



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

OCT 15 1984

PRC

Docket Nos.: STN 50-454
and STN 50-455

MEMORANDUM FOR: The Atomic Safety and Licensing Board for Byron:

Ivan W. Smith
Dr. Dixon Callihan
Dr. Richard F. Cole

The Atomic Safety and Licensing Appeal Board for Byron:

Alan S. Rosenthal
Dr. Reginald L. Gotchy
Howard A. Wilber

FROM: Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

SUBJECT: AMENDMENT TO BYRON FUEL STORAGE LICENSE
(BOARD NOTIFICATION 84-168)

In accordance with the present NRC procedures for Board Notifications, the following information is being provided:

1. Letter from T. R. Tramm (Commonwealth Edison) to John G. Davis (NRC) dated September 13, 1984.
2. Letter from R. G. Page (NRC) to T. R. Tramm (Commonwealth Edison) dated October 1, 1984.

The September 13, 1984 letter is an application for amendment of the Byron fuel storage license, SNM-1917. The October 1, 1984 letter grants, in part, that amendment.

Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

Enclosures:
As stated

cc: EDO
ACRS (10)
Parties to the Proceeding
See next page

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Byron Units 1&2
Docket No. 50-454,455

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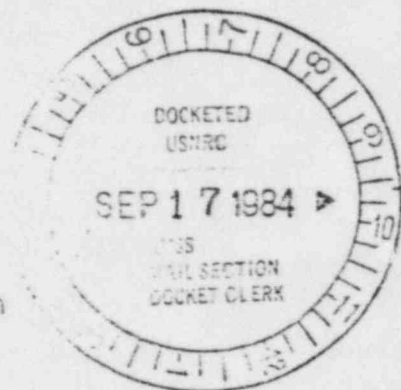


September 13, 1984

Mr. John G. Davis
 Director of Nuclear Material Safety
 and Safeguards
 U.S. Nuclear Regulatory Commission
 Washington, D.C. 20555

'84 SEP 17 P2:06

Subject: Byron Generating Station Units 1 and 2
 Special Nuclear Materials License
 Number SNM-1917
 NRC Docket Nos. 50-454 and 50-455



References (a): October 6, 1982 letter from T. R. Tramm
 to J. G. Davis.

(b): February 28, 1983 letter from T. R. Tramm
 to J. G. Davis.

Dear Mr. Davis:

This is to request amendment of the Byron fuel storage license, SNM-1917. Revision of certain existing license conditions is necessary to permit placement of the startup sources in fuel assemblies prior to the commencement of core loading. It is also necessary at this time to amend certain information provided in reference (b) in support of our application for the license. These revisions are necessary to minimize the number of times that each new fuel assembly must be handled on the core load critical path and will diminish the possibility of accidental damage to the fuel.

Attachment A to this letter contains the proposed changes to SNM-1917 and the basis for each change. Attachment B contains the amended responses to questions 4.b and 4.c which were originally provided in Attachment B of reference (b).

Expedited consideration of this amendment is requested. We anticipate receiving a fuel loading license for Byron 1 in October, 1984. The revision to license SNM-1917 is needed prior to the issuance of the Part 50 license to permit transfer of the californium neutron sources in advance of the commencement of core loading and finalization of the core loading procedures. It appears that issuance of the amendment by October 1 will provide adequate lead time.

According to 10 CFR 170.11, no fee is required for this license amendment.

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J. G. Davis

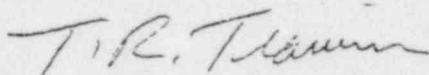
- 2 -

September 13, 1984

As you know, the request in reference (a) for authorization to receive fuel for Byron 2 is still pending. For your information, the shipment of Unit 2 fuel is presently scheduled to begin in May, 1985.

Please address any questions you may have regarding this matter to this office.

Very truly yours,



T. R. Tramm
Nuclear Licensing Administrator

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Attachments

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ATTACHMENT A

PROPOSED CHANGED TO SNM-1917

Present Wording:

- 18.b The fuel assemblies shall be stored in a checkerboard pattern.
- 20 Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area.

Proposed Wording:

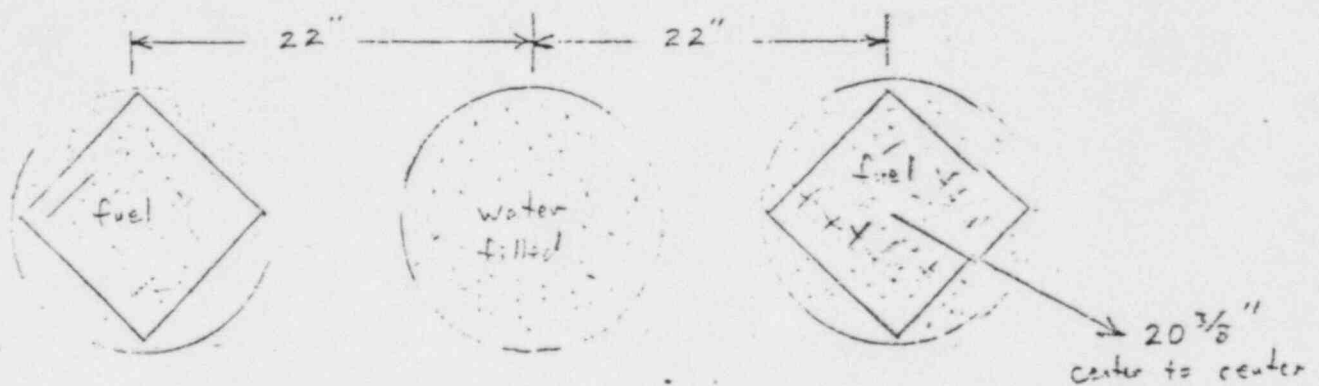
- 18.b The fuel assemblies shall be stored in a checkerboard pattern in the Spent Fuel Racks. Two fuel assemblies may be placed in two damaged fuel storage containers for Primary Neutron Source installation and shielded storage provided the center-to-center spacing of these assemblies and all other adjacent fuel assemblies exceeds 20 inches.
- 20 Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area. However, two fuel assemblies may be placed in two water filled damaged fuel storage containers for Primary Neutron Source installation and shielded storage provided that the water used is at greater than 2000 ppm boron concentration.

Reason for Changes:

Due to ALARA considerations it is desirable to install the two californium primary neutron sources into two new fuel assemblies in the spent fuel pit. Two damaged fuel storage containers filled with borated water will be used for radiation shielding. The containers will be located in the failed fuel container rack shown in FSAR figures 9.1-2 and 9.1-4 (enclosed). This rack is designed to maintain the center-to-center spacing at greater than 20 inches. The installation operation will be performed shortly before the start of core loading and the two new fuel assemblies with installed neutron sources will be temporarily stored in these containers until transferred to the reactor.

Basis for Changes:

The two fuel assemblies to receive primary sources will be installed in failed fuel containers located in two nonadjacent failed fuel container rack locations 44 inches apart. The failed fuel container has the cylindrical dimension of a 13 inch schedule 10 pipe and contains a stainless steel angle framework centered in the container to support the fuel assembly. This framework is nominally 9 inches square. Between the two loaded failed fuel containers will be a third, borated water filled failed fuel container to be used as a shielded temporary storage location for the primary source rod. When we unload the new fuel vault into the spent fuel pit, the closest a new fuel assembly would be stored with respect to a source bearing assembly would be $20 \frac{3}{8}$ inches.



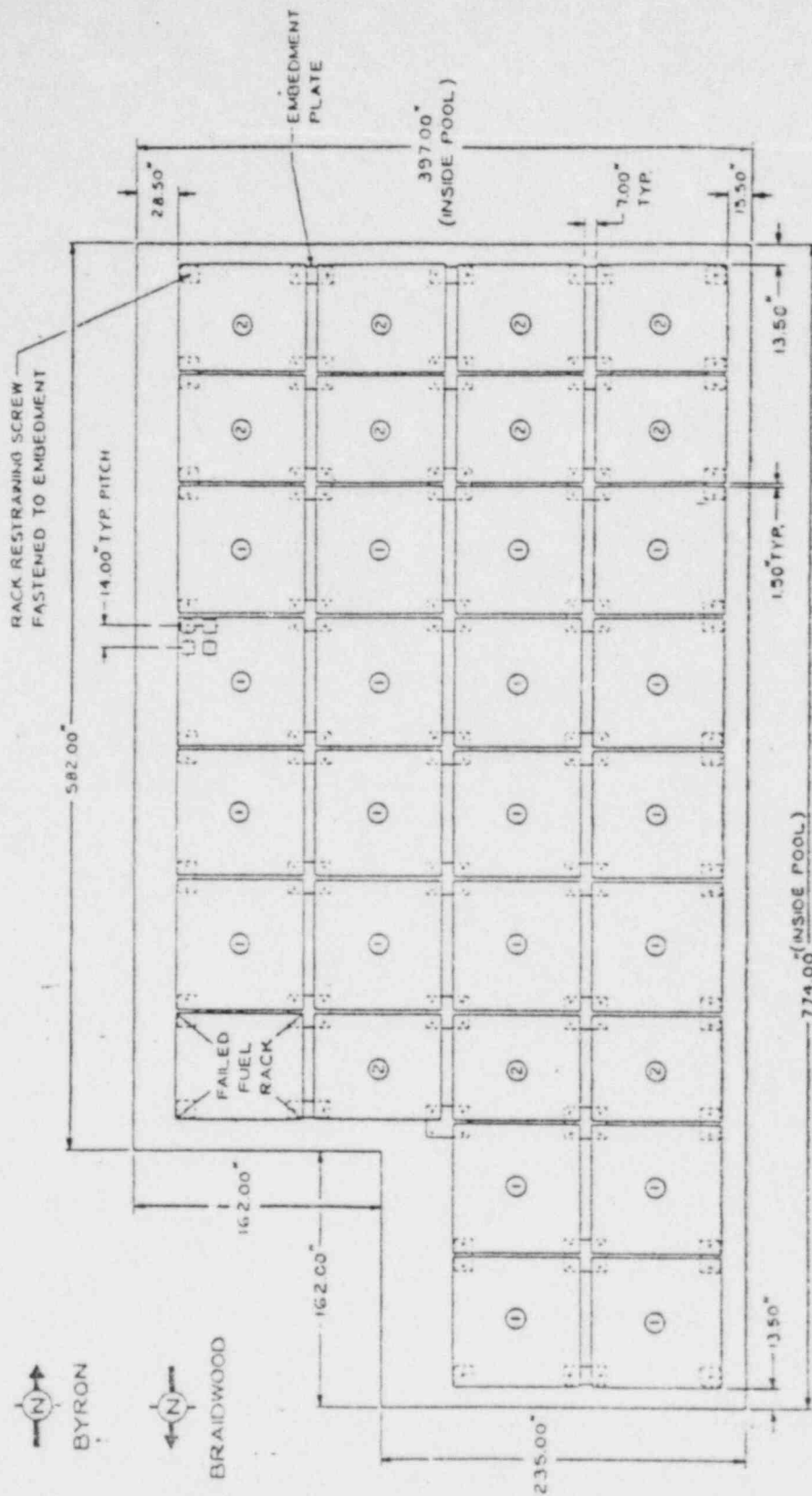
Twenty inches is greater than the minimum checkerboard center-to-center spacing. This arrangement has been analyzed by NUS Corporation the original rack criticality analyst, and found to have no adverse affect on the original results.

The total amount of water used will not exceed 250 gallons. Even if this borated water were to completely leak into the surrounding Spent Fuel Pit, it would be less than 1/4 inch in depth, still more than 18 inches below the active fuel in storage.

Normal station radiation procedures will be used to support the movement of primary neutron sources. Health Physics personnel will monitor personnel area dose rates, conduct area surveys and contamination swipe surveys, and appropriately post any radiation areas. Personnel dosimetry will include badges specifically designed for neutron exposure. Expected dose rates for source loading both with and without borated water shielding are as follows for selected areas:

<u>Area</u>	<u>Without Water</u>	<u>With Water</u>
Welding Work Area (9 ft. above source)	158 mrem/hr	0.00326 mrem/hr
426' elevation at North end of pit	4.16 mrem/hr	0.079 mrem/hr
South SFP wall at source level	688 mrem/hr	50.8 mrem/hr
426' elevation at South end of pit	9.51 mrem/hr	5.9 E-6 mrem/hr

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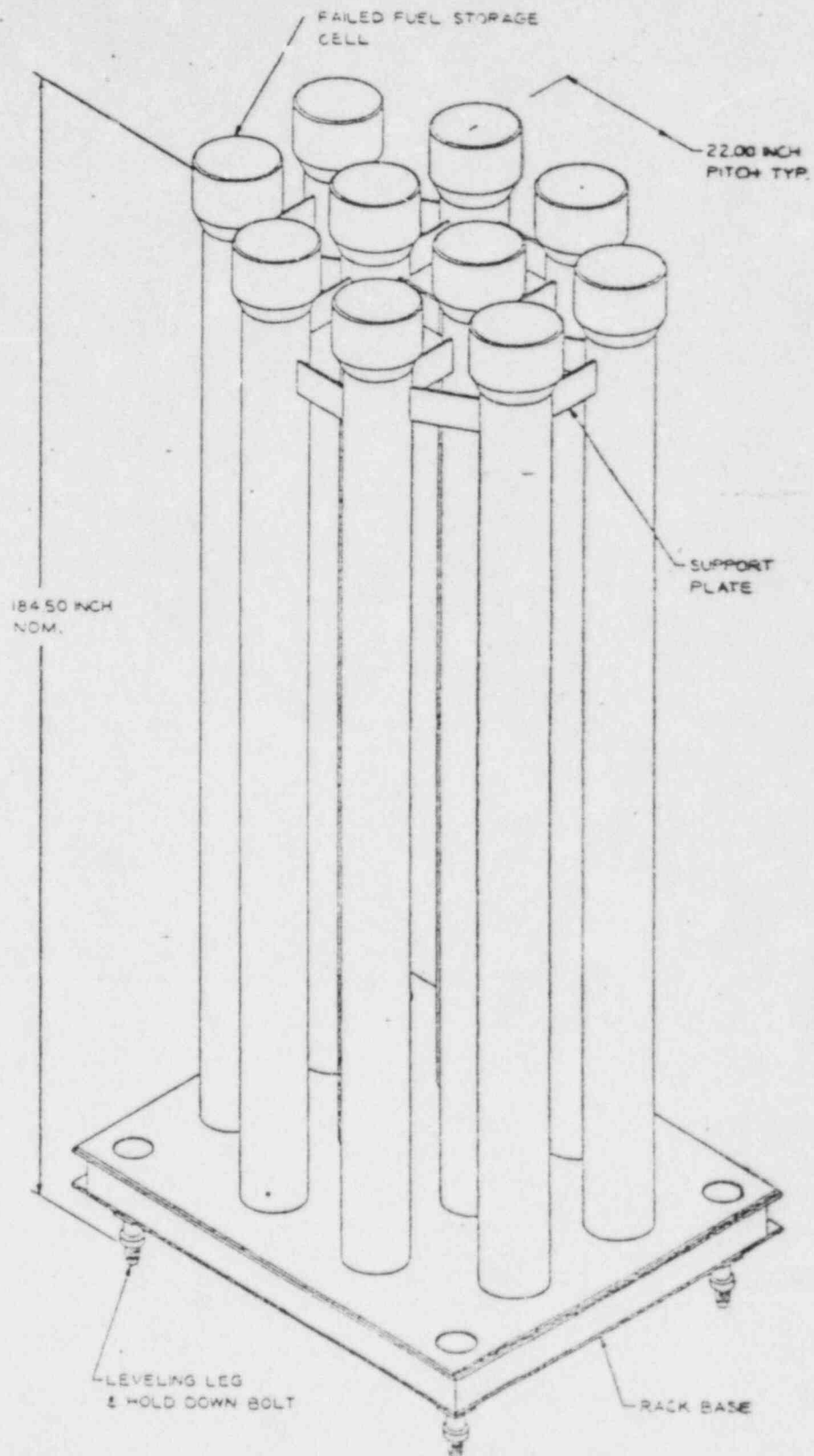


TYPE OF RACK	NO. OF RACKS	NOMINAL RACK SIZE	ACTUAL SPACES
①	20	6 x 6	720
②	11	6 x 5	330
TOTAL CAPACITY			1050

BYRON/BRAIDWOOD STATIONS
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-2

SPENT FUEL STORAGE RACK ARRANGEMENT



BYRON/BRAIDWOOD STATIONS
 FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-4

FAILED FUEL CONTAINER RACK

ATTACHMENT B

AMENDED RESPONSES TO NRC QUESTIONS

(Responses originally provided in Attachment B to letter dated February 28, 1983 from TR Tramm to JG Davis)

Question 4.c:

Describe the administrative controls to assure that the fuel will be stored and maintained in a checkerboard pattern.

Original Answer:

When transporting a new fuel assembly, the loaded area of the spent fuel racks will be approached from the unloaded side, never allowing a fuel assembly to pass over a storage cell that is immediately adjacent to a cell already containing a fuel assembly. Two independent persons will verify placement of the new fuel assemblies in the spent fuel pit storage rack locations to ensure the checkerboard pattern is maintained. During unloading, fuel assemblies nearest the unloaded side will be moved first ensuring that assemblies are not moved across from each other.

Amended Answer:

A new fuel assembly in transport will not be allowed to pass over a storage cell that is immediately adjacent to a cell that already contains a fuel assembly. Two independent persons will verify placement of the new fuel assemblies in the spent fuel pool storage rack locations to ensure the checkerboard pattern is maintained.

Reason for Change:

The previous controls prevented loading the whole core directly from the spent fuel pool. The revised controls reduce the number of fuel moves and diminish the possibility of fuel damage, yet they establish reasonable and satisfactory precautions to avoid accidental criticality.

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FCUP: NK
70-2973
SNM-1917, Amendment No. 2

Commonwealth Edison
ATTN: Mr. T. R. Tramm
Nuclear Licensing Administrator
P.O. Box 767
Chicago, IL 60690

Gentlemen:

In accordance with your application dated September 13, 1984, and pursuant to Title 10, Code of Federal Regulations, Part 70, Materials License No. SNM-1917 is hereby amended to allow the storage of new fuel assemblies in the Failed Fuel Container Rack. Accordingly, Conditions 18.b. and 20 are amended to read:

Condition 18.b. The fuel assemblies in the Spent Fuel Storage Racks shall be stored in a checkerboard pattern. However, one fuel assembly may be placed in each of two storage locations of the Failed Fuel Container Rack provided they are no closer than 20 inches (center-to-center) from the nearest fuel assembly in the Spent Fuel Storage Racks and no closer than 44 inches (center-to-center) from each other.

Condition 20. Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area. However, one fuel assembly may be placed in each of two water-filled fuel assembly storage locations (44 inches center-to-center) in the Failed Fuel Container Rack.

All other conditions of the license shall remain the same.

The above license conditions were discussed with Mr. T. R. Tramm of Commonwealth Edison and Mr. Norman Ketzlach of my staff on September 17, 1984. It should be noted that your amended answer to NRC Comment No. 4.c. in your February 28, 1983 submittal (Tom Tramm to John G. Davis) is acceptable.

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Commonwealth Edison

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Enclosed is a copy of our Safety Evaluation Report in support of this amendment.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Original Signed by
Ralph G. Page

R. G. Page, Chief
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: Safety Evaluation Report

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DOCKET FILE 70-2973
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DATE	9/27/84	9/27/84	9/28/84	9/28/84		

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DOCKET NO.: 70-2973
LICENSE NO.: SNM-1917
LICENSEE: Commonwealth Edison
FACILITY: Byron Unit 1
SUBJECT: SAFETY EVALUATION REPORT - REVIEW LICENSE AMENDMENT
APPLICATION DATED SEPTEMBER 13, 1984

Background

By application dated September 13, 1984, Commonwealth Edison (CE) requested authorization to store two new fuel assemblies in the Failed Fuel Container Rack and to install Californium (principally Cf-252) startup sources in them. The possession and handling of the Californium sources is authorized under Material License No. 12-05650-18.

Discussion

A. Nuclear Criticality Safety

In the New Fuel Storage Vault there may be three groups of fuel assemblies with each group having 2 rows of 22 assemblies each. The fuel assemblies within a group are spaced on 21 inches center-to-center. There are two 50-inch aisles between the 3 groups. The staff had determined the minimum k_{eff} for the array to be <0.89 independent of the degree of water moderation within and between assemblies or the degree of concrete reflection surrounding the array.

The fuel assemblies in the spent fuel rack are spaced on 14-inch centers. Authorization had been given (Amendment No. 1, issued August 9, 1983) for storing fuel assemblies in the Spent Fuel Storage Pool in a checkerboard pattern. Under these conditions, the k_{∞} of an infinite array in the racks would be <0.90 at optimum water mist density within and between fuel assemblies.

The Failed Fuel Container Rack is located in the Spent Fuel Pool at the southwest corner of the array of the spent fuel racks. It provides storage for 10 failed fuel assemblies spaced on 22-inch centers. CE requests the storage of only two fuel assemblies in this rack spaced on 44-inch centers (the steel pipe in the in-between position to be filled with borated water to be used as a neutron shielded temporary storage location for the startup source rod prior to assembly into one of the two fuel assemblies). The shortest distance between two adjacent assemblies in

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the Spent Fuel Storage Pool Racks is 19.8 inches center-to-center. Since the spacing between the two fuel assemblies in the Failed Fuel Container Rack is greater than those between assemblies in the New Fuel Vault and the Spent Fuel Storage Pool Racks, the combined arrays are safe independent of the degree of water moderation within and between assemblies. Therefore, it is recommended Condition 18.b be modified as follows:

Condition 18.b. The fuel assemblies in the Spent Fuel Storage Racks shall be stored in a checkerboard pattern. However, one fuel assembly may be placed in each of two storage locations of the Failed Fuel Container Rack provided they are no closer than 20 inches (center-to-center) from the nearest fuel assembly in the Spent Fuel Storage Racks and no closer than 44 inches (center-to-center) from each other.

The two fuel assemblies in the Failed Fuel Container Rack are to be submerged in water. Since it has been shown that two assemblies separated from each other by 12 inches cannot be made critical independent of the degree of water moderation within and between assemblies, they cannot be made critical whether the assemblies are submerged or not. Since Condition 20 does not allow the storage of fuel assemblies unless water would drain freely from the assemblies in the event of flooding and subsequent draining (e.g., no water between assemblies but water within assemblies), it is recommended Condition 20 be modified to allow the two assemblies to be submerged in water.

Condition 20. Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area. However, one fuel assembly may be placed in each of two water-filled fuel assembly storage locations (44 inches center-to-center) in the Failed Fuel Container Rack.

Attachment B to the license amendment application dated September 13, 1984 revised the licensee's response to NRC Comment No. 4.c. (letter from T. R. Tramm to John G. Davis dated February 28, 1983) regarding the administrative controls to assure that the fuel will be stored and maintained in a checkerboard pattern. The revised response does not affect nuclear criticality safety and meets the intent of a response solicited by the NRC. Therefore, it is acceptable.

B. Radiation Safety

Storage of two fuel assemblies under water in the Failed Fuel Container Rack does not change the radiation safety of the activities authorized by this license.

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C. Environmental Effects

There is no requested change to the environmental protection requirements of the facilities. None are required since the activities authorized by this license (either under normal or postulated accident conditions) remain unchanged. In accordance with 10 CFR 51.22(c)(11), an environmental assessment or an environmental impact statement is not necessary for this proposed action.

General

The amendment application dated September 13, 1984, was discussed with Mr. K. A. Connaughton, Byron Resident Inspector, on September 18, 1984. He foresaw no safety or environmental problem with the requested 10 CFR Part 70 authorization and stated he would contact Region III regarding any action necessary for the installation of Californium startup sources in the two fuel assemblies.

Conclusion

On the basis of the above, the staff recommends issuance of a license amendment with the revision of Condition 18.b to allow storage of two fuel assemblies in the Failed Fuel Container Rack and Condition 20 to allow submerging of the two fuel assemblies under water.

Condition 18.b. The fuel assemblies in the Spent Fuel Storage Racks shall be stored in a checkerboard pattern. However, one fuel assembly may be placed in each of two storage locations of the Failed Fuel Container Rack provided they are no closer than 20 inches (center-to-center) from the nearest fuel assembly in the Spent Fuel Storage Racks and no closer than 44 inches (center-to-center) from each other.

Condition 20. Fuel assemblies shall be stored in such a manner that water would drain freely from the assemblies in the event of flooding and subsequent draining of the fuel storage area. However, one fuel assembly may be placed in each of two water-filled fuel assembly storage locations (44 inches center-to-center) in the Failed Fuel Container Rack.

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Norman Ketzlach
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

APPROVED BY:	H. T. Crow, Section Leader		
OFFICE:	FCUP	FCUP	FCUP
NAME:	NKetzlach	VLTH	HCrow
DATE:	9/26/84	10/01/84	10/1/84

OCT 01 1984

FCUP:NK

DOCKET NO: 70-2973

APPLICANT: Commonwealth Edison (CE)
Byron Nuclear Generating Station, Unit 1
Chicago, Illinois

SUBJECT: CATEGORICAL EXCLUSION FOR LICENSE AMENDMENT REQUEST
DATED SEPTEMBER 13, 1984

By letter dated September 13, 1984, CE requested amendment of License No. SNM-1917 to allow the storage of new fuel assemblies under water in the Failed Fuel Container Rack. Such a change is procedural in nature. Therefore, in accordance with 10 CFR 51.22(c)(11), an Environmental Assessment of an Environmental Impact Statement is not warranted for this proposed action.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Original Signed by
Ralph G. Page

R. G. Page, Chief
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSIS

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