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MEMORANDUM FOR: D. G. Vassallo, Assistant Director
for Light Water Reactors, DPM

FROM: *P* V. Benaroya, Acting Assistant Director
for Plant Systems, DSS

SUBJECT: REQUEST FOR INFORMATION ON THE AHO-2 CORE PROTECTION
CALCULATOR SYSTEM

Plant Name: Arkansas Nuclear One - Unit 2
Docket Number: 50-363
Licensing Stage: Operating License
Milestone Number: 24-22
Responsible Branch: LWR-1
Project Manager: R. Martin, L. Engle
Requested Completion Date: December, 1978
Review Status: Awaiting Information

The staff has reviewed the applicant's responses to safety position 19 regarding software change procedures /1,2,3,4/ and has met with the applicant to obtain clarification of those responses /5/. At the meeting, the applicant provided verbal clarification to resolve our concerns. However, because of the significance of the software change procedures in maintaining the software at a high quality level, we require that the procedures be modified to reflect the applicant's verbal clarifications on the items stated in the enclosure. In this manner, the verbal responses provided by the applicant at our recent meeting will be documented as requirements in the software change procedures.

We recommend that the enclosure be forwarded to the applicant. Because of schedule constraints and the applicant's satisfactory verbal responses to these concerns, we will generate an SSR for position 19 upon receipt of a written commitment from the applicant to respond to the attached concerns. Your forwarding letter to the applicant should reflect this requirement, in addition to a request for a response schedule. We recommend that their response to the enclosure be docketed within 60 days after receipt of your letter.

V. Benaroya, Acting Assistant Director
for Plant Systems
Division of Systems Safety

Enclosure:

OFFICE	As stated	DSS:ICSB	DSS:ICSB	DSS:ICSB	DSS:ADPS
SURNAME	See next page	LBeltracchi	s1 MSrinivasan	RSatterfield	VBenaroya
DATE		11/17/78	11/21/78	11/21/78	11/21/78

7812040244

P

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S. Hanauer
R. Mattson
R. Boyd
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R. Martin
L. Engle
L. Beltracchi

INFORMATION REQUEST
SOFTWARE CHANGE PROCEDURE

In safety position 19, our concerns regarding software change procedures and the adequacy of the Single Channel Test Facility were established /1/. In response to these concerns, the applicant has docketed software change procedures /2,3/ and a qualification test report for the Single Channel Test System /4/. Upon evaluation of these reports, we concluded that we needed clarification of many of the statements within the reports. To obtain that clarification, a meeting with the applicant and the vendor was held on November 9, 1978 /5/.

At this meeting, the staff defined the statements in the subject report /2,3,4/ where additional clarification was required. In verbal responses, the applicant and the vendor satisfactorily clarified all of our concerns. However, because of the significance of the software change procedures in maintaining the software at a high quality level, we require that the procedures be modified or amended to reflect the clarification provided at the meeting. Specifically, we consider the following items significant with respect to software change procedures:

CEN 39 (A)-P CPC Protection Algorithm
Software Change Procedure
September 22, 19 8

1.3.2.1 Specification of CPC/CEAC Protection Algorithm Software Functional Change

Verification of a modified CPC/CEAC FORTRAN Simulation Code is an important step in the software change procedures. The verification process, the use of design codes, and the documentation and storage of results for later audit, if required, are not discussed. Provide this information to address these concerns.

2.5.3.1 Input Sweep Acceptance Criteria

In terms of acceptance criteria, it is stated that the test results will be analyzed for evidence of software errors. The acceptance criteria do not address design errors which may also exist in the software. Define and provide the methodology to be used in detecting design errors.

CEN 39 (A)-P "Supplement 1-P
Core Protection Algorithm, Software
Change Procedure Supplement",
September 24, 1978

1.4.3 Procedures

Provide a clarification of the statement:

"Any program object module which contains external references must be followed immediately by the object module containing the code which resolved the references."

1.4.4 Generation of Master Test Disc

Provide a clarification of the statement:

"If differences are encountered, it will be determined whether the error is in the reference disc (i.e. an error missed by required testing) or the test disc."

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CPC Disc Generation

Provide an amendment to step c to include verification of the core locations after they have been setup.

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Figure 1.4-3

CPC System-1

Provide modifications to the core location information to reflect the data defined by step 10 of page 34.

1A2.4 Arithmetic Fault Detection

Provide clarification of the following statement:

"1. Every scaled fixed-point addition or subtraction operation shall be followed by a "branch on overflow" instruction to an auto-restart supervisor call which shall be added at the end of each program of the normal task exit SVC."

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Attachment 2.3-1

CPC Project Disc Generation Checklist

Provide a modification to step 2b to include verification of the loaded information.

REFERENCES

1. NUREG-G308, Supplement No. 2, "Safety Evaluation Report, Arkansas Nuclear One, Unit 2", Docket No. 50-368, September 1978.
2. CEN-39(A)-P "CPC Protection Algorithm Software Change Procedure" September 22, 1978 (Proprietary).
3. CEN-39 (A)-P Supplement 1-P "CPC Protection Algorithm Software Change Procedure Supplement", September 29, 1978 (Proprietary).
4. CEN-71(A)-P Supplement 1-P "Core Protection Calculator Single Channel Qualification Test Report", September 22, 1978 (Proprietary).
5. Meeting Minutes, Meeting with Arkansas Power and Light Company, and Combustion Engineering, Inc., Held at the Nuclear Regulatory Commission, Bethesda, MD, November 9, 1978.