Entergy Operations

Entergy Operations, Inc.
Route 3 Box 137G
Russellville, AR 72801
Tel 501-964-8888

Neil S. "Buzz" Carns
Vice President
Operations ANO

June 27, 1991

1CAN069108

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Proposed Change to the Technical Specification
Increased Fresh Fuel Enrichment

Gentlemen:

Entergy Operations has identified proposed changes to the Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specifications 5.3.1.6 and 5.4.1.1. These proposed changes increase the maximum allowable enrichment for new fuel being cycled through the facility from 3.5 to 4.1 weight percent U-235. These changes are needed for economic reasons to provide an increased cycle energy while maintaining the feed batch size to a reasonable number of assemblies. Additionally, "235U" is being corrected to "U-235".

The request for the change to Specification 5.4.1.1 is supported by the enclosed Entergy Operations' report, "Criticality Analysis of ANO-1 Fresh Fuel Rack, December 1990". Operation with increased enrichment will be addressed in subsequent required reload analyses when required.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c) and it has been determined that this request involves no significant hazards considerations. The basis for this determination is included in the enclosed submittal.

The circumstances of this request are not exigent or emergency. However, we would appreciate a prompt review to allow for future reload design flexibility.

We request that the effective date for this change be 30 days after NRC issuance of the amendment to allow for distribution of the amendment and procedural revisions necessary to implement the changes.

Very truly yours,

ga yelouts for nsc

NSC/sgw
Attachment

A001
1/1

cc: Mr. Robert Martin
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

NRC Senior Resident Inspector
Arkansas Nuclear One - ANO-1 & 2
Number 1, Nuclear Plant Road
Russellville, AR 72801

Mr. Thomas W. Alexion
NRR Project Manager, Region IV/ANO-1
U. S. Nuclear Regulatory Commission
NRR Mail Stop 11-D-23
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

Ms. Sheri R. Peterson
NRR Project Manager, Region IV/ANO-2
U. S. Nuclear Regulatory Commission
NRR Mail Stop 11-D-23
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

Ms. Greta Dicus, Director
Division of Radiation Control
and Emergency Management
Arkansas Department of Health
4815 West Markham Street
Little Rock, AR 72201

STATE OF ARKANSAS)
) SS
COUNTY OF LOGAN)

OATH

I, J. W. Yelverton, being duly sworn, subscribe to and say that I am General Manager, Plant Operations ANO for Entergy Operations, Inc.; that I have full authority to execute this oath; that I have read the document numbered 1CAN069108 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.

J. W. Yelverton

SUBSCRIBED AND SWORN TO me, a Notary Public in and for the County and State above named, this 27th day of June, 1991.

Sandy Eichenmorgen
Notary Public

My Commission Expires:

May 11, 2000

PROPOSED TECHNICAL SPECIFICATION

CHANGE AND

RESPECTIVE SAFETY ANALYSIS

IN THE MATTER OF AMENDING

LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

PROPOSED CHANGE

The proposed changes will amend Specification 5.3.1.6, "Reactor Core", and 5.4.1.1, "New Fuel Storage", to increase the maximum enrichment of future reload fuel being cycled through the facility from 3.5 to 4.1 weight percent U-235. Specification 5.4.1.1 is also being revised to delineate the allowable storage positions in the fresh fuel rack. Additionally, "235U" is being corrected to "U-235" on this page.

DISCUSSION

The proposed changes relate to the requirements for the enrichment limit of reload fuel assemblies. The changes are needed for economic reasons to provide an increased cycle energy while maintaining feed batch size. The changes involve an increase in the maximum allowable enrichment of fuel being cycled through the facility from 3.5 to 4.1 weight percent U-235.

In letter ØCANØ283Ø2 (dated February 17, 1983), Arkansas Power & Light (AP&L) submitted a Technical Specification change request to allow operations with the proposed expansion of the spent fuel pool capacity. This submittal also included the request to increase the enrichment o the fuel assemblies to 4.1 weight percent U-235

In a letter dated April 15, 1983, the NRC issued Amendment 76 to the ANO-1 Technical Specifications which approved the Technical Specifications proposed in the February 17, 1983, AP&L's letter. In the Safety Evaluation associated with Amendment 76, the Staff concluded that any number of fuel assemblies of the Babcock & Wilcox (B & W) 15 x 15 design having enrichments no greater than 4.1 weight percent U-235 may be stored in Regions 1 and 2 of the ANO-1 spent fuel pool.

Subsequent to the receipt of the Safety Evaluation, it was noted that we had inadvertently failed to propose to change the enrichment limit for new (reload) fuel listed in Specification 5.3.1.6. In letter 1CAN128602 (dated December 12, 1986) AP&L submitted a Technical Specification change request to delete the specification of the maximum enrichment limit for reload fuel and specify in its place the use of low enrichment fuel while maintaining the design basis of the initial core loading.

In April 1989, in an effort to clear the back log of outstanding Technical Specification changes under consideration by the NRC Staff, AP&L was questioned by the NRR Project Manager pertaining to the immediate need for the December 12, 1986 submittal. As it was not deemed essential at the time it was mutually agreed to consider the request withdrawn.

To make the maximum allowable enrichment level for reload fuel (Specification 5.3.1.6) consistent with the enrichment limits for new fuel which can be stored in the spent fuel pool, Entergy Operations is also proposing to change Specification 5.3.1.6.

Current practice is to store the new fuel, after receipt inspection, in the spent fuel pool. However, to be consistent in storage evaluations, we are requesting Specification 5.4.1.1 be changed. The scope of the request for Specification 5.4.1.1 is limited to the handling and storage of fuel with 4.1 or less weight percent enrichment. The current Specification 5.4.1.1 limits the maximum enrichment of fuel to an enrichment of 3.5 weight percent of U-235. ANO-1 is planning to begin transitioning to a higher energy fuel cycle beginning with Cycle 11. To accomplish this plan, Entergy Operations proposes to increase the maximum allowed initial enrichment for fuel up to of 4.1 weight percent U-235. The fuel bundles currently being procured for ANO-1 are the B & W supplied MK-B8. The design of these fuel bundles is not affected by these proposed changes.

Although it is used in conjunction with a number of parameters and considerations in determining safe operation of the reactor core, the fuel enrichment is not a direct input to the reactor safety analysis.

The fuel enrichment, number of fuel assemblies, exposure (burnup) of existing fuel, burnable poisons and fuel management schemes are used to derive measurable reactor core parameters important to safe operation. These dynamic parameters, rod worths and peaking factors are currently included in the ANO-1 Technical Specifications. The specification of fuel enrichment in the core design section alone does not uniquely determine nor limit the values of the reactor core parameters which are important to safe operation.

The existing safety limits and limiting conditions for operation (LCOs) as established in the Technical Specifications will not be changed by the proposed changes. These safety and operating limits assure fuel cladding integrity, reactor coolant system integrity, availability of sufficient instrumentation to provide automatic protective actions, acceptable core power distribution during power operation, core subcriticality after a reactor trip, and prevents the release of significant amounts of fission product activity.

The fuel loading errors: pellets, rod, and assembly, which were discussed in the FSAR presented example cases using enrichments up to 3.40 weight percent and stated "the enrichments analyzed are conservative and the greatest possible enrichments." Even though these enrichments were the highest planned at that time (1972), this was not intended to invalidate the statements pertaining to fuel misloadings with fuel of higher enrichment for the following reasons:

(1) As currently noted in the ANO-1 SAR, the incore instrumentation is designed to detect the occurrence of gross core loading errors by observing power distribution anomalies during startup physics testing. A wider range of fuel enrichments, lump burnable poison concentration, and burnup would result in an equal or higher probability of the detections of a power distribution change from a core loading error.

(2) Strict administrative controls during fabrication prevent pellet or rod enrichment loading errors at the fabrication facility as currently stated in the ANO-1 SAR.

Current reload practices for a given cycle require a safety evaluation and Technical Specification change with respect to 10 CFR 50.59 and 50.90. Safety and operating limits are established and verified ac eptable to the appropriate criteria, in accordance with NRC approved reload design methodology for ANO-1. The ANO-1 Reload Reports document

- the acceptance of key physics parameters to the appropriate criteria,
- the review of each SAR accident analysis and
- the assurance that the transient evaluation of the reload cycle is bounded by previously accepted analysis.

Entergy Operations also requests the addition of Figure 5.4-1 to Technical Specification 5.4.1.1 to indicate the locations in the Fresh Fuel Storage Rack that will be prohibited from use. These locations are prohibited to maintain k-effective below 0.98 with an optimum moderation as required by NUREG-0800, Section 9.1.1. This is demonstrated in the attached criticality analysis (Attachment 1).

DETERMINATION OF SIGNIFICANT HAZARDS

In accordance with 10 CFR 50.92, Entergy Operations has evaluated whether the proposed changes involves a significant safety hazards consideration. The following discussion for the proposed change to Specification 5.4.1.1 is limited to the fuel storage and handling accident scenarios since the impact of core enrichment upon operational safety margins is an integral part of each reload analysis.

Entergy Operati ns has concluded that the proposed changes to Technical Specifications 5.3.1.6 and 5.4.1.1 do not involve a significant hazards consideration because the operation of Arkansas Nuclear One, Unit 1 in accordance with these changes would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed changes will not significantly increase the probability or consequences of any accident previously evaluated since the effect of increasing fuel enrichment is included in the calculation of measurable core parameters each reload cycle and these, in turn, are reviewed to ensure adequate margins for safe operation and conformance to the safety limits and LCOs established by Technical Specifications are met. The fission product inventory contained in the fuel is a function of burnup, not enrichment, so the consequences of postulated accident releases are unchanged.

The fuel loading errors originally addressed in the FSAR have been reviewed and the statements made continue to be valid for the higher 4.1 weight percent enrichment. Gross core loading errors would be detected with an equal or higher probability and the strict administrative controls used to prevent pellet and rod enrichment errors continue to remain in effect.

Fresh fuel handling accidents remain bounded by the original FSAR analysis. The only accident scenarios for which the probability of occurrence are affected by fuel enrichment involve criticality events during fuel handling and storage. The enclosed criticality analysis demonstrates that the calculated k-effective, during fuel handling and storage, is adequate to ensure subcriticality for all defined accident conditions. Since subcriticality is maintained, no releases result from the above fuel handling criticality accident scenario.

(2) Create the possibility of a new or different kind of accident from any previously evaluated.

The proposed changes will not create the possibility of a new or different kind of accident from any previously analyzed since the current request does not address the actual enrichment currently utilized in the ANO-1 core; but merely changes the maximum allowable enrichment limit for new fuel. A separate safety evaluation is required prior to the use of such reload fuel which will address specific enrichments. The possibility of loading assemblies into the prohibited spaces in the Fresh Fuel Storage Rack will be prevented by physical blockage of these spaces prior to any fuel storage in the Rack. It should be noted that if these spaces were not blocked through error and if the rack was fully loaded, then inadvertant criticality would still not occur until foam of the appropriate density was introduced into the racks.

(3) Involve a significant reduction in the margin of safety.

The proposed enrichment increase may cause an increase in future fresh fuel reactivity but it will not change or reduce the related margins of safety, such as the Limiting Condition for Operation which requires maintaining a 1% $\Delta k/k$ shutdown margin or the Safety Limits on DNBR or allowable power peaking.

The enclosed criticality analysis demonstrates that there is adequate margin to ensure subcriticality of the new fuel during storage and handling operations.

Therefore, based on the evaluation discussed above, Entergy Operations has concluded that the proposed changes do not involve a significant hazards consideration.