas are separated from the control room by a glass partition wall and glass doors.

5.1.3 Consequences if No Fire Suppression

An unmitigated fire in the control room has the potential for damaging redundant divisions of safety-related equipment including systems required for safe shutdown.

5.1.4 Fire Protection System

Fire detection is provided in the cable spreading area behind the control board by smoke detectors. Portable CO_2 extinguishers are provided for manual fire suppression capability. Two hose stations in the administration building provide partial coverage of the area. Access doors are Class A rated fire doors.

5.1.5 Adequacy of Fire Protection

The fire detection system is inadequate to provide for the prompt detection and location of fires in the control room. The existing hose stations do not provide adequate coverage for the entire area. Small portable extinguishers do not have sufficient capacity or reach to suppress fires in electrical cabinets. The lack of detection in the

make-up air supply to the control room is inadequate for limiting the introduction of smoke into the area from external sources. The computer, support, and cable spreading areas are an exposure fire hazard to the control room.

5.1.6 Modifications

The licensee has proposed the following modifications. A large wheeled Halon extinguisher unit will be provided for the control room. Additional hose stations will be provided at the two entrances to the control room equipped with fog nozzles suitable for use in this area. One of these hose stations will be a booster hose station with a low flow capacity nozzle with sufficient hose to reach the electrical cables in the spreading area. Ionization smoke detectors will be provided inside control boards and auxiliary electrical equipment cabinets which contain safety-related systems. A smoke detector will be provided in the make-up air supply to the control room. An ionization smoke detector and a portable Halon extinguisher will be provided in the computer area. The licensee will study and propose a means to reduce the exposure fire hazard of the cable spreading, computer, and support areas.

We find that, subject to the implementation of the above described modifications and pending a proposal to resolve the exposure fire hazards, the fire protection for the control room satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.2 Cable Spreading Room

5.2.1 Safety-Related Equipment

The cable spreading area is used exclusively for routing of electrical cables and includes no other equipment. One division of safety-related cables are routed in the cable spreading room. The other division is located in the control room.

5.2.2 Combustibles

The combustibles in the areas consist of electrical cable insulation.

5.2.3 Consequences if No Fire Suppression

An unmitigated fire in these areas could result in the loss of one of the redundant systems required for safe shutdown.

5.2.4 Fire Protection Systems

Smoke detectors are provided which annunciate in the main control room. Portable fire extinguishers are provided and a hose station located in the administration building at the entrance to the area. An automatic total flooding CO_2 fire suppression system is provided for the cable spreading room. Class A fire doors are provided at the entrances to the room.

5.2.5 Adequacy of Fire Protection

All areas of the cable spreading room are not readily accessible from the existing hose station.

5.2.6 Modifications

The licensee has proposed the addition of a hose station in the administration building outside the southwest entrance to the cable spreading room.

We find that, subject to the implementation of the above described modification, the fire protection for the cable spreading room satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.3 Switchgear Rooms

5.3.1 Safety-Related Equipment

A separate enclosed switchgear room is provided for each of the two safety-related divisions of switchgear. The battery chargers and DC distribution panels associated with each division of switchgear are located in each room.

5.3.2 Combustibles

The combustibles in each room consists of electrical cable and wire insulation materials.

5.3.3 Consequences if No Fire Suppression

The switchgear rooms are separated from each other and the remainder of the plant by three hour fire barriers and Class A fire doors. Unsealed penetrations exist in the common wall between the switchgear rooms which do not preclude the potential for smoke and the products of combustion communicating between the rooms.

5.3.4 Fire Protection Systems

The smoke detectors are provided in each switchgear room which annunciate in the control room. Portable extinguishers and hose stations are available nearby.

5.3.5 Adequacy of Fire Protection

A roll up fire door is provided in the wall separating the switchgear rooms. A fuse link release mechanism is provided on one side of this fire door and does not provide adequate protection to prevent an exposure due to a fire on the other side of the door. Steel columns in the wall separating the rooms are unprotected. Existing hose stations do not have

sufficient reach to be used without requiring hose to be routed through one room to reach the other room.

5.3.6 Modifications

The licensee has proposed the following modifications. The exposed structural steel column will be coated to provide a one-hour fire rating. The penetrations and openings in the wall separating the switchgear rooms will be sealed. The fuse link for the fire door between the switchgear rooms will be replaced with an electro/thermal link actuated by the smoke detectors in either room. A live reel booster hose and a low flow capacity nozzle will be provided at the outside entrance to each switchgear room. One of these stations will be a replacement for the existing hose station near the battery rooms.

We find that, subject to the implementation of the above described modification, the fire protection for the switchgear rooms satisfies the objectives, as noted in Section 2.1 of this report and is, therefore, acceptable.

5.4 Battery Rooms

5.4.1 Safety-Related Equipment

The battery rooms contain only batteries and associated electrical cables for one division of safety-related systems.

5.4.2 Combustibles

The major combustibles consist of the acrylic plastic material of the container for the battery cells and electrolyte.

5.4.3 Consequences if No Fire Suppression

The consequence of an unmitigated fire in a battery room would be limited to damage of that division of batteries located therein.

5.4.4 Fire Protection Systems

A smoke detector is provided in each battery room. Portable extinguishers and hose stations are available in adjacent areas for manual fire suppression.

5.4.5 Adequacy of Fire Protection

The absence of air flow supervision for the battery rooms ventilation exhaust could permit an undetected accumulation of hydrogen in these areas. Due to the limited fire hazard that is presented by these areas, manual fire protection would be adequate to extinguish fires in these areas.

5.4.6 Modifications

To avoid conditions conducive to hydrogen accumulation, the licensee will install a flow switch in each of the exhaust outlets for the battery rooms. A common alarm will be annunciated in the control room to indicate a no-flow condition in one of the rooms.

We find that, subject to the implementation of the above described modification, the fire protection provisions for the battery rooms satisfy the objectives noted in Section 2.1 of this report and are, therefore, acceptable.

5.5 Reactor Building Refueling Floor

5.5.1 Safety-Related Equipment

The spent fuel pool and associated auxiliary systems are located at this elevation of the reactor building.

5.5.2 Combustibles

Combustibles at this elevation include materials associated with the handling of spent fuel; plastic sheeting materials, wood, cable insulation, and flammable liquids.

5.5.3 Consequences if No Fire Suppression

A fire in this area would not affect systems required for safe shutdown.

5.5.4 Fire Protection Systems

Portable extinguishers are provided in the area.

5.5.5 Adequacy of Fire Protection

Portable extinguishers are inadequate as the only means of suppression in this area. The lack of fire detection would prevent prompt response to fires in this area.

5.5.6 Modifications

The licensee has proposed the following modifications. Ionization smoke detectors will be provided for this area. Hose stations will be provided at each stairwell to this area.

We find that, subject to the implementation of the above described modifications, the fire protection for the refueling floor satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.6 Reactor Building Elevation 833 Feet

5.6.1 Safety-Related Equipment

The standby liquid control system is located in this area.

5.6.2 Combustibles

The combustibles in this area include resins and 55 gallon drums of dry radiation protection clothing.

5.6.3 Consequences if No Fire Suppression

An unmitigated fire in this area could result in the loss of the standby liquid control system.

5.6.4 Fire Protection Systems

Portable fire extinguishers are located in this area.

5.6.5 Adequacy of Fire Protection

Portable extinguishers are inadequate as the only means of fire suppression in this area. The lack of fire detection would prevent prompt response to fires in this area. The stored resins are an unnecessary addition to the combustibles in this area.

5.6.6 Modifications

The licensee has proposed the following modifications. A hose station will be provided at the entrance to each stairwell. Ionization smoke detectors will be provided in this area to alarm locally and in the control room. Storage drums will be capped to reduce the fire hazard which they present. Resins stored in this area will be removed.

We find that, subject to the implementation of the above described modifications, the fire protection for the reactor building elevation 833 feet satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.7 Reactor Building Elevation 812 Feet

5.7.1 Safety-Related Equipment

Equipment in this area includes spent fuel pool pumps, reactor cooling water heat exchangers, a 480 V motor control center and redundant division of safety-related cables.

5.7.2 Combustibles

The combustibles in this area consist of electrical cable insulation, a wood partition barricade, and miscellaneous lumber.

5.7.3 Consequences if No Fire Suppression

An unmitigated fire in this area could result in the loss of redundant divisions of safety-related cables and the loss of equipment in this area.

5.7.4 Fire Protection Systems

Fire protection is provided by two hose stations and portable extinguishers.

5.7.5 Adequacy of Fire Protection

The hose stations in this area do not provide adequate fire water coverage for the entire area. The lack of fire detection would prevent prompt response to fires in this area. The wooden barricade and lumber are an unnecessary addition to the combustibles in this area.

5.7.6 Modifications

The licensee has proposed the following modifications. An additional hose station will be located near the south stairwell. Ionization smoke detectors will be installed in this area. The wooden barricade will be replaced with noncombustible construction. Miscellaneous lumber in this and other safety-related areas will be replaced by the use of fire retardant treated lumber.

We find that, subject to the implementation of the above described modifications, the fire protection for the reactor building elevation 812 feet satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.8 Reactor Building Elevation 786 Feet

5.8.1 Safety-Related Equipment

Equipment in this area consists of both divisions of safety-related cables and a motor control center. The standby gas treatment systems are located in a separate room at this elevation.

5.8.2 Combustibles

The combustibles in this area consist of electrical cable insulation, agitene cleaning fluid, and a wooden barricade.

The primary coolant recirculation pump motor generator sets and associated lubrication and fluid drives are located at this elevation in a separate 3-hour fire rated room. Lubrication oil associated with these systems contain 2300 gallons of oil.

5.8.3 Consequences if No Fire Suppression

An unmitigated fire in this area could result in the loss of redundant safety-related cables. Unmitigated fires associated with the standby gas treatment system would be contained in that area. An oil spill in the motor generator set room may not be contained to this area due to the lack of fire rated doors and curbs to limit the spread of a fire.

5.8.4 Fire Protection Systems

The standby gas treatment filter trains are protected by automatic water deluge systems. Automatic water deluge protection is provided for the motor generator set lube oil pumps. Fire water coverage of all areas of this elevation are provided by hose stations. Portable extinguishers are provided.

5.8.5 Adequacy of Fire Protection

The lack of fire detection prevents prompt response to fire in this area and the motor generator set room. The agitene cleaning fluid and wooden barricade are an unnecessary addition to the combustible loading in this area.

5.8.6 Modifications

The licensee has proposed the following modifications. One of the two air lock doors at each entrance to the motor generator set room will be replaced with a Class A fire door and an oil spill curb will be located at the fire door opening. Ionization smoke detectors will be installed in the vicinity of cable trays in this area and in the motor generator set room. The agitene cleaning fluid and wooden barricades will be removed from the area.

We find that, subject to the implementation of the above described modifications, the fire protection for the reactor building elevation 786 feet satisfies the objective identified in Section 2.1 of this report and is, therefore, acceptable.

5.9 Reactor Building Elevation 757 Feet

5.9.1 Safety-Related Equipment

The control rod drive modules, both divisions of safety-related cables, and motor control centers are located in this area.

5.9.2 Combustibles

The combustibles in this area consist of electrical cable insulation and radiation protection clothing.

5.9.3 Consequences if No Fire Protection

An unmitigated fire in this area could result in damage to redundant safety-related electrical cables.

5.9.4 Fire Protection Systems

Hose stations and portable extinguishers are provided in the area.

5.9.5 Adequacy of Fire Protection

The hose stations in this area do not have sufficient reach to provide fire water coverage for the entire area. The lack of fire detection prevents prompt response to fires in this area. Combustibles located in the railroad air lock adjacent to this area present an exposure hazard to the air lock door and this area.

5.9.6 Modifications

The licensee has proposed the following modifications. Ionization smoke detectors will be installed in the vicinity of cable trays in this area. Hose stations will be provided with 75 feet of hose to provide sufficient reach to all areas. An automatic sprinkler system will be installed in the railroad air lock area.

We find that, subject to the implementation of the above described modifications, the fire protection for the reactor building elevation 757 feet satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.10 Reactor Core Isolation Cooling Room

5.10.1 Safety-Related Equipment

This room contains the piping, valves, electrical cables, and equipment for the reactor core isolation cooling system.

5.10.2 Combustibles

The combustibles in this area consist of cable insulation and lube oil.

5.10.3 Consequences if No Fire Suppression

An unmitigated fire in this area could result in the loss of the reactor core isolation cooling system. The area is bounded by fire barriers which would prevent the spread of a fire to other areas. Systems located in other areas could perform the safety function of this system.

5.10.4 Fire Protection Systems

This area is protected by an automatic water deluge system. A portable extinguisher is located in the area and hose stations located nearby provide fire water coverage of the area.

5.10.5 Adequacy of Fire Protection

Adequate protection is provided for this area, however, the manual actuation station for the deluge system is located in the fire area.

5.10.6 Modifications

The licensee has proposed to relocate the manual actuation station for the deluge system outside the fire area.

We find that, subject to the implementation of the above described modification, the fire protection for the reactor core isolation system satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.11 High Pressure Coolant Injection Room

5.11.1 Safety-Related Equipment

This room contains the piping, valves, electrical cables, and equipment for the high pressure coolant injection system.

5.11.2 Combustibles

The combustibles in this area consists of cable insulation and 155 gallons of lube oil.

5.11.3 Consequences if No Fire Suppression

An unmitigated fire in this area could result in the loss of the high pressure coolant injection system. The area is bounded by fire barriers which would prevent the spread of fire to other areas. Systems located in other areas could perform the safety function of this system.

5.11.4 Fire Protection Systems

This area is protected by an automatic water deluge system. A portable extinguisher is located in the area.

5.11.5 Adequacy of Fire Protection

The manual actuation station for the deluge system is located in the fire area. Hose stations are not provided which can reach this area.

5.11.6 Modifications

The licensee has proposed the following modifications. The manual actuation station for the deluge system will be relocated outside the fire area. A hose station will be provided at elevation 747 feet to provide coverage of this area.

We find that, subject to the implementation of the above described modifications, the fire protection for the high pressure coolant injection room satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.12 Reactor Building Corner Rooms

5.12.1 Safety-Related Equipment

Residual heat removal systems and the core spray system are located with redundant equipment in separate corner rooms. A third room contains the control rod drive pumps.

5.12.2 Combustibles

The combustibles in each area consists of electrical cable insulation. The residual heat removal rooms each contain 32 gallons of lube oil.

5.12.3 Consequences if No Fire Suppression

An unmitigated fire in one room could result in a loss of one of the redundant residual heat removal or core spray systems.

5.12.4 Fire Protection Systems

Portable extinguishers are provided in each of the corner rooms.

5.12.5 Adequacy of Fire Protection

The lack of fire detection prevents prompt response to fires in these areas. Hose stations in other areas do not have sufficient reach to provide fire water protection for the corner rooms.

5.12.6 Modifications

The licensee has proposed to provide ionization smoke detectors in the areas of the residual heat removal, core spray, and control rod drive equipment areas. Hose station modifications noted in Sections 5.9.6 and 5.11.6 of this report will provide fire water coverage for these areas.

We find that, subject to the implementation of the above described modifications, the fire protection of the corner rooms satisfies the objectves identified in Section 2.1 of this report and is, therefore, acceptable.

5.13 Primary Containment

5.13.1 Safety-Related Equipment

The safety-related equipment in this area includes rod drives, containment isolation valves and safety/relief valves.

5.13.2 Combustibles

Combustibles in this zone include 50 gallons of lubricating oil for each recirculation pump and cables routed in the conduit.

5.13.3 Consequences if No Fire Suppression

During normal plant operation the primary containment has an inert atmosphere which would prevent initiation of a fire. During refueling operations, the plant is shutdown and fires would not result in damage to prevent maintaining the plant in a safe condition.

5.13.4 Fire Protection System

Fire protection for the containment is provided by hose stations and portable extinguishers. Drains are provided to mitigate the consequences of an oil spill fire. The containment sprays could be used to suppress an oil spill fire.

5.13.5 Adequacy of Fire Protection

The fire protection for the containment is adequate to protect against fire damage to the safety-related equipment required to effect a safe shutdown.

5.13.6 Modifications

The licensee has proposed to provide spare coils of 1½ inch hose at hose stations near the containment and additional portable extinguishers in the area when the primary containment is deinerted.

We find that, subject to the implementation of the above described modifications for deinerted operations, the fire protection for the primary containment satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.14 Radwaste Building

5.14.1 Safety-Related Equipment

No safety-related equipment is located in the radwaste building which is isolated from adjacent areas by three hour fire barriers.

5.14.2 Combustibles

The combustibles in the area include dry low level contaminated waste, cable insulation, plastic sheeting materials, dry resins, and filters.

5.14.3 Consequences if No Fire Suppression

The licensee will be evaluating the radiological consequences of fires in the radwaste area as part of their revised fire hazards analysis. We have requested that that the licensee provide a summary of such an analysis.

5.14.4 Fire Protection Systems

Hose stations and portable extinguishers are provided on each level of the radwaste building. The baler and dry waste storage areas are

protected by an automatic sprinkler system. Ionization smoke detectors are located in the radwaste control room.

5.14.5 Adequacy of Fire Protection

The adequacy of the fire protection for this area will be addressed in a supplement to this report.

5.14.6 Modifications

No modifications have been proposed for this area.

5.15 Diesel Generator Rooms

5.15.1 Safety-Related Equipment

Each of the two diesel generators are located in separate rooms within the turbine building. Their day tanks are located in a separate room within the diesel generator room. One diesel generator is capable of supplying power for safe shutdown on the loss of offsite power.

5.15.2 Combustibles

Each day tank contains 1000 gallons of diesel fuel oil which is pumped to the diesel generators. A motor control center is located in each diesel generator room. Turbine lubricating oil piping passes through one diesel generator room.

5.15.3 Consequences if No Fire Suppression

An unmitigated fire in a diesel generator room would cause the loss of the diesel generator and could seriously threaten the integrity of the rated fire barrier wall and penetrations separating it from the remaining diesel generator.

5.15.4 Fire Protection Systems

Four infrared detectors are provided in each diesel generator room which alarm locally and in the control room. The diesel day tank rooms are protected by a separate sprinkler system for each room with waterflow annunciation in the control room. Both the diesel generator and diesel day tank rooms are enclosed in three hour fire rated construction. Fire doors into these areas are Class A 3-hour rated doors. Manual fire fighting equipment consists of a portable fire extinguisher and a hose station located outside the entrance to the diesel generator rooms.

5.15.5 Adequacy of Fire Protection

The diesel generators are inadequately protected from the effects of an oil fire. The protection of the steel supporting members in the room is in need of repair. An oil spill in the turbine building could affect both

diesel generator rooms. The products of combustion due to a fire in one room might enter the adjacent diesel generator room through the air intake.

5.15.6 Modifications

The licensee has proposed to provide an automatic water suppression system over the diesel end of the generator units. Curbs will be provided at the doors to both diesel rooms. The fire protective coating on the structural steel will be repaired to provide a 3-hour fire rating. Turbine lube oil piping will be rerouted outside the diesel generator room.

The licensee will evaluate the diesel generator intakes and the need for a barrier partition between them to prevent combustion products due to a fire in one room from entering the other room via the air intakes. If corrective action is necessary, the licensee will make suitable modifications.

We find that, subject to implementation of the above described modifications and evaluation, the fire protection for the diesel generator rooms satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.16 Turbine Building

5.16.1 Safety-Related Equipment

Safety-related equipment within the turbine building includes the diesel generator rooms and safety-related electrical cables.

5.16.2 Combustibles

The combustibles in the turbine building consist of lubricating and hydrogen seal oil systems and electrical cable insulation. Transient combustibles exist in and near the turbine trackway consisting of wood and resins in plastic containers, drums of oil, and a diesel locomotive.

5.16.3 Consequences if No Fire Suppression

A fire in the area of the neutralizing tank at elevation 734 could damage both divisions of safety-related cables in conduit from the diesel generators. A fire in the area of the reactor feedwater pumps could damage the power cables routed to one division of safety-related pumps in the intake structure.

5.16.4 Fire Protection Systems

The hydrogen seal oil system is protected by an automatic water deluge system. The system is actuated by a thermostatic release or a manual pull station located adjacent to the deluge valve. The heating boiler is

enclosed in a separate three hour room protected by automatic sprinklers. The turbine lube oil tank is protected top and bottom by an automatic water deluge system. The system is actuated by a thermostatic release or a manual pull station located adjacent to the deluge valve. The reactor feedwater pumps are protected by an automatic water deluge system, actuated by a thermostatic release or a manual pull station located adjacent to valve. The new and used lube oil storage tanks and the centrifuge areas are protected by an automatic sprinkler system. An area also protected by a sprinkler system is the area adjacent to the lube oil line running in the condenser enclosure. All the areas within fixed protection systems above, except for the condenser enclosure, are protected by hose stations and portable extinguishers.

5.16.5 Adequacy of Fire Protection

Due to the lack of curbing to contain oil spills from affecting safety-related cables and other areas of the turbine building, the protection is inadequate. The combustibles stored in the turbine trackway may present an unacceptable exposure hazard to the turbine building structure. The lube oil lines in the vicinity of the diesel generator rooms may present an unacceptable exposure hazard to the diesel generator rooms.

5.16.6 Modifications

The licensee has proposed the following modifications. The existing automatic sprinkler system at elevation 734 feet below the turbine lube oil reservoir will be extended to provide coverage of the unprotected areas. Additional curbs will be provided in this area to limit the spread of an oil spill fire. Ionization smoke detection will be provided at elevation 734 feet in the area below the diesel generator units. Seventy-five feet of hose will be provided at hose station number 14 to provide adequate fire water coverage.

The licensee will evaluate the consequences of fires involving the lube oil piping outside the diesel generator rooms and combustibles in and near the turbine trackway for their effect on the diesel generator units.

We find that, subject to the implementation of the above described modifications and evaluation, the fire protection for the turbine building satisfies the objectives identified in Section 2.1 of the report and is, therefore, acceptable.

5.17 Pump House

5.17.1 Safety-Related Equipment

The pump house is divided into two basic areas. The south area contains both divisions of residual heat removal service water pumps and emergency service water pumps and is isolated from the other area by substantial

concrete walls and an electrically supervised water tight door. The two fire pumps and jockey pump are located in the remaining area. The diesel fire pump is located in a separate room from the electric fire pump.

5.17.2 Combustibles

Combustibles in this area include the fire pump diesel day tank, the diesel fuel in the fire pump, and the lubricating oil in the circulating water pumps.

5.17.3 Consequences if No Fire Suppression

A fire in the south room of the pump house may cause the loss of one safety-related pump but the fire would not spread to the adjacent pumps or affect the redundant division pumps due to the limited combustibles in the area and a concrete block wall separating redundant equipment. A fire in the north room could result in the loss of both fire pumps.

5.17.4 Fire Protection System

Sprinkler protection is provided in the diesel day tank room and in the diesel fire pump room. Both rooms are separated from each other and the remainder of the building by substantial construction. Portable extinguishers are provided in both areas.

5.17.5 Adequacy of Fire Protection

There is no detection system provided over the safety-related pumps.

Portable extinguishers are inadequate as the only means of fix suppression. A diesel oil spill in the day tank room presents an unacceptable exposure hazard to the electric fire pump. Due to the lack of an automatic door closure or electrical supervision to assure the water tight door to the diesel fire pump room is kept closed, the door could be left open and a fire in the room could effect both fire pumps. The fire protective coating on the structural steel in the diesel fire pump room has been damaged and is in need of repair.

5.17.6 Modifications

The licensee will install ionization smoke detectors over both divisions of safety-related pumps in the south room. A hose station will be provided at the entrance of the pump house. The door to the diesel fire pump room will be electrically supervised in the closed position. The fire protection for the structural steel in the diesel fire pump room will be repaired to the original fire resistance rating. A curb will be provided at the entrance to the diesel day tank room.

We find that, subject to the implementation of the above modifications, the fire protection for the pump house satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.18 Intake Structure

5.18.1 Safety-Related Equipment

The water supply pumps located in two rooms, with two pumps each, provide the make up water for the cooling towers and the wet pit.

5.18.2 Combustibles

Combustibles in this area include minor amounts of cable insulation and lubricating oil.

5.18.3 Consequences if No Fire Suppression

A fire in one pump would not likely affect the adjacent pump and would not affect its redundant counterpart in the adjacent room.

5.18.4 Fire Protection Systems

The two rooms are separated from each other by three hour fire rated construction. Portable fire extinguishers are provided in the intake structure.

5.18.5 Adequacy of Fire Protection

The lack of fire detection prevents prompt response to fire in this area.

5.18.6 Modifications

The licensee has proposed installation of smoke detectors over the water supply pumps in each room of the intake structure to alarm in the control room. Two additional portable extinguishers will be provided in the area.

We find that, subject to implementation of the above described modifications, the fire protection for the intake structure satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

5.19 Yard Area

5.19.1 Safety-Related Equipment

The safety-related equipment in the yard area includes underground power cables to the residual heat removal pumps, emergency service water pumps, and water supply pumps. The condensate storage tanks are isolated from the buildings and from exterior storage areas.

5.19.2 Combustibles

Combustibles in yard area include transformer oil in the transformers adjacent to the turbine building, wooden cooling towers, warehouse buildings and hydrogen storage.

5.19.3 Consequences if No Fire Suppression

The consequences of an unmitigated fire in the yard area do not impact safe shut down or safety-related systems.

5.19.4 Fire Protection Systems

All the transformers are protected by automatic deluge systems actuated by thermostatic releases. The cooling towers are also protected by automatic deluge systems. The condensate storage tanks are not exposed by exterior storage. A concrete berm encloses both tanks. The yard is protected by manual fire protection consisting of a hose house located at each yard hydrant.

5.19.5 Adequacy of Fire Protection

The automatic systems for the various hazards in the yard area is adequate. Hose houses do not have an adequate amount of manual fire fighting equipment.

5.19.6 Modifications

The hose cabinet associated with curb valve 33-66 will be moved to eliminate the obstruction to proper operation of the hydrant. A 2-1/2 inch gated valve will be installed on one outlet of each yard hydrant. A hydrant inspection program will be established for winterizing the hydrants in the fall and for insuring proper operation in the spring. A hose cart equipped with hose and related fire fighting equipment will be provided at a central readily accessible location.

We find that, subject to implementation of the above described modifications, the fire protection for the yard area satisfies the objectives identified in Section 2.1 of this report and is, therefore, acceptable.

6.0 ADMINISTRATIVE CONTROLS

The licensee's description of the administrative controls is not adequate to permit a conclusion by the staff. We have recommended that the licensee's administrative controls follow the guidelines set forth in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance." The licensee will either revise his program description for administrative controls to indicate conformance with these guidelines or will identify those items which do not conform along with the basis therefor. Our evaluation of the administrative controls for fire protection will be addressed in a supplement to this report.

7.0 TECHNICAL SPECIFICATIONS

The Technical Specifications have been modified to include limiting conditions for operation and surveillance requirements for existing fire protection systems and administrative controls. Following the implementation of the modifications of fire protection systems and administrative controls resulting from this review, the Technical Specifications will be similarly modified to incorporate the limiting conditions for operation and surveillance requirements for these modifications.

8.0 CONCLUSION

The licensee has performed a fire hazards analysis and has proposed certain modifications to improve the fire protection program. Additional modifications have been proposed by the licensee during the course of our review of the fire hazards analysis and our onsite evaluation of the fire protection program. These proposed modifications are summarized in Section 3.1. In addition, we have concluded that the licensee should implement certain evaluations or improvements related to the fire protection program. These are summarized in Section 3.2.

In summary, significant steps are being taken to provide additional assurance that safe shutdown can be accomplished and the plant can be maintained in a safe condition in response to potential fire situations. Additional evaluation of incomplete items, discussed in the preceding sections, will be necessary before we can conclude that the overall fire protection at the Duane Arnold Energy Center will satisfy the provisions of the fire protection guidelines identified in Section 2.0 of this report which the staff has established for satisfactory long-term fire protection.

We find that the licensee's proposed modifications described herein are acceptable both with respect to the improvements in the fire protection program that they provide and with respect to continued safe operation of the facility, while the remaining items are completed.

In the report of the Special Review Group on the Browns Ferry Fire (NUREG-0050) dated February 1976, consideration of the safety of operation of all operating nuclear power plants pending the completion of our detailed fire protection evaluation was presented. The following quotations from the report summarize the basis for our conclusion that the operation of the facility, pending resolution of the incomplete items and the implementation of all facility modifications, does not present an undue risk to the health and safety of the public.

> "A probability assessment of public safety or risk in quantitative terms is given in the Reactor Safety Study (WASH-1400). As the result of the calculation based on the Browns Ferry fire, the study concludes that the potential for a significant release of radioactivity from such a fire is about 20% of that calculated from all other causes analyzed. This indicates that predicted potential accident risks from all causes were not greatly affected by consideration of the Browns Ferry fire. This is one of the reasons that urgent action in regard to reducing risks due to potential fires is not required. The study (WASH-1400) also points out that 'rather straightforward measures, such as may already exist at other nuclear plants, can significantly reduce the likelihood of a potential core melt accident that might result from a large fire.'
>
> "Fires occur rather frequently; however, fires involving equipment unavailability comparable to the Browns Ferry fire are quite infrequent

(see Section 3.3 of NUREG-0050). The Review Group believes that steps already taken since March 1975 (see Section 3.3.2) have reduced this frequency significantly.

"Based on its review of the events transpiring before, during and after the Browns Ferry fire, the Review Group concludes that the probability of disruptive fires of the magnitude of the Browns Ferry event is small, and that there is no need to restrict operation of nuclear power plants for public safety. However, it is clear that much can and should be done to reduce even further the likelihood of disabling fires and to improve assurance of rapid extinguishment of fires that occur. Consideration should be given also to features that would increase further the ability of nuclear facilities to withstand large fires without loss of important functions should such fires occur."

We have determined that the licensee amendment does 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 amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4) that an environmental statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

We have concluded, based on the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendment does 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 Commission'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.

9.0 CONSULTANTS REPORT

Under contract to Nuclear Regulatory Commission, Brookhaven National Laboratory has provided the services of fire protection consultants who participated in the evaluation of the licensee's fire protection program and in the preparation of this report. Their letter, "Fire Protection in Operating Nuclear Power Stations - Duane Arnold Energy Center," dated March 1, 1978, discusses several matters which have been addressed in this report. The elements of the consultants recommendations which we have not adopted are identified in Appendix "B" along with our bases therefore.

APPENDIX A

CHRONOLOGY

In February 1976 the report by the NRC Special Review Group was issued as NUREG-0500, "Recommendations Related to the Browns Ferry Fire."

On May 1, 1976, Standard Review Plan 9.5.1 "Fire Protection" was issued, incorporating the various recommendations contained in NUREG-0500.

By letter dated May 11, 1976, Iowa Electric Light and Power Company was requested to compare the existing fire protection provisions at their facilities with new NRC guidelines as set forth in Standard Review Plan 9.5.1 "Fire Protection" dated May 1, 1976 and to describe (1) the implementation of the guidelines met, (2) the modifications or changes underway to meet the guidelines that will be met in the near future, and (3) the guidelines that will not be met and the basis therefor.

By letters of September 27, 1976, Iowa Electric Light and Power Company was requested to provide the results of a fire hazards analysis and propose Technical Specifications pertaining to fire protection. Commonwealth Edison was also provided a copy of Appendix A to BTP 9.5-1 which includes acceptable alternatives to the guidelines of SRP 9.5-1.

On January 18, 1977, Iowa Electric Light and Power Company provided submittals responding to our requests of May 11 and September 27, 1976.

On August 8, 1976, we provided Iowa Electric Light and Power Company a copy of guideline titled, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

On November 28 to December 2, 1977 the DOR fire protection review team visited the Duane Arnold Energy Center. On December 20, 1976, we provided Iowa Electric Light and Power Company a list of staff concerns and positions with a request for additional information. On January 6, 1978, a similar request was made on the subject of administrative controls.

On January 11 and 12, 1978, Iowa Electric Light and Power Company provided a response to the NRC letter of December 20, 1977.

On January 24 a meeting was held in Bethesda with the NRC staff and representatives of Iowa Electric Light and Power Company to discuss staff concerns and positions.

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By letters of September 27, 1976, Iowa Electric Light and Power Company was requested to provide the results of a fire hazards analysis and propose Technical Specifications pertaining to fire protection. Commonwealth Edison was also provided a copy of Appendix A to BTP 9.5-1 which includes acceptable alternatives to the guidelines of SRP 9.5-1.

On January 18, 1977, Iowa Electric Light and Power Company provided submittals responding to our requests of May 11 and September 27, 1976.

On August 8, 1977, we provided Iowa Electric Light and Power Company a copy of guideline titled, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

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On January 24 a meeting was held in Bethesda with the NRC staff and representatives of Iowa Electric Light and Power Company to discuss staff concerns and positions.

APPENDIX B

DISCUSSION OF CONSULTANT'S REPORT

Under contract to Nuclear Regulatory Commission, Brookhaven National Laboratory has provided the services of fire protection consultants who participated in the evaluation of the licensee's fire protection program and in the preparation of the Safety Evaluation Report (SER). Their letter, "Fire Protection in Operating Nuclear Power Stations - Duane Arnold Energy Center - Safety Evaluation Report Review," dated March 1, 1978, concurs with the staff conclusions noted in the Safety Evaluation Report.

The consultant's recommendation, which we have not adopted, along with our basis therefor is as follows:

Consultant's Recommendation:

"Electrical valve supervision should be provided on all valves controlling fire water systems and sectionalizing valves. The present proposal of administrative controls or locks will increase the probability of suppression system failure on demand."

Staff Response:

The NRC guidelines on valve supervision are given in Appendix "A" of Branch Technical Position (BTP) 9.5-1 of the Standard Review Plan. These guidelines permit, as an alternative to electrical supervision, an administrative program to assure that valves are maintained in the proper position. Such a program includes locking valves with strict key control or sealing valves with tamper-proof seals. Periodic inspections are to be performed to verify that the method of securing the valve is intact.

These measures are consistent with the requirements imposed for supervising valves in safety-related systems, and provide adequate assurance that valves are maintained in the appropriate position. The licensee's program for valve supervision is consistent with NRC guidelines (see Safety Evaluation Report Section 4.3.1.3). In addition, the plant technical specifications were revised to require a monthly check of all valves in the flow path to fire suppression systems. We find that a significant increase in plant safety would not result from the use of electrical supervision of all valves controlling fire water systems and sectionalizing valves.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-331

IOWA ELECTRIC LIGHT AND POWER COMPANY
CENTRAL IOWA POWER COOPERATIVE
CORN BELT POWER COOPERATIVE

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 43 to Facility Operating License No. DPR-49 issued to Iowa Electric Light and Power Company, Central Iowa Power Cooperative, and Corn Belt Power Cooperative, which revised Technical Specifications for operation of the Duane Arnold Energy Center, located in Linn County, Iowa. The amendment is effective as of the date of issuance.

The amendment incorporates fire protection Technical Specifications on the existing fire protection equipment and adds administrative controls related to fire protection at the facility. The amendment also adds a license condition that approves and requires completion of fire protection system modifications. This action is being taken pending completion of the Commission's overall fire protection review of the facility.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. 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 amendment. Prior public notice of this amendment is not required since the amendment does not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the application for amendment dated October 26, 1977, as supplemented by letter dated December 9, 1977, (2) the Commission's letter of November 23, 1977, transmitting proposed interim Technical Specifications on fire protection and a related Safety Evaluation, (3) Amendment No. 43 to License No. DPR-49, 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. and at the Cedar Rapids Public Library, 426 Third Avenue, S. E., Cedar Rapids, Iowa 52401. A copy of items (2), (3) and (4) 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 1 day of June 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

George Lear

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors