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M. Chatterton
J. Shapakin
W. Burton

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RULES & DIR. BRANCH
US NRC

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72801
Tel 501 858-5000

(30)

June 19, 1997

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Chief, Rules Review and Directives Branch
U. S. Nuclear Regulatory Commission
Mail Stop T-6D-69
Washington, DC 20555-0001

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Comments on Proposed NRC Bulletin 96-01,
Supplement 1; Control Rod Insertion Problems

Gentlemen:

By letter dated June 18, 1997, the Babcock and Wilcox Owners Group (BWOG) submitted comments on the subject proposed bulletin supplement. Entergy Operations at Arkansas Nuclear One (ANO) endorses the comments provided by the BWOG (attached for information only). NEI and NUBARG are also providing comments to the proposed bulletin. Entergy Operations has been involved with development of the NEI and NUBARG comments and agrees with the conclusions and recommendations that will be submitted. In order to supplement the BWOG comments, Entergy Operations also desires to provide the following comments.

Fuel Assembly Design:

The ANO-1 fuel design has prevented the occurrence of control rod insertion problems. One of the 11 key Mark-B fuel design differences compared to the Westinghouse V5H fuel and delineated in the BWOG comments is utilization of helical holddown springs. ANO-1 currently utilizes helical holddown springs in its Framatome Cogema Fuels (FCF) fuel design. For the helical spring fuel designs, the holddown force per guidetube is substantially less than the Westinghouse V5H fuel design. The ANO-1 fuel design features result in significantly less compressive loading or stress on the control rod guidetubes, less control rod guidetube deformation, and reduced control rod insertion forces. As a result of the margins incorporated into the design, ANO-1 fuel assemblies have not shown a similar susceptibility, nor are believed to be susceptible to the control rod guidetube distortion described in the subject bulletin.

Control Rod Drop Time Testing:

ANO-1 control rod drop time data over the past three years indicates no correlation between higher fuel assembly burnups and control rod drop times (see attached graph). This includes technical specification required control rod drop time testing at the beginning of cycle and unplanned reactor trip data. Also, on September 12, 1996, ANO-1 experienced a reactor trip at the end of a fuel cycle. At the time of the trip, 44 of the 60 control rods were located in fuel assemblies with burnups greater than 35,000 MWd/mtU, including 13 control rods which resided in fuel assemblies whose burnups were in the range of 43,000 to 48,000 MWd/mtU. The remaining 16 control rods were located in fuel assemblies with burnups greater than 31,000 MWd/mtU. When the reactor tripped, all control rods fully inserted as designed with no significant variation in previous control rod trip times. Therefore, ANO-1 fuel is not believed to be susceptible to exhibiting control rod insertion problems within the current licensed fuel burnup limits.

Operational Concerns:

The proposed control rod drop time testing would result in unnecessary reactor shutdowns and unwarranted reactor trips. Plant operation, other than at steady-state conditions, exposes a nuclear power plant to increased vulnerabilities. Special concerns arise during the approach to or return from shutdown conditions. Numerous operator actions occur during a controlled decrease in power which increases the chance for error. The operator has to diagnose off-normal conditions which are complicated by the transient plant conditions and the numerous actions occurring during plant maneuvering. Therefore, increasing the frequency of either controlled shutdowns or reactor trip events significantly increases the probability of operator error.

Fuel Integrity and Reliability:

The frequency of reactor trip events impacts fuel integrity. During a reactor trip the fuel is thermally cycled, thus increasing the probability for inducing failure in a pre-existing flaw (e.g., the local wear of the cladding by debris or increased grid to fuel rod fretting due to changes in core cross-flow). Furthermore, a reactor trip aggravates any pre-existing fuel failures. The probability for inducing secondary hydriding failures is also increased. This normally results in increased levels of tramp activity which persists for several cycles following removal of the failed fuel.

Radiological, Industrial, and Environmental Considerations:

Failed fuel provides a path for fission products to enter the primary reactor coolant. During a reactor trip with failed fuel present, iodine spiking occurs which can briefly increase the reactor coolant activity by an order of magnitude of two or more. Also, highly radioactive "crud bursts" can occur during a reactor trip. These phenomena increase the radiation dose that plant employees receive.

Higher reactor coolant activity levels impact the balance of plant if primary-to-secondary leakage exists. Increasing the frequency of plant shutdowns, especially late in cycle, substantially increases the amount of liquid and gaseous radwaste generated and subsequently discharged. In addition to the environmental considerations, this has dose consequences as well, given the increased frequency of changing filters and resins. Therefore, a control rod testing program with high reactor coolant activity levels would substantially increase the radiation dose to plant employees.

Increasing the frequency of performing a controlled power decrease, reactor trip, and power ascension increases the likelihood of component failure due to mechanical and thermal cycling. Such failures pose industrial hazards to plant employees and could result in extended outages. If an anticipated or actual component failure requires cooldown to cold shutdown conditions, or even opening or draining the reactor coolant system, consequences increase dramatically. This substantially increases employee exposure to industrial and radiological hazards and significantly increases liquid, gaseous, and solid radiological waste generation.

Safety Impact:

The ANO-1 Probabilistic Safety Assessment identifies a number of complicating events, such as losses of feedwater or offsite power, which in conjunction with reactor trip lead to core damage. During plant maneuvering to shutdown or to perform a reactor trip, key operator actions are required to realign main feedwater and offsite power. Though operators are aware of protecting these critical safety functions, the opportunity for error is greater during plant maneuvering. The proposed testing plan would systematically require the plant to enter transient operating conditions. The resulting increase in exposure to conditions potentially adverse to safety must be thoughtfully considered.

Entergy Operations has made a significant effort to decrease unnecessary reactor trips. Although ANO-1 can be safely shutdown and restarted when required, it is not prudent to mandate a testing program that results in approximately five extra shutdowns or reactor trips per year for a concern that is not applicable to ANO-1. From a safety standpoint, control rod drop time testing would provide no increased safety benefit and could potentially degrade safety.

Therefore, Entergy Operations concludes that control rod insertion problems are not a safety concern for ANO-1 and requests that the reactors operating with FCF Mark-B fuel be excluded from the final bulletin supplement. Entergy Operations appreciates the NRC's consideration of these comments. Should you have any questions, please contact me.

Very truly yours,

Alan R. Ashley
for
Dwight C. Mims
Director, Nuclear Safety

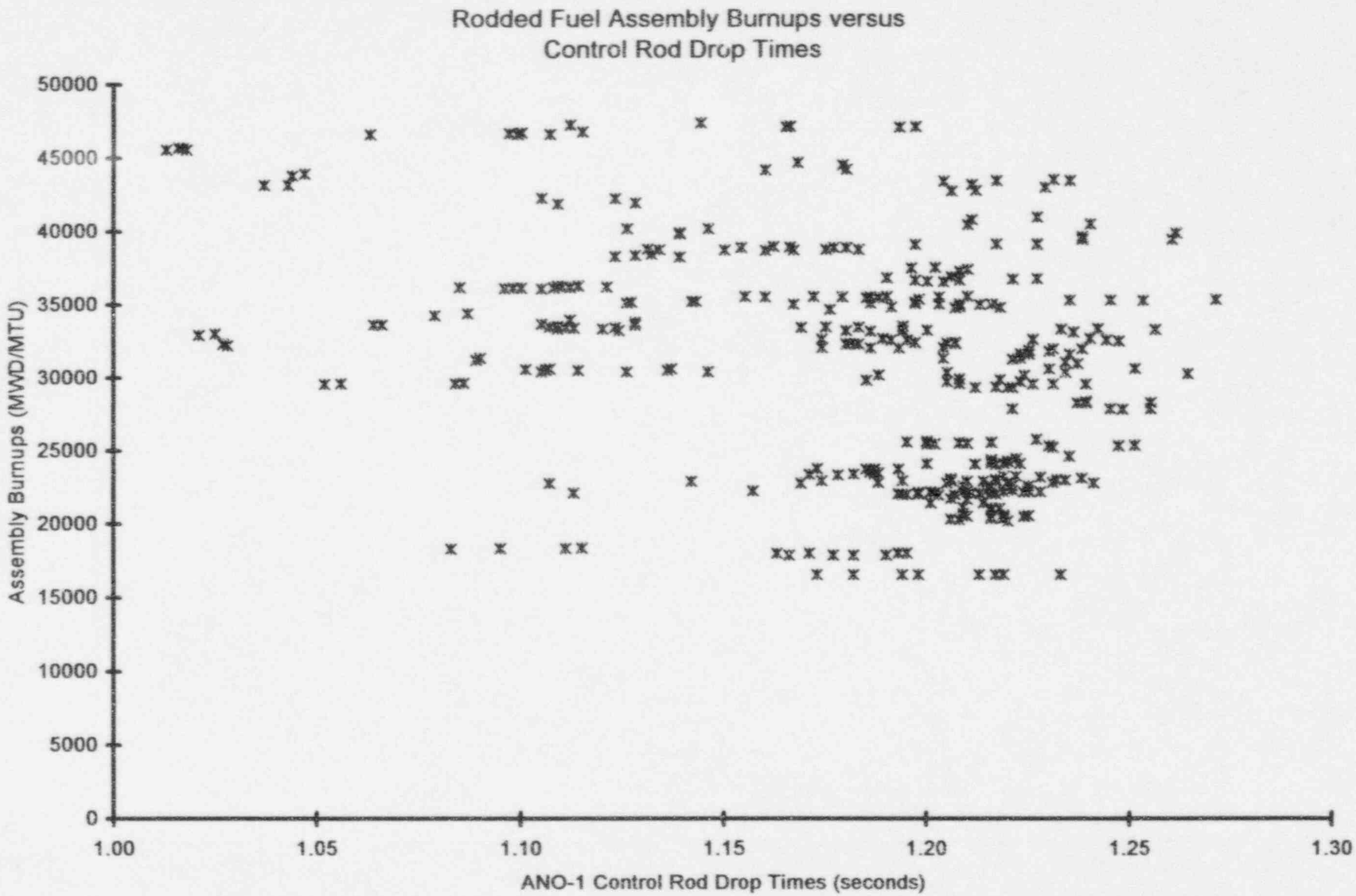
DCM/nbm
Attachments

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

Mr. Ellis W. Merschoff
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

Mr. George Kalman
NRR Project Manager Region IV/ANO-1 & 2
U. S. Nuclear Regulatory Commission
NRR Mail Stop 13-H-3
One White Flint North
11555 Rockville Pike
Rockville, MD 20852


Rodded Fuel Assembly Burnups versus
Control Rod Drop Times
Assembly Burnups (MWD/MTU)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1.00
1.05
1.10
1.15
1.20
1.25
1.30
ANO-1 Control Rod Drop Times (seconds)