

January 24, 1986

Docket No.: 50-483

Mr. D. F. Schnell  
Vice President - Nuclear  
Union Electric Company  
Post Office Box 149  
St. Louis, Missouri 63166

Dear Mr. Schnell:

Subject: Callaway Plant, Unit 1 - Amendment No. 12 to License NPF-30

The Commission has issued the enclosed Amendment No. 12 to Operating License NPF-30 for the Callaway Plant, Unit 1. The amendment consists of a change to the Technical Specifications in response to your application dated October 15, 1985, as supplemented by letter dated December 23, 1985. The amendment increases the permitted enrichment of fuel to be stored in the Callaway Plant, Unit 1 spent fuel storage pool, permits the storage of Westinghouse Optimized Fuel Assemblies (OFA) in the pool, and revises the nominal center-to-center distance between fuel assemblies placed in storage racks.

The amendment approves modifications to Pages 3/4 9-16, 5-6 and 5-7 of the Callaway Technical Specifications. The amendment also approves deletion of Page 5-8 of the Callaway Technical Specifications.

A copy of the related Safety Evaluation is enclosed. This notice of issuance will be included in the Commission's next regular bi-weekly Federal Register Notice.

Sincerely,

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B. J. Youngblood, Director  
PWR Project Directorate #4  
Division of PWR Licensing-A, NRR

Enclosures:

1. Amendment No. 12 to License No. NPF-30
2. Safety Evaluation Report

DISTRIBUTION:  
SEE ATTACHED PAGE

cc w/enclosures:  
See next page

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for PWR#4:DPWR-A  
TAlexion:kab  
01/9/86

PWR#4:DPWR-A  
PO'Connor  
01/9/86

PWR#4:DPWR-A  
MDuncan  
01/9/86

OELD  
RPerlis  
01/11/86

DSH for  
PWR#4/DPWR-A  
BJYoungblood  
01/23/86

January 24, 1986

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Operating License No. NFP-30 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 12, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the license. UE shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

151

B. J. Youngblood, Director  
PWR Project Directorate #4  
Division of PWR Licensing-A, NRR

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: January 24, 1986

for PWR#4:DPWR-A *pwt*  
TAlexion:kab  
01/9/86

PWR#4:DPWR-A *pwt*  
PO'Connor  
01/9/86

PWR#4:DPWR-A  
MDuncan  
01/9/86

OELD  
RPerlis  
01/16/86  
*RJ*

*DS/m*  
PWR#4/DPWR-A  
BJYoungblood  
01/23/86



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

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 12  
License No. NPF-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Union Electric Company (the licensee) dated October 15, 1985, as supplemented by letter dated December 23, 1985, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public; and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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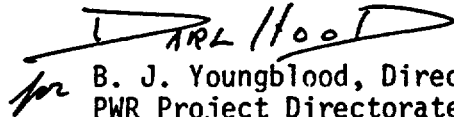
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Operating License No. NFP-30 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No.12 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the license. UE shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "B. J. Youngblood". The signature is stylized with a large, sweeping flourish at the end.

B. J. Youngblood, Director  
PWR Project Directorate #4  
Division of PWR Licensing-A, NRR

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: January 24, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 12

OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE

3/4 9-16  
5-6  
5-7  
5-8

INSERT

3/4 9-16  
5-6  
5-7  
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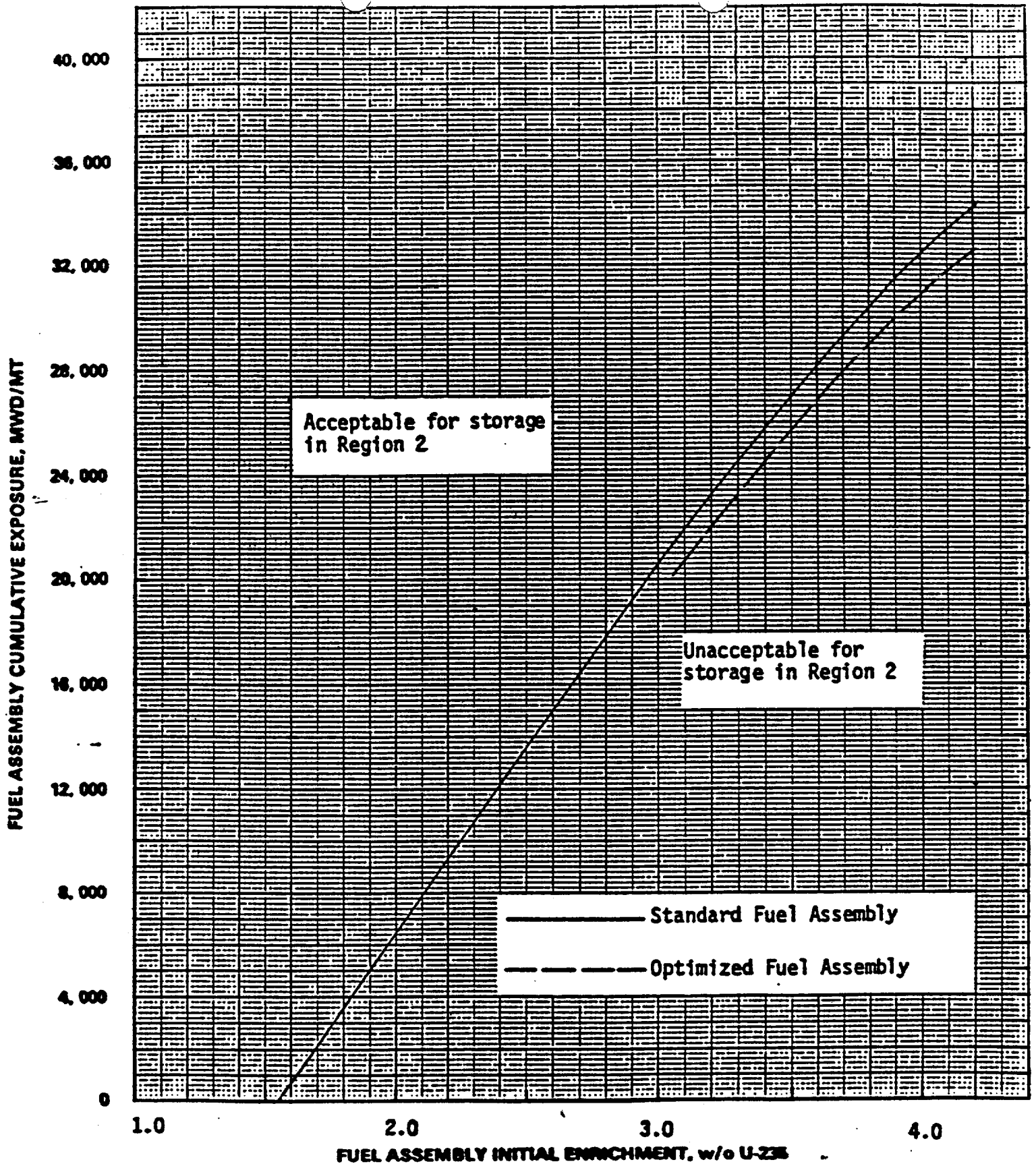


FIGURE 3.9-1

MINIMUM REQUIRED FUEL ASSEMBLY EXPOSURE AS A FUNCTION OF INITIAL ENRICHMENT TO PERMIT STORAGE IN REGION 2

## DESIGN FEATURES

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### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

5.3.1 The core shall contain 193 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 144 inches and contain a maximum total weight of 1766 grams uranium. The initial core loading shall have a maximum enrichment of 3.10 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.20 weight percent U-235.

#### CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 53 full-length and no part-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 142 inches of absorber material. All control rods shall be hafnium, clad with stainless steel tubing.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The Reactor Coolant System is designed and shall be maintained:

- a. In accordance with the Code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
- b. For a pressure of 2485 psig, and
- c. For a temperature of 650°F, except for the pressurizer which is 680°F.

#### VOLUME

5.4.2 The total volume of the Reactor Coolant System, including pressurizer and surge line, is 12,135 ± 100 cubic feet at a nominal  $T_{avg}$  of 557°F.

### 5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1.

## DESIGN FEATURES

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### 5.6 FUEL STORAGE

#### CRITICALITY

5.6.1.1 The spent fuel storage racks are designed and shall be maintained with:

- a. A  $k_{eff}$  equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance of 2.6%  $\Delta k/k$  for uncertainties as described in Section 4.3 of the FSAR. This is based on new fuel with an enrichment of 4.20 weight percent U-235 in Region 1 and on spent fuel with combination of initial enrichment and discharge exposures, shown in Figure 3.9-1, in Region 2, and
- b. A nominal 9.24 inch center-to-center distance between fuel assemblies placed in the storage racks.

5.6.1.2 The  $k_{eff}$  for new fuel for the first core loading stored dry in the spent fuel storage racks shall not exceed 0.98 when aqueous foam moderation is assumed.

#### DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 2040 feet.

#### CAPACITY

5.6.3 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1344 fuel assemblies.

### 5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.7-1.





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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 12 TO OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By letter dated October 15, 1985, as supplemented by letter dated December 23, 1985, Union Electric Company (the licensee) requested an amendment to Facility Operating License No. NPF-30 for operation of the Callaway Plant in Callaway County, Missouri.

The amendment approves modifications to Pages 3/4 9-16, 5-6 and 5-7, and the amendment approves deletion of Page 5-8 of the Callaway Technical Specifications (TS). The amendment increases the permitted enrichment for storage in the Callaway Plant, Unit 1 spent fuel storage pool from the current value of 3.5 weight percent (w/o) U-235 to 4.2 w/o. This permits extended cycle operation in the Callaway plant and results in larger discharge fuel burnups. Therefore, the curve of acceptable burnup as a function of initial enrichment (Figure 5.6-1 in the present Technical Specifications) is extended. This figure is also amended to include a separate curve for the optimized fuel assembly.

The Callaway plant has a two region spent fuel pool. Region one is designed to contain fresh fuel and has a sufficient number of storage locations to accommodate a full core unloading. Region 2 contains a large number of storage locations but will safely store only fuel that has achieved a certain minimum burnup. The previous limits on storage are 3.5 weight percent (w/o) U-235 enrichment in Region 1 and an initial enrichment dependent burnup limit in Region 2 which has a minimum value of 29000 MWD/T at 3.5 w/o enrichment. These values are obtained under the assumption of Westinghouse standard fuel assemblies.

The licensee wishes to reload the Callaway plant with Westinghouse Optimized Fuel Assemblies (OFA) having a maximum enrichment of 4.2 w/o U-235 in order to permit an 18 month cycle length fuel management plan. The spent fuel rack criticality analysis was redone to confirm that the criterion on rack k-effective could still be met.

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## 2.0 EVALUATION

### A. Criticality Considerations

The calculational methods and procedures used to perform the analyses are the same as those used in the prior analyses as described in the Callaway FSAR (Docket No. 50-483, Section 9.1.2). Those methods and procedures were found to be acceptable for the original analysis and remain so.

The center-to-center spacing between the boxes in the original analysis was assumed to be 9.14 inches. The "as-built" racks had a value of 9.24 for this dimension. In Region 1 fuel is stored in every other box in a checkerboard design and three out of every four boxes are filled in Region 2. These values meet our acceptance criterion of 0.95 for this quantity and are acceptable.

Calculational biases and uncertainties were obtained in the same manner as those of the original analyses. These were combined and added to the nominal k-effective value to obtain the value to be compared to the acceptance criterion. The results were 0.939 for Region 1 and 0.915 for Region 2. These values meet our acceptance criterion of 0.95 for this quantity and are acceptable.

A curve of minimum enrichment as a function of critical enrichment was developed using the target value of 0.915. Separate curves were developed for OFA and standard fuel. This is the same procedure employed for the original analysis and is acceptable.

We conclude that the criticality analysis for the storage of 4.2 weight percent U-235 enrichment standard as well as OFA Westinghouse fuel in the Callaway racks is acceptable. This conclusion is based on the following:

1. Previously approved methods and procedures were employed in the analysis
2. Appropriate input assumptions are made and proper account is taken of biases and uncertainties.
3. The results meet our criterion for k-effective of the racks.

### B. Other Considerations

The increase in enrichment and consequent increase in discharge burnup as well as the use of OFA fuel has certain consequences for the thermal-hydraulic, seismic and radiation aspects of the rack design. These are discussed below.

The increased discharge burnup implies an increased heat load on the spent fuel pool cooling system. The pool temperature resulting from a refueling off-load and from an off-load plus full core discharge have been recalculated by the licensee. The pool temperature criterion was met in both cases. Audit calculations by the staff confirm these results. We conclude that the increase in enrichment is acceptable from a thermal-hydraulic standpoint.

The effect of the OFA fuel on the seismic analysis of the pool was analyzed by the licensee. The lower weight of the OFA fuel when compared to standard fuel ensures that the original analysis is conservative. We find this to be acceptable.

The effect of the increased discharge burnup and switch to OFA fuel on the dose calculations was analyzed. The methods and procedures that were used in the original analyses were employed and the results were within the acceptance criterion. Because acceptable results were obtained from previously used and approved methods we find the dose results to be acceptable.

In summary, we conclude that the use of OFA fuel and fuel of up to 4.2 w/o U-235 enrichment in the Callaway Spent Fuel Pool is acceptable.

#### C. Technical Specification Changes

Figure 3.9-1 of Technical Specification 3/4.9.12 is altered to account for the revised analyses and to include a curve for OFA fuel. The revised curves are consistent with the analyses and are acceptable. Specification 5.3.1 is revised to increase the permitted enrichment in the core to 4.2 w/o U-235. This is consistent with the limit for the spent fuel pool and is acceptable.

Specification 5.6.1.1 is altered to delete Figure 5.6-1 (identical to Figure 3.9-1) and to change the figure reference to 3.9-1. In addition the enrichment designation is increased to 4.2 w/o U-235 and the storage location center-to-center spacing is increased to 9.24 inches. These changes are consistent with the spent fuel pool criticality analysis and are acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant change in the types or significant increase in the amounts of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

#### 4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (50 FR 46218) on November 6, 1985, as corrected in (50 FR 49468) on December 2, 1985, and consulted with the state of Missouri. No public comments were received, and the state of Missouri did not have any comments.

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

**Principal Contributors:**

W. L. Brooks, RSB  
T. W. Alexion, PWR#4

Dated: January 24, 1986

January 24, 1986

Amendment No. 12

DISTRIBUTION

Docket File

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