NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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DOCKET NUMBER	50-331
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TO: Mr. B.C. Rusche	FROM: Iowa Elec Light & Power Co Cedar Rapids, Iowa Lee Liu	DATE OF DOCUMENT	3-15-77
		DATE RECEIVED	3-21-77

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DESCRIPTION: Ltr notarized 3-15-77 requests for change to tech specs regarding Cycle 3 operational limits & safety limits & trans the following: 1P

ENCLOSURE: Proposed change to tech specs.... (14P)

ACKNOWLEDGED

DO NOT REMOVE

(40 cys rec'd)

PLANT NAME: Duane Arnold Plant

DHL

FOR ACTION/INFORMATION

	SAFETY		ENVIRO
	ASSIGNED AD:		ASSIGNED AD:
✓	BRANCH CHIEF:	Lear (5)	BRANCH CHIEF:
✓	PROJECT MANAGER:	Shea	PROJECT MANAGER:
✓	LIC. ASST.:	Parrish	LIC. ASST.:

INTERNAL DISTRIBUTION

✓	REG FILE		SYSTEMS SAFETY		PLANT SYSTEMS		SITE SAFETY &
✓	NRC PDR		HEINEMAN		TEDESCO		ENVIRO ANALYSIS
✓	I & E (2)		SCHROEDER		BENAROYA		DENTON & MULLER
✓	OELD				LAINAS		
✓	GOSSICK & STAFF		ENGINEERING		IPPOLITO		ENVIRO TECH.
	MIPC		MACARRY		KIRKWOOD		ERNST
	CASE		BOSNAK				BALLARD
	HANAUER		SIHWEIL		OPERATING REACTORS		YOUNGBLOOD
	HARLESS		PAWLICKI		STELLO		
							SITE TECH.
	PROJECT MANAGEMENT		REACTOR SAFETY		OPERATING TECH.		GAMMILL
	BOYD		ROSS	✓	EISENHUT		STEPP
	P. COLLINS		NOVAK	✓	SHAO		HULMAN
	HOUSTON		ROSZTOCZY	✓	BAER		
	PETERSON		CHECK	✓	BUTLER		SITE ANALYSIS
	MELTZ			✓	GRIMES		VOLLMER
✓	HELTEMES		AT & I				BUNCH
	SKOVHOLT		SALTZMAN			✓	J. COLLINS
			RUTBERG				KREGER

EXTERNAL DISTRIBUTION

✓	LPDR: Cedar Rapids, Ia	NAT. LAB:	BROOKHAVEN NAT. LAB.	CONTROL NUMBER
✓	TIC:	REG V.IE	ULRIKSON (ORNL)	
✓	NSIC:	LA PDR		
	ASLB:	CONSULTANTS:		770810349 AP 2
✓	ACRS 16 CYS ~~HOLDING~~/SENT	As CAT B		GD

NRC FORM 195 (2-76)

IOWA ELECTRIC LIGHT AND POWER COMPANY

General Office

CEDAR RAPIDS, IOWA

March 15, 1977
IE-77-551

LEE LIU
VICE PRESIDENT - ENGINEERING

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20545

Dear Mr. Rusche:

In accordance with 10CFR50.59 and 50.90, we transmitted our application dated January 31, 1977 for amendment of DPR-49 and the Technical Specifications for the Duane Arnold Energy Center for Cycle 3 operational limits and safety limits. We hereby amend the application to include proposed Technical Specifications for the Recirculation Pumps (RTS-82).

Also included with this submittal are responses to questions 1, 3, 4, and 5 contained in your February 28, 1977 Request for Additional Information. A response to Question 2 should be forwarded in about one week.

The amendment to the Technical Specifications has been reviewed and approved by the DAEC Operations Committee and DAEC Safety Committee and does not involve significant hazards considerations.

Three signed and notarized originals and 40 additional copies of this submittal are transmitted herewith.

This submittal, consisting of the foregoing letter and enclosures hereto, is true and accurate to the best of my knowledge and belief.

IOWA ELECTRIC LIGHT AND POWER COMPANY

BY: _____
Lee Liu
Vice President, Engineering

LL/KAM/ms
Encls.
cc: K. Meyer
D. Arnold
R. Lowenstein
J. Shea (NRC)
L. Root
File J-60a

Subscribed and Sworn to before me on this 15th day of March, 1977.

_____
Notary Public in and for the State of Iowa.

NOTARIAL SEAL IOWA
Marjorie E. McDonald
My Commission Expires
September 30, 1979

PROPOSED CHANGE RTS-82 TO DAEC TECHNICAL SPECIFICATIONS

I. Affected Technical Specifications

Appendix A of the Technical Specifications for the DAEC (DPR-49) does not provide adequately for all phases of Recirculation Pump operation.

II. Proposed Change in Technical Specifications

The licensees of DPR-49 propose the following changes in the Technical Specifications set forth in I above:

Change existing Specification "3.3.E" to "3.3.F".

Add new Specification 3.3.E as follows:

"Recirculation Pumps - A recirculation pump shall not be started while the reactor is in natural circulation flow and reactor power is greater than 1% of rated thermal power."

III. Justification for Proposed Change

This proposed change is being submitted in response to a request from the Nuclear Regulatory Commission for additional information required to evaluate fuel cycle 3. (Letter; Mr. G. Lear, Chief, Operating Reactors Branch #3, to Mr. D. Arnold, President, Iowa Electric Light and Power Company; February 28, 1977.)

IV. Review Procedure

This proposed change has been reviewed by the DAEC Operations Committee and Safety Committee which have found that this proposed change does not involve a significant hazards consideration.

TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.D Reactivity Anomalies The reactivity equivalent of the difference between the actual critical rod configuration and the expected configuration during power operation shall not exceed 1% Δ k. If this limit is exceeded, the reactor will be shut down until the cause has been determined and corrective actions have been taken as appropriate.	4.3.D Reactivity Anomalies During the startup test program and startup following refueling outages, the critical rod configurations will be compared to the expected configurations at selected operating conditions. These comparisons will be used as base data for reactivity monitoring during subsequent power operation throughout the fuel cycle. At specific power operating conditions, the critical rod configuration will be compared to the configuration expected based upon appropriately corrected past data. This comparison will be made at least every full power month.
E. Recirculation Pumps A recirculation pump shall not be started while the reactor is in natural circulation flow and reactor power is greater than 1% of rated thermal power.	
F. If Specifications 3.3.A through D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the Cold Shutdown condition within 24 hours.	

DAEC

Question 1:

Provide a quantitative discussion of the ΔCPR's given in Table 6-3 NEDO 21082-2.

RESPONSE:

Cycle 2 and Cycle 3 void coefficients and ΔCPR's are as follows:

		ΔCPR	
	V.C.	8x8	7x7
EOC2	-14.36 ¢/%	0.37	0.28
EOC2-1GWD/T	-16.93 ¢/%	0.27	0.19
EOC2-2GWD/T	-16.88 ¢/%	0.23	0.17

		ΔCPR	
	V.C.	8x8	7x7
EOC3	-13.27 ¢/%	0.37	0.27
EOC3-1GWD/T	-14.47 ¢/%	0.36	0.28
EOC3-2GWD/T	-14.40 ¢/%	0.29	0.21

Smaller void coefficients in Cycle 3 are expected to result in ΔCPR's that are lower than Cycle 2 which has higher void coefficients. However, scram reactivity degradation experienced in Cycle 3 more than compensated for the benefit of improvement in the void coefficients. Figure 1, 2, 3 show the degradation in the scram reactivity between Cycle 2 and Cycle 3 exposure points

analyzed. Note that Figures 1, 2, 3 are based on the same data submitted in the licensing submittals, minor variations may exist due to variations in replotting and scaling.

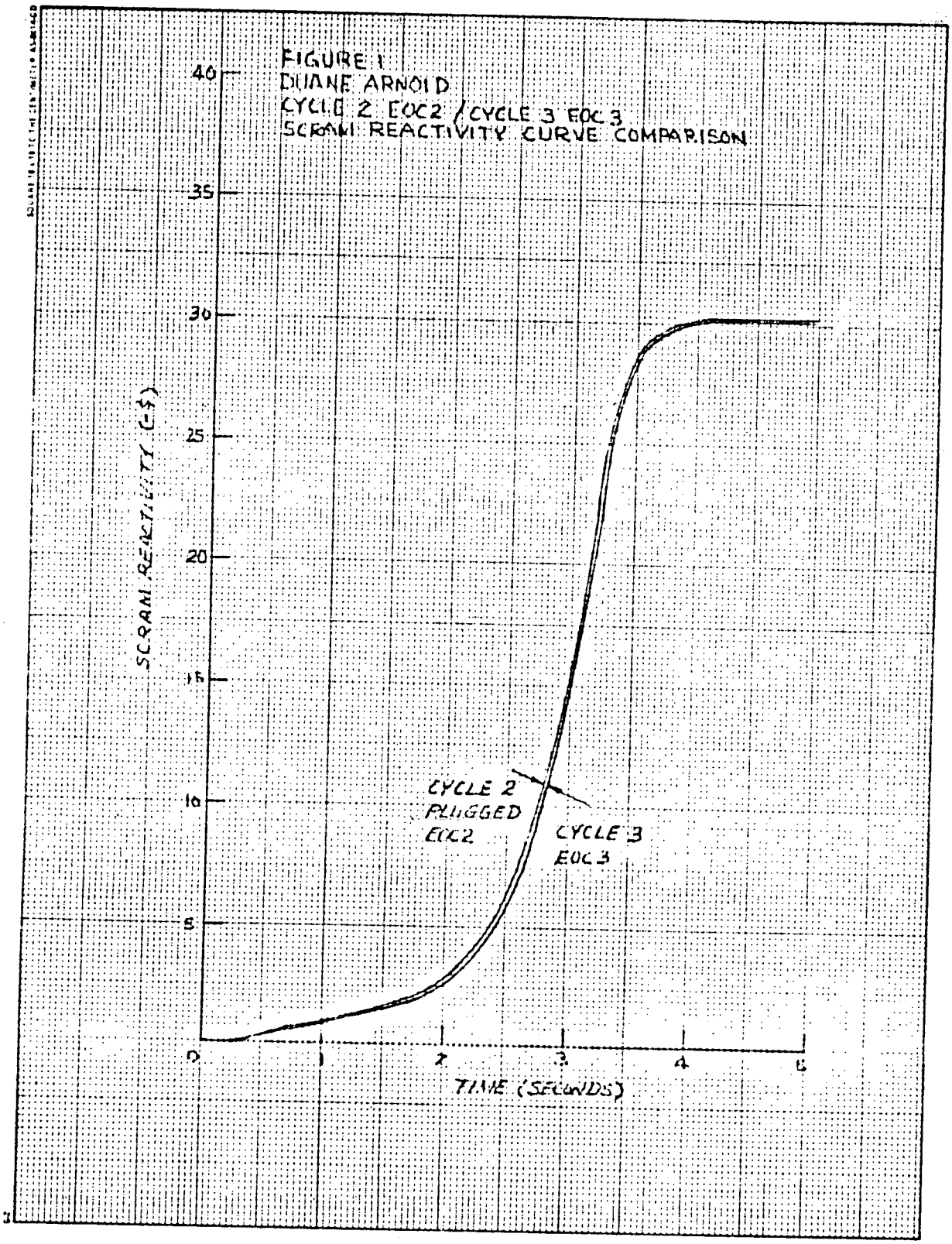
FIGURE 1
DIANE ARNOLD
CYCLE 2 EOC2 / CYCLE 3 EOC 3
SCRAM REACTIVITY CURVE COMPARISON
SCRAM REACTIVITY (-$)
40
35
30
25
20
15
10
5
0
1
2
3
4
5
TIME (SECONDS)
CYCLE 2
PLUGGED
EOC2
CYCLE 3
EOC 3

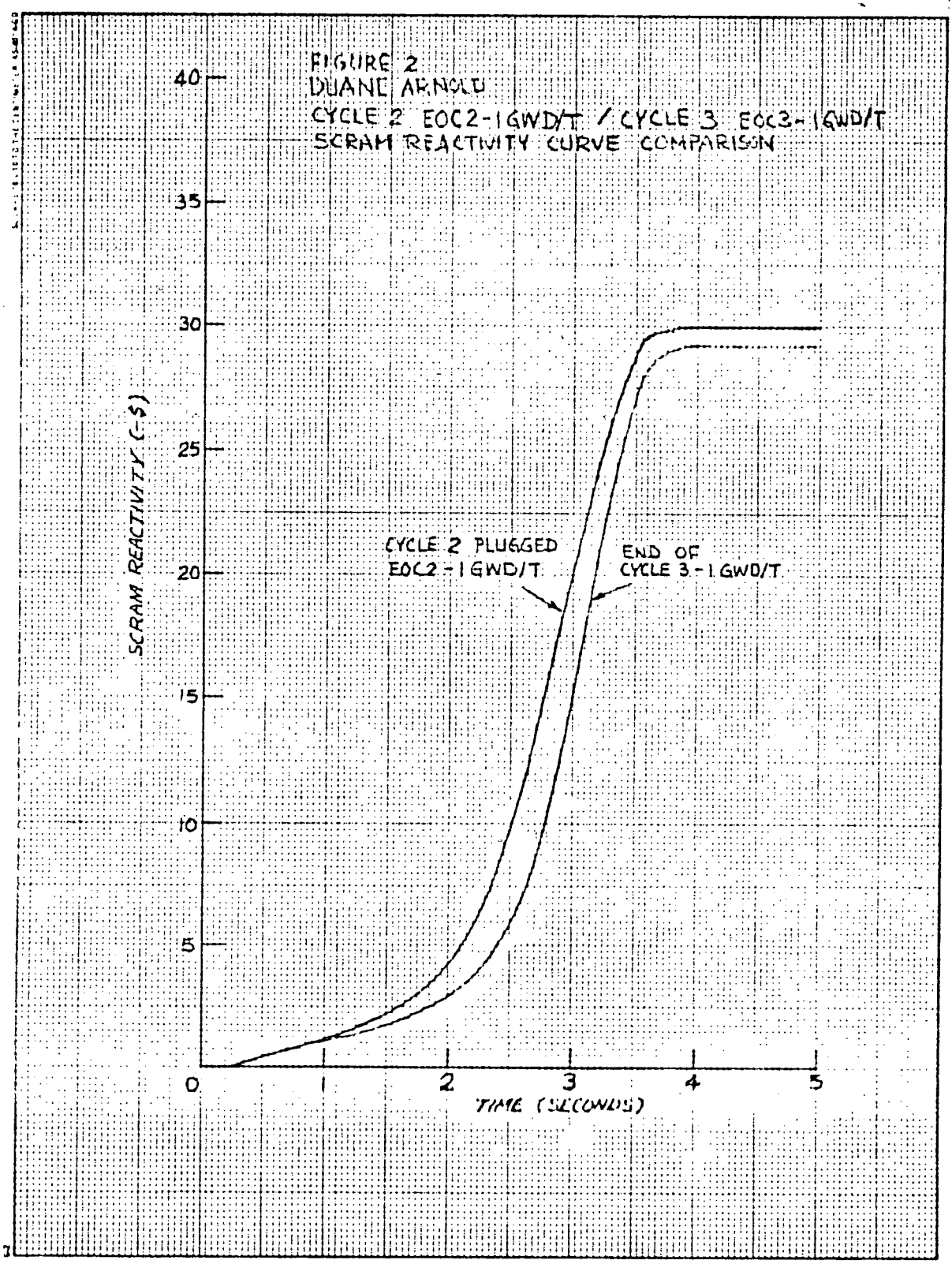
FIGURE 2
DUANE ARNOLD
CYCLE 2 EOC2-1GWD/T / CYCLE 3 EOC3-1GWD/T
SCRAM REACTIVITY CURVE COMPARISON
SCRAM REACTIVITY (-$)
40
35
30
25
20
15
10
5
0
1
2
3
4
5
TIME (SECONDS)
CYCLE 2 PLUGGED
EOC2-1GWD/T
END OF
CYCLE 3-1GWD/T

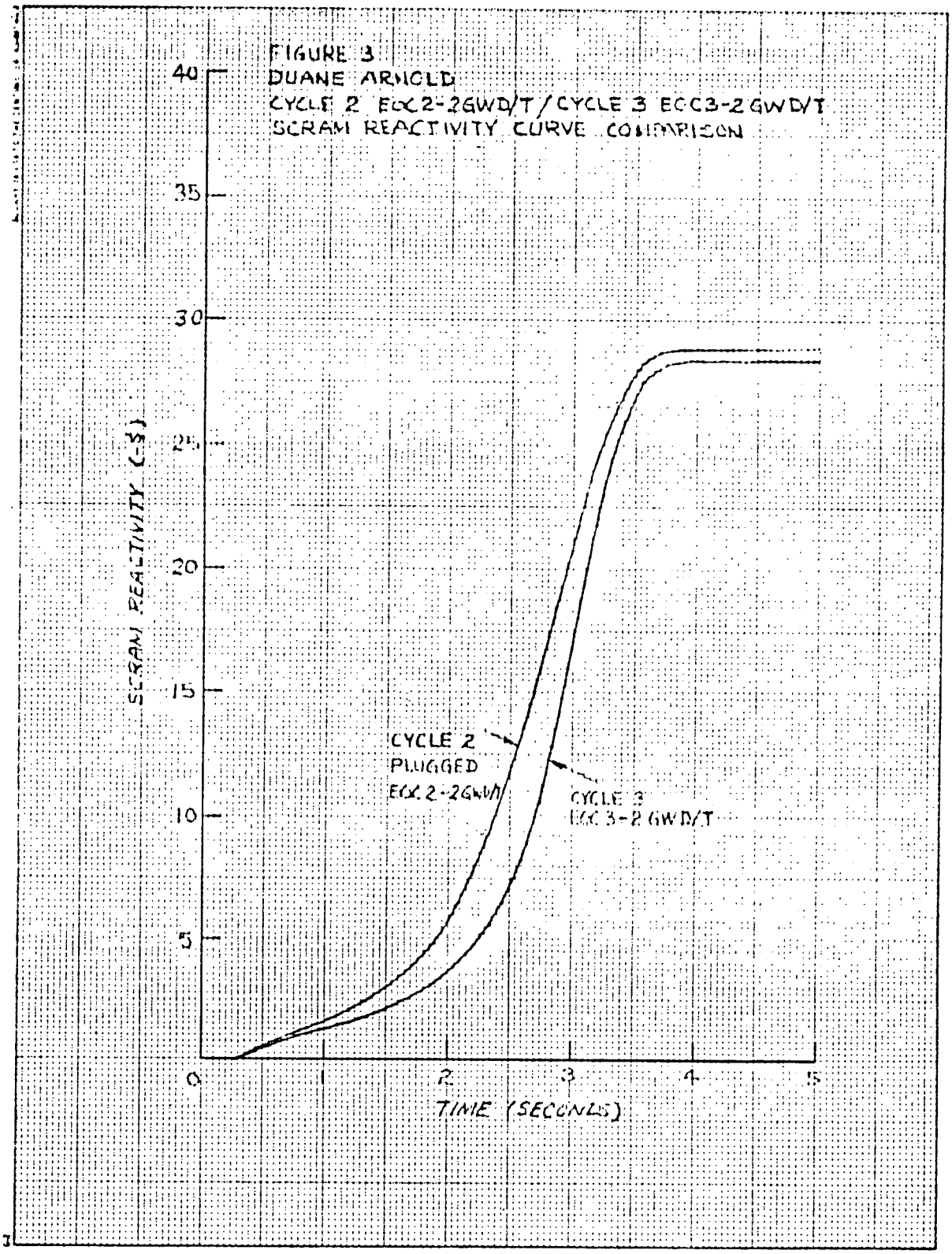
FIGURE 3
DUANE ARNOLD
CYCLE 2 EOC2-2GWD/T / CYCLE 3 EOC3-2GWD/T
SCRAM REACTIVITY CURVE COMPARISON
SCRAM REACTIVITY (-$)
40
35
30
25
20
15
10
5
0
1
2
3
4
5
TIME (SECONDS)
CYCLE 2
PLUGGED
EOC 2-2GWD/T
CYCLE 3
EOC 3-2 GWD/T

Question 3:

Provide analyses and results of any test previously conducted which demonstrate that recirculation pump startup from the natural circulation mode does not cause a reactivity insertion transient in excess of the most severe coolant flow increase currently analyzed. The startup test results shall quote reactivity insertions observed during reactor startup for conditions of recirculation pump startup from natural circulation modes. This concern can be addressed either by the analyses and test data described above, or by a proposed technical specification change which precludes operation with natural circulation flow.

RESPONSE:

Proposed Technical Specification Change RTS-82 transmitted herewith addresses the concern.

Question 4:

Provide a list and briefly describe each physics startup test to be performed for the Cycle 3 reload. Also provide the acceptance criterion for each test and discuss how the measured parameter(s) relates to the values in the accident analysis.

RESPONSE:

The following physics tests will be conducted at DAEC after the refueling outage:

A) Scram Insertion Time Tests: This test satisfies the requirements of Technical Specifications Section 4.3.C. The acceptance criteria are as stated in Technical Specifications 3.3.C. The scram insertion times acceptance criteria is used in the derivation of the scram reactivity curves.

B) Shutdown Margin Test: This test satisfies the requirements of Technical Specifications Section 4.3.A. The acceptance criteria is contained in the above Technical Specification. This test also fulfills the requirements in Paragraph C below by the acceptance criteria of ± 1% ΔK being applied to this test. This test verifies acceptable shutdown margin as stated in NEDO 21082-02.

C) Reactivity Anomolies Check: This test satisfies the requirements of Technical Specifications Section

C) Continued

4.3.D. The acceptance criteria is as stated in Technical Specifications Section 3.3.D. This test is normally conducted at 80% power and 100% flow. The number of control rod positions inserted into the core are plotted versus exposure and compared to the ± 1% ΔK band. This verifies that reactivity of the core and control rods is within the band of values used in NEDO 21082-02.

D) LPRM Instrument Calibration: This test is not a required post refueling check, however, work is normally accomplished on the LPRM's during refueling which does require LPRM calibration. LPRM maintenance requiring recalibration is planned during the Spring 1977 refueling outage. This test satisfies the requirements of the Technical Specifications Section 4.1.A pertaining to LPRM and APRM calibration (Table 4.1-2).

E) Control Rod Drive Friction Testing and Insert/Withdraw Timing: Each control rod is friction tested and the insert/withdraw timing checked. This testing is conducted at zero pressure. The criteria is as follows:

E) Continued

1) Each CRD must have a normal insert or withdraw of 3.0± 0.6 inches per second, indicated by a full 12 foot stroke in 40 to 60 seconds.

2) Friction tests: If the differential pressure exceeds 25 psid for a continuous drive in, a settling test must be performed. For a settling test the differential settling pressure should not be less than 30 psid nor should it vary more than 10 psid over a full stroke.

F) Core Power Distribution Symmetry Test: This test determines the magnitude and location of indicated core power distribution asymmetrics. This is accomplished by comparing symmetric integrated TIP data collected in conjunction with full core TIP sets. The acceptance criteria is that maximum deviation between integrated powers of symmetrical TIP strings are less than 20% and the average deviation is less than 6%. This criteria is based on initial startup test instructions. This test may only be accomplished if initial operation is in the "A" sequence which ensures octant symmetry and control.

G) Power Distribution Test: This test will be conducted at core thermal power greater than 50% of rated and at or near rated core flow with equilibrium xenon. The axial power distribution will be evaluated using the neutron monitoring system. The measured distribution will be compared to a predicted distribution supplied by General Electric Company. Measured and predicted values, and the percent difference will be recorded.

Question 5:

State your schedule for submitting to NRC a brief summary report of physics startup tests. This report should include both measured and predicted values. If the difference between the measured and predicted values exceeds the acceptance criterion, the report should discuss the actions that were taken and justify the adequacy of these actions.

RESPONSE:

It does not appear that the Technical Specifications require a report, however, Iowa Electric will submit a brief summary report of the above tests as requested. Section 6.11.1.a of the Technical Specifications specifies 90 days after return to power for submission of Startup Test results which we shall use as guidance. The report will include the requested information.