

March 5, 1987

DMB 016

Docket No. 50-335

Mr. C. O. Woody  
Group Vice President  
Nuclear Energy  
Florida Power & Light Company  
P. O. Box 14000  
Juno Beach, Florida 33408

Dear Mr. Woody:

SUBJECT: EXEMPTION REQUESTS FOR ST. LUCIE PLANT, UNIT NO. 1, 10 CFR PART 50, APPENDIX R, FIRE PROTECTION PROGRAM FOR NUCLEAR POWER FACILITIES OPERATING PRIOR TO JANUARY 1, 1979

The Commission has issued the enclosed Exemption from certain requirements of Appendix R to 10 CFR Part 50 in response to your December 14, 1983, November 28 and December 31, 1984, and February 21, 1985 and January 30, 1987 applications submitted pursuant to 10 CFR Part 50, Section 50.12.

The disposition of the requested exemptions is as follows:

1. Reactor containment building (Fire Area K) to the extent that containment cables are not provided with 20 feet of separation with no intervening combustibles. Granted
2. Electrical penetrations in the containment to the extent that they are not provided with fire rated seals. Granted
3. Mechanical penetrations in the containment to the extent that they are not provided with fire rated seals. Granted
4. Containment purge valves to the extent that they are not 3-hour fire rated. Granted
5. Reactor containment building to the extent that 8-hour battery emergency lights are not provided. Granted
6. Exterior wall penetrations of specified areas to the extent that exterior wall penetrations of these areas have not been provided with 3-hour fire rated barriers. Not necessary
7. Structural supports for steel conduits to the extent that these supports are not provided with a fire-rated barrier or wrap. Denied

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Mr. C. O. Woody

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In granting the exemption requests, the staff has determined that the level of protection provided, given the proposed modifications, is equivalent to the level of protection required by Sections III.G and III.J of Appendix R. The details of our evaluation and bases for our findings are contained in the enclosed Exemption.

In connection with the structural supports for steel conduit to the extent that these supports are not provided with a fire-rated barrier or wrap, the modification schedule should be completed according to 10 CFR 50.48(c)(2) or (c)(3), depending on whether a shutdown is needed. The commencement date is the date of this letter.

A copy of the Exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

**Original signed by:**

Ashok Thadani  
Ashok C. Thadani, Director  
PWR Project Directorate #8  
Division of PWR Licensing-B

Enclosure:  
Exemption

cc w/enclosure:  
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March 5, 1987

DOCKET NO. 50-335

MEMORANDUM FOR: Rules and Procedures Branch  
Division of Rules and Records  
Office of Administration

FROM: Office of Nuclear Reactor Regulation

SUBJECT: ST. LUCIE PLANT, UNIT NO. 1

One signed original of the *Federal Register* Notice identified below is enclosed for your transmittal to the Office of the Federal Register for publication. Additional conformed copies ( 5 ) of the Notice are enclosed for your use.

- Notice of Receipt of Application for Construction Permit(s) and Operating License(s).
- Notice of Receipt of Partial Application for Construction Permit(s) and Facility License(s); Time for Submission of Views on Antitrust Matters.
- Notice of Consideration of Issuance of Amendment to Facility Operating License.
- Notice of Receipt of Application for Facility License(s); Notice of Availability of Applicant's Environmental Report; and Notice of Consideration of Issuance of Facility License(s) and Notice of Opportunity for Hearing.
- Notice of Availability of NRC Draft/Final Environmental Statement.
- Notice of Limited Work Authorization.
- Notice of Availability of Safety Evaluation Report.
- Notice of Issuance of Construction Permit(s).
- Notice of Issuance of Facility Operating License(s) or Amendment(s).
- Order.
- Exemption.
- Notice of Granting Exemption.
- Environmental Assessment.
- Notice of Preparation of Environmental Assessment.
- Other: \_\_\_\_\_

PWR Project Directorate #8, PWR-B  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

Contact: Caryn Faircloth  
Phone: 27253

OFFICE ▶	PBD#8						
SURNAME ▶	PKreutzer;cf						
DATE ▶	3/9/87						

Mr. C. O. Woody  
Florida Power & Light Company

St. Lucie Plant

cc:

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Executive Director for Operations  
101 Marietta Street N.W., Suite 2900  
Atlanta, Georgia 30323

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
FLORIDA POWER AND LIGHT	)	Docket No. 50-335
COMPANY	)	
	)	
(St. Lucie Plant,	)	
Unit No. 1)	)	

EXEMPTION

I.

Florida Power and Light Company (the licensee) is the holder of Facility Operating License No. DPR-67 that authorizes the operation of the St. Lucie Plant, Unit No. 1 (the facility) at a steady-state power level not in excess of 2700 megawatts thermal. The facility is a pressurized water reactor (PWR) located at the licensee's site in St. Lucie County, Florida. The license provides, among other things, that the facility is subject to all rules, regulations and orders of the Commission now or hereafter in effect.

II.

10 CFR 50.48, "Fire protection," and Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," set forth certain specific fire protection features required to satisfy the General Design Criterion related to fire protection (Criterion 3, Appendix A to 10 CFR Part 50).

Section III.G of Appendix R requires fire protection of safe shutdown capability for structures, systems and components important to safe shutdown. Section III.J of Appendix R requires emergency lighting with at least an 8-hour battery power supply for all plant areas needed for operation of safe shutdown

equipment and in access and egress routes thereto associated with this equipment.

### III.

The licensee requested exemptions from specific requirements of Appendix R to 10 CFR Part 50, Sections III.G and III.J, in their applications dated December 14, 1983, November 28 and December 31, 1984, and February 21, 1985.

In a letter dated January 30, 1987, the licensee provided information to the "special circumstances" finding required by revised 10 CFR 50.12(a) (See 50 Fed. Reg. 50764). The licensee stated that the fire protection features at St. Lucie Unit 1 accomplish the underlying purpose of the rule. To require installation of additional suppression systems, detection systems, and fire barriers would result in the expenditure of engineering and construction resources as well as the associated capital costs. The costs to be incurred are those costs associated with:

- o Engineering and installation of additional piping, sprinkler heads, and supporting structures and associated surveillances.
- o Engineering and installation of fire barriers, supports, support protection, and ongoing maintenance.
- o Engineering and installation of replacements for existing mechanical and electrical containment penetrations.
- o Engineering and installation of additional fire detection systems and the associated surveillance.
- o Increased congestion in a number of plant locations complicating future plant modifications/operations.

The licensee stated that application of the regulations in these particular circumstances is not necessary to meet the underlying purpose of

the rule. The staff concludes that "special circumstances" exist for the licensee's requested exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of Appendix R to 10 CFR Part 50. See 10 CFR 50.12(a)(2)(ii).

The NRC staff evaluation of the requested exemptions is contained in Section IV, below.

#### IV.

##### FIRE AREAS A, B, C, E, F, H-H, I-I, AND J

Exemptions were requested from Section III.G.2.a of Appendix R to the extent that exterior wall penetrations of these areas have not been provided with 3-hour fire rated barriers. The licensee, by Revision 3 to the fire hazards analysis dated November 28, 1984, requested eight exemptions (identified as A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub>, E<sub>2</sub>, F<sub>1</sub>, H-H<sub>1</sub>, I-I<sub>1</sub> and J<sub>1</sub>) from installing 3-hour fire rated doors, HVAC duct dampers, and penetration seals in exterior walls of these fire areas. Because none of the exterior wall penetrations separate redundant safe shutdown systems and no fire hazards are located near the exterior walls, the subject exemption requests are not required by Appendix R criteria. Based on the above evaluation, it is concluded that exemption requests A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub>, E<sub>2</sub>, F<sub>1</sub>, H-H<sub>1</sub>, I-I<sub>1</sub> and J<sub>1</sub> are not necessary.

##### FIRE AREA K (REACTOR CONTAINMENT BUILDING)

###### Exemption Requested

An exemption was requested from Section III.G.2.d of Appendix R to the extent that cables for safe shutdown equipment and associated nonsafety

circuits of redundant trains in containment are not separated by 20 feet of horizontal distance with no intervening combustibles or fire hazards.

#### Discussion

This exemption request for Fire Area K was previously submitted to the NRC in the form of an exemption from either the "20 feet of separation" or "separation by a noncombustible radiant energy heat shield." This exemption was granted by a letter dated February 21, 1985. The revised exemption request, which is the subject of this evaluation, now incorporates the additional parameter of "no intervening combustibles" in the 20 feet of separation space.

The reactor containment building is separated from other plant areas by 3-hour fire rated barriers. The containment is one fire area with a large volume and a high ceiling. There are four floor levels inside the containment at the 18-, 23-, 45-, and 62-foot elevations. Normal access to the containment is controlled and limited.

Our previous evaluation of this exemption and its approval was based, in part, on the following:

- All nonqualified IEEE Std 383 cables are covered with a fire retardant mastic.
- Separation of redundant cables was by more than 7 feet horizontally and 25 feet vertically.
- Because of limited access and small amounts of combustibles, a fire of

sufficient magnitude to damage redundant cables or associated circuits is unlikely.

- The containment volume and high ceiling would cause a small fire's energy to readily dissipate and not threaten redundant cables simultaneously.

#### Evaluation

The fire protection in the containment fire area does not comply with the technical requirements of Section III.G.2.d of Appendix R because 20 feet of separation free of intervening combustibles have not been provided between safe shutdown equipment cables and associated nonsafety circuits of redundant trains.

Reaffirming our previous evaluation of the containment fire area and its redundant cables, it is concluded that because of the small amount of combustibles, a potential fire would be of limited magnitude and extent. The products of combustion from such a fire would be dissipated up into the higher elevations of the containment structure and away from the vulnerable shutdown components. Therefore, we conclude that one shutdown division would remain free of fire damage.

#### Conclusion

Based on the above evaluation, it is concluded that exemption request K<sub>1</sub> for Fire Area K (containment) from Section III.G.2.d of Appendix R is acceptable because the removal of the combustibles in the separation space between redundant cables and associated circuits would not significantly increase the level of fire protection. Therefore, the exemption is granted.

## STEEL CONDUIT STRUCTURAL SUPPORTS

### Exemptions Requested

Exemptions were requested from Section III.G.2.a of Appendix R to the extent that it requires fire resistant materials for covering all structural supports for steel conduits that are provided with a fire rated barrier or wrap.

### Discussion

The requested exemptions apply to the following areas:

- Fire Area A
- Fire Area B
- Fire Area C
- Fire Area E
- Fire Area N
- Fire Area O

The exemptions are identified by the licensee as A<sub>3</sub>, B<sub>2</sub>, C<sub>4</sub>, E<sub>4</sub>, N<sub>4</sub> and O<sub>5</sub>. Each of the above areas contains early warning fire detection either on an area-side or spot location basis. The fuel load is low. The licensee has made provisions for confining any flow of combustible liquids. In these areas, the redundant shutdown equipment cables are either separated or are in steel conduits protected by a fire-rated wrap. Fire extinguishers and hose stations are available to the areas affected.

### Evaluation

The technical requirements of Section III.G.2.a are not met in the above-referenced areas because conduit supports have not been protected against fire damage.

Our principal concern is that a fire could produce elevated room temperatures sufficient to cause the supports to fail, resulting in damage to the protected conduit and loss of shutdown capability.

The affected areas have no automatic fire suppression capability. A fire, if one should occur, would have to be extinguished by the plant fire brigade. From the time a fire occurs, through the arrival of the brigade, a significant time lapse may occur. We normally expect that it will take at least one-half hour before a fire would be considered under control and up to an hour before near-ambient conditions are restored. If a fire were to produce elevated room temperature in accordance with the standard fire test of ASTM E-119, steel failure could be expected after about 10 minutes. Because it is not possible to consistently predict the nature of fire in any plant area and because of the inherent time delays associated with fire brigade response, it is very important to have complete passive fire protection for one train of shutdown components in an area without an automatic fire suppression system. Without protection for the conduit supports, safe shutdown cannot be reasonably assured.

#### Conclusion

Based on our evaluation, we conclude that the licensee's existing fire protection for the above-referenced areas does not achieve an equivalent level of safety to that attained by complete conformance with Section III.G.2. Therefore, the licensee's request for exemption in these areas is denied.

#### CONTAINMENT ELECTRICAL PENETRATIONS

##### Exemptions Requested

Exemptions A<sub>4</sub>, C<sub>5</sub>, and K<sub>3</sub> were requested from Section III.G.2.a of Appendix R to the extent that 3-hour fire rated electrical penetration seals are not provided in the containment structure.

Discussion

The licensee has identified the electrical penetration assemblies as not being fire rated. The electrical penetration consists of a primary and secondary seal. The primary seal is located within the 3 5/8-inch steel containment shell and the secondary seal is located within the 36-inch concrete containment wall. A 48-inch-wide annulus exists between the two seals. Both seals are constructed of substantial steel materials consisting of 1 1/2-inch-thick by 20-inch-diameter ASTM Grade A-36 plates, 80 ASME SA 106 Grade B sleeves, 80 ASME SA 234 pipe cap, and fillet welds. The seals are completely closed and tested for airtightness. The entire length of the seal is about 7 feet. As the cables pass through the annulus, they are covered completely by a 12-inch steel sleeve. The wall thickness coupled with the seal construction is deemed to provide equivalent protection to a standard 3-hour fire rated penetration seal.

The electrical penetration areas for trains A and B are constructed of concrete and have high ceilings. Each area has a fire detection system. There is no fire loading on the floor and cables are in covered metal cable trays or conduits. It is expected that a fire would be small and of short duration. The electrical penetration rooms are separated from each other by a concrete fire wall. The containment side of these penetrations is a high radiation area and personnel access is limited, thus minimizing the probability of introducing transient combustibles. The cables entering the containment side are immediately separated and a radiant energy shield is provided between redundant safety-related cable trays. The containment volume is large (2.5 million cubic feet) and allows for free dissipation of heat and smoke. Therefore, a fire (which would be small) would not be able to affect a seal. The annulus area has a negligible fire load.

### Evaluation

The fire protection in the containment structure does not comply with Section III.G.2.a of Appendix R because 3-hour fire rated electrical penetration seals are not provided.

Because of the materials of construction, airtightness, and seal arrangement, it is concluded that the electrical penetration seals provided by the licensee are equal to or better than a standard 3-hour fire rated seal. Further, both sides of the subject electrical penetrations have a low fire loading and/or are under the protection of fire detection systems. The containment side has a large volume that allows heat to dissipate away from the seals. It is concluded that should a fire occur, it would be small, of short duration, and easily extinguished by automatic systems or the fire brigade.

### Conclusion

Based on the above evaluation, it is concluded that the existing electrical penetrations provided for these areas are equivalent to a 3-hour fire rated barrier and/or are sufficient to withstand the expected fire severity with considerable conservatism. Therefore, the exemption is granted.

### CONTAINMENT MECHANICAL PENETRATIONS

#### Exemptions Requested

Exemptions E<sub>5</sub>, J<sub>5</sub>, and K<sub>4</sub> were requested from Section III.G.2.a of Appendix R to the extent that 3-hour fire rated mechanical penetration seals are not provided in the containment structure.

#### Discussion

The mechanical penetration assemblies are similar to those for electrical penetrations in that they pass through a 36-inch concrete containment wall, a

4-foot-wide annulus, and a 3 5/8-inch steel containment shell. The penetrations are welded air-tight and are constructed of heavy steel components similar to the electrical penetrations.

Evaluation

The fire protection in the containment does not comply with Section III.G.2.a of Appendix R because 3-hour fire rated mechanical penetration seals are not provided.

Because of the materials of construction, airtightness, and seal arrangements, it is concluded that the mechanical seals provided by the licensee are equal to or better than a standard 3-hour fire rated seal. Further, as in the case for the electrical penetration seals, both sides of the mechanical seal penetrations have a low fire loading and/or fire detection systems. The containment side has a large volume that allows heat to dissipate away from the seals. It is concluded that should a fire occur, it would be small, of short duration, and easily extinguished by the fire brigade.

Conclusion

Based on the above evaluation, it is concluded that the existing mechanical penetration seals provided for the containment penetrations are equivalent to a 3-hour fire rated barrier and are sufficient to withstand the expected fire severity with considerable conservatism. Therefore, the exemption is granted.

CONTAINMENT PURGE VALVES (FIRE AREAS E AND K)

Exemptions Requested

Exemptions E<sub>6</sub> and K<sub>5</sub> were requested from Section III.G.2.a of Appendix R to the extent that fire rated dampers are not provided for 3-hour fire rated barriers.

### Discussion

The licensee has stated in the submittal that containment purge valves are not fire rated. For these fire areas, the purge HVAC system is constructed of piping and valves instead of the usual ducts and dampers. The pipes have a wall thickness of about 0.375 inch compared with the 0.0312-inch thickness of a 3-hour fire rated damper. This pipe wall thickness far exceeds the fire damper in material size and, therefore, would have greater fire endurance.

Each 48-inch purge line pipe has three remote manually operated butterfly valves. The 2-inch bypass line pipes each have two remote manually operated butterfly valves. All of these valves are required by Technical Specifications to be shut, except when in the refueling or shutdown mode. The valves for each pipe are in separate fire areas; thus, a single fire would not affect all valves on any one pipe. Should a valve fail, the failure mode is to the closed (safe) position. Cable routing for these valves is such that a single fire would not cause the spurious opening of all redundant valves.

All of the affected areas have a negligible fire loading. Ionization smoke detectors are provided, but not on an area-wide basis. Fire extinguishers and hose stations are available for use in the area.

### Evaluation

Because of the low fire loading, a fire would be of limited magnitude and short duration. The existing piping and valves would provide an adequate fire barrier and are deemed to be equal to a standard 3-hour fire damper. Redundant safe shutdown cables and equipment would not be in jeopardy. Based on the evaluation, it is concluded that the existing purge HVAC piping and valves serve as an adequate fire barrier and are equivalent to a 3-hour rated fire damper and/or are sufficient to withstand the expected fire severity with considerable conservatism.

Conclusion

Based on the above evaluation, it is concluded that the existing containment purge valves provided for the containment HVAC penetrations are equivalent to a 3-hour fire rated damper and/or are sufficient to withstand the expected fire severity. Therefore, the exemption is granted.

REACTOR CONTAINMENT BUILDING

Exemption Requested

An exemption was requested from Section III.J of Appendix R to the extent that 8-hour battery powered emergency lights in the containment structure were not provided.

Discussion

The purpose of providing 8-hour battery powered emergency lights is to ensure that minimal required lighting is available for the performance of manual actions necessary for safe shutdown after a fire. Usually, manual actions are required for valve alignment, repairs, and pump control operations. The licensee stated that the only operator actions in the containment would be to operate valves for cold shutdown. Operation of these valves is not required for hot shutdown.

Normal and emergency lighting exists inside the containment. Also, in the event of a loss of offsite power, the normal lighting system can be energized manually from an onsite source. The licensee has also provided four dedicated portable emergency lighting units for use by the operators. These units are located outside of the containment.

Evaluation

Emergency lighting for fire protection purposes for the containment structure does not comply with the technical requirements of Section III.J because of the lack of 8-hour battery powered emergency lights.

Since the only manual actions required inside the containment are for the operation of valves for cold shutdown and not hot shutdown, sufficient time is available for the licensee to take appropriate action to reenergize the normal containment lighting or to assemble portable lighting units prior to containment entry. Also, because of the high containment atmospheric temperatures, battery powered lights would be in an environment hostile to battery life and thus would degrade their reliability.

Conclusion

Based on the above evaluation, it is concluded that the installation of 8-hour battery powered emergency lighting units inside the containment would not significantly improve the level of fire protection for this fire area. Therefore, the exemption is granted.

SUMMARY

Based on our evaluation, we conclude that because the existing fire protection and/or proposed fire protection modifications provide a level of safety equivalent to the technical requirements of Sections III.G and III.J of Appendix R, the following exemptions are granted:

1. Reactor containment building (Fire Area K) to the extent that containment cables are not provided with 20 feet of separation with no intervening combustibles.

2. Electrical penetrations in the containment to the extent that they are not provided with fire rated seals.
3. Mechanical penetrations in the containment to the extent that they are not provided with fire rated seals.
4. Containment purge valves to the extent that they are not 3-hour fire rated.
5. Reactor containment building to the extent that 8-hour battery powered emergency lights are not provided.

Based on our evaluation, we conclude that the existing level of fire protection for steel conduit supports does not provide an equivalent level of safety to that achieved by compliance with Section III.G of Appendix R. Therefore, the licensee's request for exemption from the requirement to protect the supports is denied.

The exemptions requested for penetrations in exterior walls are not needed.

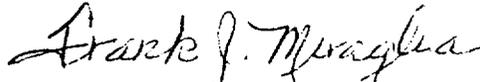
V.

Accordingly, the Commission has determined pursuant to 10 CFR 50.12(a) that (1) these exemptions as described in Section IV are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security, and (2) special circumstances are present for these exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purposes of Appendix R to 10 CFR Part 50. Therefore, the Commission hereby grants the exemption requests identified in Section IV above.

Pursuant to 10 CFR 51.32 the Commission has determined that the granting of these Exemptions will not result in any significant impact on the environment (51 FR 39926).

Dated at Bethesda, Maryland, this 5th day of March 1987.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script that reads "Frank J. Miraglia".

Frank J. Miraglia, Director  
Division of PWR Licensing-B  
Office of Nuclear Reactor Regulation