

**CALCULATION COVER SHEET**  
PILGRIM NUCLEAR POWER STATION

Sh 1 of 16

CALC. NO. <u>S+SA088</u> EV. <u>0</u> FILE NO. _____		SR <input checked="" type="checkbox"/>	R-TYPE _____
Subject <u>Scram Times for Tech Spec 3.3.C.1</u>		NSR <input type="checkbox"/>	_____
Discipline Division Manager <u>S.S. Wallman/D.N. Keene</u>		Preliminary Calc. <input type="checkbox"/>	
Approval <u>[Signature]</u> Date: <u>1/6/99/95</u>		Finalization Due Date _____	
Independent Review <u>B.H. KELLEY</u>		Final Calc. <input checked="" type="checkbox"/>	
Page(s) <u>ALL</u>		Statement Attached <input checked="" type="checkbox"/>	
By <u>B.W. Hagemier</u>	Date <u>6/28/95</u>	Ch'kd <u>B.H. KELLEY</u>	Date <u>6/29/95</u> Agreed <u>ALL</u>

This design analysis  DOES,  DOES NOT require revision to affected design documents.  
 Affected Design Documents: \_\_\_\_\_  
 A PDC  IS,  IS NOT Required.  
 A Safety Evaluation  IS,  IS NOT Required. See attached preliminary evaluation checklist.  
 This design analysis  DOES,  DOES NOT affect the piping analysis index (PAI). If the PAI is affected, initiate a revision to Calculation M561.

Minor revisions made on pages \_\_\_\_\_ of this calculation. See next revision.

Replaces Calc. No. _____	Voided By Calc. No. _____ <input type="checkbox"/> Or Attached Memo _____
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9509200154 950912  
PDR ADOCK 05000293  
PDR



### Abstract

Scram insertion times for Technical Specification 3.3.C.1 are developed.

### Introduction

SUDDS 92-51 presents scram insertion times for Technical Specification 3.3.C.1 and 3.3.C.2. SUDDS 93-170 revises these scram times are based on the conservative assumption that the control rod feed switch is at the minimum tolerance and presents revised scram times for Technical Specification 3.3.C.2 with this conservative assumption removed. This calculation uses the difference between scram times from SUDDS 92-51 and 93-170 to derive scram times for Technical Specification 3.3.C.1 that, likewise, have this conservative assumption removed.

### Results

The screw times for Technical Specification 3.3.C.1 are:

Notch 4d	Dropout	0.508	seconds
Notch 3d	Dropout	1.252	seconds
Notch 2d	Dropout	2.016	seconds
Notch 0d	Dropout	3.578	seconds

These limits explicitly account for uncertainties in the location of the position indication probes and for the uncertainty in the control rod position when dropout of the read switch occurs. Because these values are based on averaging of multiple control rod drives, they do not reflect the assumption that the read switch is at the minimum tolerance.

## Methodology

The conservative assumption that the rod switch is at the minimum tolerance effectively requires the rod to travel farther into the core before each dropout signal is produced. This travel penalty, call it  $\Delta L$ , translates directly to a scram insertion time penalty,  $\Delta t$ , for a given scram insertion rod velocity.

The scram insertion time penalty is derived in this calculation by taking the difference in scram insertion times from SUDDS 92-51 and 93-170. These scram insertion times are for Technical Specification 3.3.C.2 only, not 3.3.C.1. Scram insertion times for 3.3.C.1 that do not include this time penalty are derived by adding the time penalty  $\Delta t$  to the times in SUDDS 92-51.

CALC. # S+SA 088



PREPARED BY BWH

REV. 0 DATE 6/28/95

CHECKED BY RHC

SHEET 5 OF 16

### Input and Assumptions

This section presents SUDOS 92-51 and 93-170. It is noteworthy that both documents are design verified by GE.

Boston Edison Company  
Supplier Design Document Review Form  
PNPS Unit 1

SUDDS/RF # 92-51

Pages of attachments 3

Activity Scram Time Technical Specification

Contractor General Electric

Document Type: Design Bases/Criteria/Work Scope ,  
Sys Description , Equip Spec/  
Matl Req , Analysis Rpt/ Calc ,  
Dwg , Diagram , Test Plan/  
Proc , Test Rpt , Work Instr/  
Proc , Other \_\_\_\_\_

Document ELH: 92-023

Issue Date 2/5/92 Draft: Yes  No  Review: Conceptual   
Detail

Cognizant Engr/GL (BECO) Hagemeyer / Gosnell

Cognizant Engr(s), Contractor E. L. Heinlein

Conforms to FSAR Reqmts: Yes  No  Comment None

Conforms to Procurement Reqmts: Yes  No  Comment None

Conforms to Other Applicable Doc/Proc N/A : Yes  No

Comment \_\_\_\_\_

Detailed Review Only

Review and Evaluation Bases \_\_\_\_\_

CALCULATION SHEET

CAPITAL AUTHORIZATION NO \_\_\_\_\_

PRELIMINARY

PREPARED BY RWH DATE 6/29/95

REV \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY RWH DATE 6/29/95

Results of Evaluation (Reason  FINCHANGES, if any) APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

REV 0 DATE 6/28/95

DATE 6/16

Comments (Suggested/Required Changes) \_\_\_\_\_

NUCLEAR DISTRIBUTION

NAJAE

WFO  
A

Hagemeyer  
Gosnell

Cognizant Engineer  
NED File

Action: Release , Release w/Comments Incorporated , Resubmit w/Comments Incor.   
Reject  Letter# \_\_\_\_\_ Date \_\_\_\_\_ Part 21 Evaluation Req'd: Yes  No

R. Hagemeyer 5/28/92 /S/ Cognizant Engr Date \_\_\_\_\_ Contributing Engineer Date \_\_\_\_\_  
J. Gosnell 5/29/92 /S/ Group Leader Date \_\_\_\_\_ Contributing Engineer GL Date \_\_\_\_\_

Records Management Information

Q  Non-Q

Keywords: Scram Time

SUDDS/RF# 92+51

Doc # ELH: 92-023

IWP # \_\_\_\_\_

ESR # \_\_\_\_\_

PDC # \_\_\_\_\_

PO/Req # \_\_\_\_\_

Other \_\_\_\_\_

DOCUMENT RELEASED

MAY 29 1992

FOR USE

General Electric Company  
175 Currier Avenue San Jose CA 95126

February 5, 1992  
ELH:92-023

cc: J. P. Aboltin  
P. T. Antonopoulos  
P. J. Bukunt  
J. W. Gosnell  
A. D. Himle  
G. G. Jones  
J. D. Kerr  
S. J. Peters  
D. C. Serell  
E. G. Thacker  
G. A. Watford  
File: 1.3

Mr. J. H. Piascik, Manager  
Nuclear Fuel Procurement Administration  
Boston Edison Company  
25 Braintree Hill Park  
Braintree, Massachusetts 02184

SUBJECT: **Technical Specification Scram Time Requirements**

REFERENCE: Memo, G. A. Watford to E. L. Heinlein, "PNPS Technical Specification Scram Time Requirements," dated 2/3/92

Dear John,

Attached for your information and use is the referenced memo regarding tech spec scram time requirements.

Please do not hesitate to contact our San Jose offices if there are any questions regarding the attached memo.

Sincerely,

E. L. Heinlein  
Fuel Project Manager  
Pilgrim  
M/C 174, (408) 925-6158

ELH:mg

Attachment

CALCULATION SHEET

CAPITAL AUTHORIZATION NO. \_\_\_\_\_

PRELIMINARY

PREPARED BY RWT DATE 6/29/95

REV. DATE \_\_\_\_\_

CHECKED BY RHC DATE 6/29/95 SR

FINAL S+SA 088

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

NSR

REV. DATE 6/28/95

SHEET 7 OF 16

February 3, 1992

cc: J.S. Charnley  
E.G. Thacker  
D.C. Serell  
DRF A12-00038-2

To: E.L. Heinlein

From: G.A. Watford *GW*

Subject: PNPS Technical Specification Scram Time Requirements

- Reference:
1. Letter, R.V. Fairbank (BECO) to E.L. Heinlein (GE), same subject, 11/21/91.
  2. Letter, R.V. Fairbank (BECO) to E.L. Heinlein (GE), same subject, 12/18/91.
  3. Letter, G.A. Watford to E.L. Heinlein, same subject, 1/22/92.

This letter summarizes the information provided in Reference 3 and also provides additional information concerning the GEMINI scram times. The responses are also provided in the same format as the questions of References 1 and 2.

- 1) Average scram insertion time requirements for all operable control rods (TS 3.3.b.1) from deenergization of the scram pilot valve solenoids to dropout (DO) (reed switch opening) of Notches 04, 24, 34, and 44.

Notch Position	Average Scram Time (seconds)
44 DO	0.504
34 DO	1.249
24 DO	2.013
04 DO	3.575

- 2) Average scram insertion time requirements for the three fastest control rods in each group of four control rods in all two-by-two arrays (TS 3.3.c.2) from deenergization of the scram pilot valve solenoids to dropout of Notches 04, 24, 34, and 44.

Notch Position	3 out of 4 Scram Time (seconds)
44 DO	0.534
34 DO	1.324
24 DO	2.134
04 DO	3.790

- 3) The  $\mu$  and  $\sigma$  values based on scram insertion times from deenergization of scram pilot valve solenoids to dropout of Notch 34 which are used to calculate  $\tau_B$  (TS 4.11.C) consistent with GEMINI advanced physics methods.

$\mu = 0.937$  seconds  
 $\sigma = 0.021$  seconds

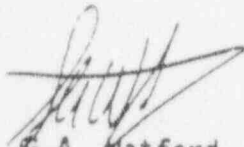
AUTHORIZATION NO. \_\_\_\_\_  
 PREPARED BY: *Bult* DATE: *6/29/95*  
 CHECKED BY: *PHC* DATE: *6/29/95*  
 NSR    
 DATE: \_\_\_\_\_  
 of *16*

CALCULATION SHEET  
 PRELIMINARY  
 REV. DATE: \_\_\_\_\_  
 ORIGINAL SA 088  
 REV. DATE: *6/29/95*



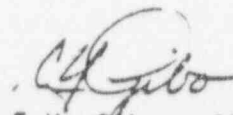
- 4) Correction factors required to account for measurement biases and uncertainties when demonstrating compliance with the scram insertion times requested in Items 1 and 2 above.

The limits specified in the responses to Items 1, 2, and 3, explicitly account for the uncertainties in the location of the position indication probes and for the uncertainty in the control rod position when pickup or dropout of the reed switch occurs. Any other measurement uncertainties and biases introduced by the BECo surveillance procedures and hardware configuration used in the measurements are specific to Pilgrim and are not included in the specified limits (e.g., determination of time zero, accuracy of measurement devices, etc.).



G.A. Watford  
Systems Integration Engineering  
M/C 740, Tel. 5-6136

verified by:



E.Y. Gibo, LSE  
Control Rod Drive System  
Reactor Design Engineering  
M/C 771, Tel. 5-6783

CAPITAL AUTHORIZATION NO. \_\_\_\_\_

CALCULATION SHEET

PRELIMINARY

REV. DATE \_\_\_\_\_

FINAL

REV. DATE 6/29/95

PREPARED BY BWH DATE 6/29/95

CHECKED BY RHK DATE 6/29/95

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

SR  NSR

Sheet 9 of 16

Boston Edison Company  
Supplier Design Document Review Form  
PNPS Unit 1

SUDDS/RF # 93-170

Pages of attachments 2

Activity Tech Spec Screen Times

Contractor General Electric

Document Type: Design Bases/Criteria/Work Scope ,  
Sys Description , Equip Spec/  
Matl Req , Analysis Rpt/ Calc ,  
Dwg , Diagram , Test Plan/  
Proc , Test Rpt , Work Instr/  
Proc  Other Letter

Document ELH: 93-138

Issue Date 9/20/93 Draft: Yes  No  Review: Conceptual   
Detail

Cognizant Engr/GL (BECO) B.W. Hagemier J.W. Caswell

Cognizant Engr(s), Contractor E.L. Heinlein

Conforms to FSAR Reqmts: Yes  No  Comment \_\_\_\_\_

Conforms to Procurement Reqmts: Yes  No  Comment \_\_\_\_\_

Conforms to Other Applicable Doc/Proc N/A : Yes  No

Comment See Attachment

Detailed Review Only

Review and Evaluation Bases \_\_\_\_\_

Results of Evaluation (Reason for Changes, if any) \_\_\_\_\_

Comments (Suggested/Required Changes) \_\_\_\_\_

Action: Release , Release w/Comments Incorporated , Resubmit w/Comments ,  
Reject  Letter# \_\_\_\_\_ Date \_\_\_\_\_ Part 21 Evaluation Req'd Yes  No

IS/ B.W. Hagemier 9/24/93  
Cognizant Engr Date Contributing Engineer N/A

IS/ J.W. Caswell 9/24/93  
Group Leader Date Contributing Engineer GL N/A Date

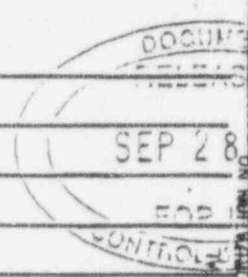
Records Management  
Information

Non-Q

Keywords: \_\_\_\_\_

SUDDS/RF# 93-170  
Doc # ELH: 93-138  
IWP # \_\_\_\_\_  
ESR # \_\_\_\_\_  
PDC # \_\_\_\_\_  
PO/Req # \_\_\_\_\_  
Other \_\_\_\_\_

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NAME	NO	OR
	A	A
Hagemier		X
Caswell		X
NAD File		X



PREPARED BY	CHECKED BY	APPROVED BY
DATE	DATE	DATE
NSR		
PREPARED BY	CHECKED BY	APPROVED BY
DATE	DATE	DATE
NSR		

ATTACHMENT TO SUDDS 93-170

The values reported here differ from the values reported in SUDDS 92-51 because, here, GE has removed the conservative assumption that the reed switch is at the minimum tolerance. Since this assumption is still more valid for the core-average scam times, the difference between the scam times reported here and the 2x2 Technical Specification scam times may be applied to the core-average Technical Specification scam times to yield the appropriate allowable values for the core-average scam times. These values are:

<u>Notch Position</u>	<u>Core-Average Time(Seconds)</u>
Dropout 44	0.508
Dropout 34	1.252
Dropout 24	<del>2.017</del>
Dropout 04	<del>3.583</del>

These values are incorrect.

*Best.*

AGREED  
RHK  
6/29/95

CAPITAL AUTHORIZATION NO. \_\_\_\_\_

CALCULATION SHEET

PRELIMINARY

PREPARED BY *Best* DATE *6/29/95*

REV. DATE \_\_\_\_\_ CHECKED BY *RHK* DATE *6/29/95* SR  NSR

APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

ORIGINAL STSA 088

REV. DATE *6/29/95*

SHEET 11 OF 16

Erin L. Heinlein  
Senior Fuel Project Manager  
Fuel Engineering and Projects

General Electric Company  
170 Summer Avenue, Danvers, MA 01923  
408 925 6158  
408 925 6521

September 20, 1993  
ELH:93-138

cc: J. P. Aboltin  
P. T. Antonopoulos  
P. J. Bukunt  
J. W. Gosnell  
A. D. Himle  
J. D. Kerr  
S. J. Peters  
E. G. Thacker  
File: 1.3

Mr. J. H. Piasecik, Manager  
Nuclear Fuel Procurement Administration  
Boston Edison Company  
25 Braintree Hill Park  
Braintree, Massachusetts 02184

SUBJECT: Tech Spec Scram Times at PNPS

- REFERENCE:
- 1) Letter, E. L. Heinlein to J. H. Piasecik, "Technical Specification Scram Time Requirements", February 5, 1993
  - 2) Letter, E. L. Heinlein to J. H. Piasecik, "Time to Notch 44 Dropout Pilgrim", August 29, 1993

Dear John,

Attached for your information and use is additional information regarding time to notch 34, 24 and 04 dropout for Pilgrim requested by Dr. Gosnell of BECo.

Sincerely,

E. L. Heinlein  
Senior Fuel Project Manager  
Pilgrim  
M/C 174, (408) 925-6158

ELH:mg

Attachment

CALCULATION SHEET

AUTHORIZATION NO. \_\_\_\_\_

PREPARED BY ELH DATE 9/29/93

CHECKED BY RAK DATE 9/29/93

REV. DATE \_\_\_\_\_

ORIGINAL SA 088 PVB BY \_\_\_\_\_

REV. DATE 6/29/95

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<input checked="" type="checkbox"/> SR	<input type="checkbox"/> NSR
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Fuel Engineering  
San Jose, California

General Electric Nuclear Energy  
175 Curtner, San Jose, CA 95125

RNE93-260

September 3, 1993

TO: E.L. Heinlein

FROM: S.J. Peters

SUBJECT: Time to NOTCH 34, 24, and 04 DROPOUT for Pilgrim

REFERENCE: Letter, E.L. Heinlein to J.H. Paiscik, "Technical Specification Scram Time Requirements", February 5, 1993.

The referenced letter contains scram times to assure technical specification compliance for the fastest three rods in a clumped 2X2 control rod array at Pilgrim. At BECo request, the purpose of this letter is to update the time requirement for 10%, 30%, 50% and 90% insertion if it is determined by measuring from the NOTCH 44 DROPOUT, NOTCH 34 DROPOUT, NOTCH 24 DROPOUT and NOTCH 04 DROPOUT, respectively. The values are shown in the table below and they supersede the values reported in the referenced letter.

NOTCH 44 DROPOUT	0.538 seconds
NOTCH 34 DROPOUT	1.327 seconds
NOTCH 24 DROPOUT	2.137 seconds
NOTCH 04 DROPOUT	3.793 seconds

These values are based on removing the conservative assumption that the control reed switch is at the minimum tolerance, reasonable for averaging multiple control rod drives. All other effects discussed in the referenced letter remain conservatively included.

If you have any questions please call.

*Steve Peters*  
 \_\_\_\_\_  
 S.J. Peters  
 Reload Nuclear Engineering 2  
 M/C 156, Ext. 51124

Verified by:

*J. Casillas*  
 \_\_\_\_\_  
 J. Casillas  
 Reload Nuclear Engineering 1  
 M/C 171, Ext. 66970

cc. P.J. Savoia  
E.G. Thacker II  
DRF J2042

CAPITAL AUTHORIZED BY: *J. Casillas* DATE: *6/29/95*

PREPARED BY: *J. Casillas* DATE: *6/29/95*

CHECKED BY: *J. Casillas* DATE: *9/8/93*

REV. DATE: *5/5/95* BY: *SA*

REV. DATE: *6/29/95* BY: *SA*

ORIGINAL 545A 086 PPD BY: *SA*

REV. DATE: *6/29/95* BY: *SA*

FIG 13

CALCULATION SHEET

PRELIMINARY

NSR

### Calculations

The scram insertion time penalty values,  $\Delta t$ , for Technical Specification 3.3.C.2 are:

<u>Notch Position</u>	<u>Scram Time from SUDDS 92-51</u>	<u>Scram Time from SUDDS 93-170</u>	<u><math>\Delta t</math></u>
44 DO	0.534 sec	0.532 sec	0.004 s
34 DO	1.324 sec	1.327 sec	0.003 s
24 DO	2.134 sec	2.137 sec	0.003 s
04 DO	3.790 sec	3.793 sec	0.003 s

Addition of these  $\Delta t$  to the scram times for Technical Specification 3.3.C.1 in SUDDS 92-51 yields the revised scram times without the conservative assumption that the control rod need switch is at the minimum tolerance.

CALC. # S+SA 088

REV 0 DATE 6/28/95

SHEET 15 OF 66



PREPARED BY BWT

CHECKED BY RHC

<u>Notch Position</u>	<u>Scram Time from SUDDS 92-51</u>	<u>Δt</u>	<u>Revised Scram Time</u>
44 DO	0.504 s	0.004 s	0.508 s
34 DO	1.249 s	0.003 s	1.252 s
24 DO	2.013 s	0.003 s	2.016 s
04 DO	3.575 s	0.003 s	3.578 s

Discussion

None.

References

None.

Calculation # SKSA 088 Revision # 0 has been independently verified by the following method(s), as noted below:

Mark each item yes, no or not applicable (N/A) and initial each item checked by you.

Design Review  including verification that:

- Design inputs were correctly selected and included in the calculation.
- Assumptions are adequately described and are reasonable.
- Input or assumptions requiring confirmation are identified, and if any exist, the calculation has been identified as "Preliminary" and a "Finalization Due Date" has been specified.
- Design requirements from applicable codes, standards and regulatory documents are identified and reflected in the design.
- Applicable construction and operating experience was considered in the design.
- The calculation number has been properly obtained and entered.
- An appropriate design method or computer code was used.
- A mathematical check has been performed.
- The output is reasonable compared to the input.

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Alternate Calculation  including verification of asterisked items noted above. The alternate calculation (\_\_\_\_\_ pages) is attached.

Qualification Testing  for design feature \_\_\_\_\_ including verification of asterisked items noted above and the following:

- The test was performed in accordance with written test procedures.
- Most adverse design conditions were used in the test.
- Scaling laws were established and verified and error analyses were performed, if applicable.
- Test acceptance criteria were clearly related to the design calculation.
- Test results (documented in \_\_\_\_\_) were reviewed by the calculation Preparer or other cognizant engineer.

Independent Reviewer Comments: THE APPLICATION OF THE Δt CORRECTION FOR THE "FAST" RODS TO THE "AVIRAGE" RODS IS CONSERVATIVE. THE ACTUAL PENALTY (ΔL OR Δt) WOULD BE GREATER THAN THAT CREDITED BY THIS CALCULATION.

Richard H Kelly Independent Reviewer / 6/29/95 Date

Preparer concurrence with findings and comment resolution Preparer Preparer or Other Cognizant Engineer / 6/29/95

Note: Exhibit 3.06-B (Sheet 3 of 3) may to used for additional comments by IR as a part of the Independent Verification for calculations.



PRELIMINARY EVALUATION CHECKLIST

1. IDENTIFICATION: Document Number STSA 088 Revision 0

Description Scram Times for Tech Spec  
3.3.C.1

2. CLASSIFICATION:

- Yes  No a. Does the proposed change involve Q listed equipment?
- Yes  No b. For a new procedure, Temporary Procedure, or major revision; does the Procedure contain procedural steps or requirements in the FSAR?  
If yes, identify FSAR sections.

- Yes  No c. Is this a new procedure or Temporary Procedure that is Fire Protection Program related or a major revision that makes an existing procedure Fire Protection Program related?

3. PRELIMINARY EVALUATION:

- Yes  No a. Would this modify plant characteristics or procedural steps described in the FSAR? If yes, identify section:
- Yes  No b. Does this affect the design of systems, structures, or components described in the FSAR?
- Yes  No c. Does this affect the function of systems, structures, or components described in FSAR?
- Yes  No d. Does this affect the method of performing the function of systems, structures, or components described in FSAR?
- Yes  No e. Does this indirectly affect the capability of safety related systems, structures, or components described in the FSAR to perform their functions?
- Yes  No f. Does this create a new test not described in the FSAR that could affect plant safety?

PRELIMINARY EVALUATION CHECKLIST (Continued)

- Yes  No      g. Would this change assumptions used in the accident analyses described in FSAR Chapter 14? If yes, identify sections:
- 
- Yes  No      h. Does this change affect the ability of a system required to achieve and maintain safe shutdown in the event of a fire?
- Yes  No      i. Does this change affect a requirement of, or major commitment to, 10CFR50 Appendix R?
- Yes  No      j. Does this change affect a requirement of IE Circular 80-18 (for Radioactive Waste Systems)?
- Yes  No      k. Could this affect the function of systems or components required for compliance with the Limiting Conditions for Operation in the Technical Specifications?
- Yes  No      l. In the judgment of the evaluator, is a Safety Evaluation required?

If the answer to any question in Part 3 is "Yes", then a Safety Evaluation is required prior to implementation. Check the appropriate block and provide any explanatory comments below:

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4. SAFETY EVALUATION REQUIRED?       Yes       No

5. PREPARED BY: Bruce Hagemeyer / Sr. Nuc. Engr. Date 6/29/95  
Title

APPROVED BY: JW Stone / Act. S + SA Dir. Date 6/29/95  
Title

Attachment 5

Memo to F. A. Mulcahy from J. A. Seery dated July 31, 1974;  
Subject: Tech Spec Scram Times

TO Mr. F. A. Mulcahy FROM Mr. J. A. Seery DATE July 31, 1974

MAIL PHONE

TECH. SPEC. SCRAM TIMES

References:

1. Memo to W. J. Neal from Bob Lutman, dated Jan. 25, 1972, Subject: Control Rod Scram Times, with attachments.
2. Letter to Directorate of Licensing, USAEC signed by James Carroll, dated October 16, 1973, Subject: Results of Transient Reanalyses for Pilgrim with End-Of-Cycle Core Dynamics Characteristics
3. Tech. Spec. 3.3.C

In reference 1, Bob Lutman derived factors to apply to the Tech. Spec. scram time limits to account for the difference between the percent rod insertion (10, 50 and 90%) and the actual position (drop out 44, pick-up 24 and pick-up of 04) we use to monitor scram times on the process computer.

As you know, change number 5 to the Tech. Specs. has revised the scram time limits and also added a requirement to check the 30% insertion time. The revision is due to the change in end of cycle reactivity insertion rate and the subsequent analysis presented to the AEC in reference 2. A consequence of this analysis is that the Control Rod Scram Position vs. Time curve used in Bob Lutman's derivation is no longer valid and should be replaced by Figure 2, Control Rod Scram Times - Pilgrim, in Reference 2.

Based on Figure 2 I have recalculated the factors to apply to the Tech. Spec. scram times including the new 30% criterion, as follows:

1. Insertion %		<u>10</u>	<u>30</u>	<u>50</u>	<u>90</u>
2. Insertion (in.)	144 x ①	14.4	43.2	72.0	129.6
3. Notch Observation		DO 44	PU 34	PU 24	PU 04
4. Notch Location (inch)	144 x 3.0 x ③	12.0	42.0	72.0	132.0
5. $\Delta$ I Switch (inch)		+ .56	- .56	- .56	- .56
6. $\Delta$ L Hystereses (inch)		+ .25	+ .25	+ .25	+ .25
7. Observation Location (in.)	④ + ⑤ + ⑥	12.8	41.7	71.7	131.7
8. $\Delta$ L Observation	⑦ - ②	-1.6	-1.5	-0.3	+2.1
9. $\Delta$ L/ $\Delta$ t (in/sec.)	From Fig. 2	40.0	40.0	40.0	19.2
10. $\Delta$ t Observation (sec.)	⑧ / ⑨	-.040	-.037	-.0075	+.110
Tech. Spec. Correction:		-.04	-.04	-.01	+.11

The net effect is that for the 10% insertion, the observation criterion should be .04 sec. less than the specified criterion given in Tech. Spec. 3.3.C; likewise 30% should be .04 sec. less, 50% should be .01 sec. less and 90% should be .11 sec. greater.

JAS/amm

cc: G. D. Baston

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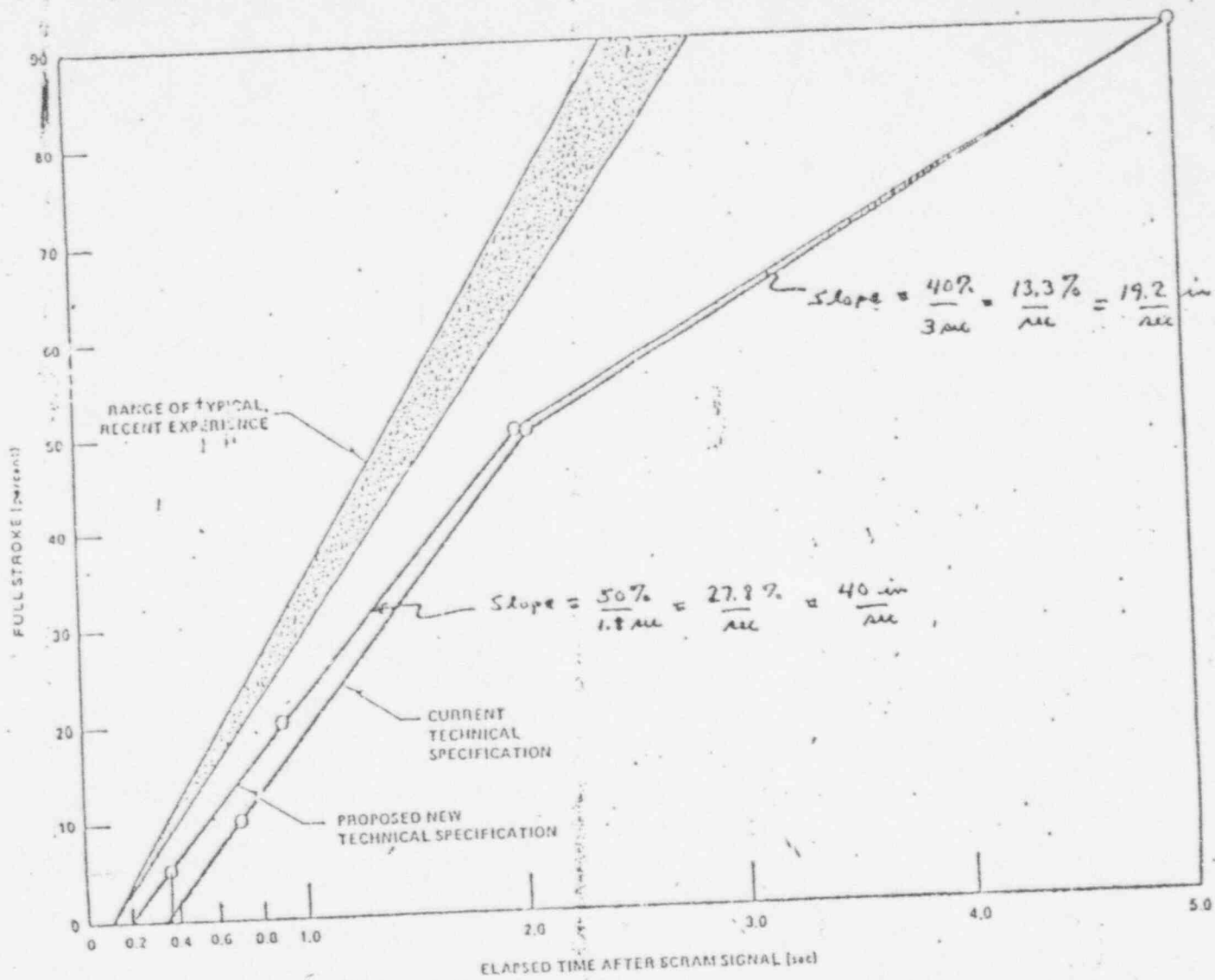


FIGURE 2. CONTROL ROD DRIVE SCRAM TIMES - PILGRIM

Attachment 6

Figures 1&2, Comparison of Old and New Scram Times  
for TS 3.3.C.1 and Comparison of Old and New Scram Times  
for TS 3.3.C.2, respectively

FIGURE 1

TECH SPEC 3.3.C.1

ROD POSITION		OLD TIMES (SEC)				
NOTCH	%	TS TIMES	DEL TIMES	OLD TIMES	NEW TIMES	DEL TIME
DO 44	10	0.550	0.042	0.508	0.504	-0.004
DO 34	30	1.275	0.023	1.252	1.249	-0.003
DO 24	50	2.000	-0.017	2.017	2.013	-0.004
DO 04	90	3.500	-0.083	3.583	3.575	-0.008

COMPARISON OF OLD AND NEW SCRAM TIMES FOR TS 3.3.C.1

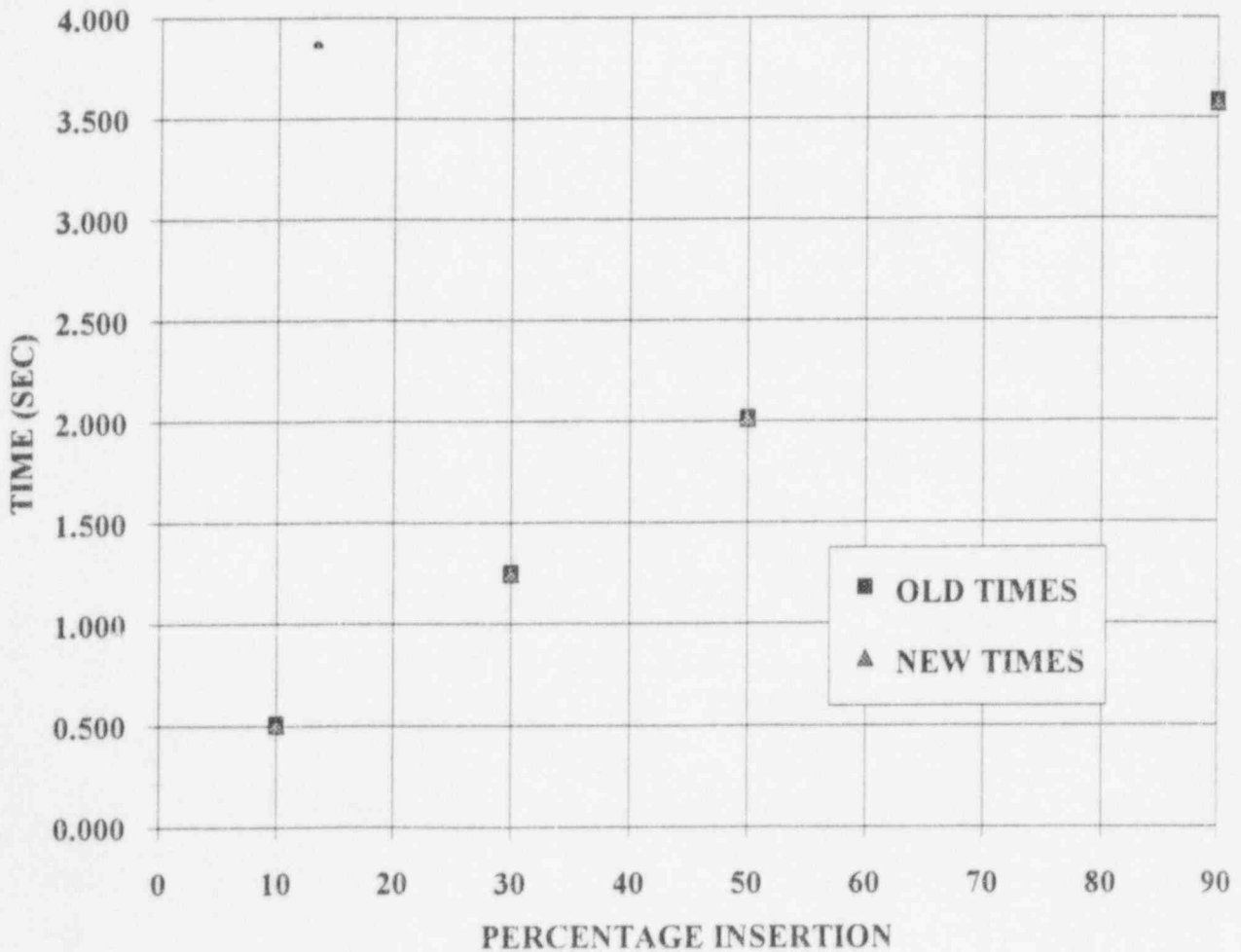
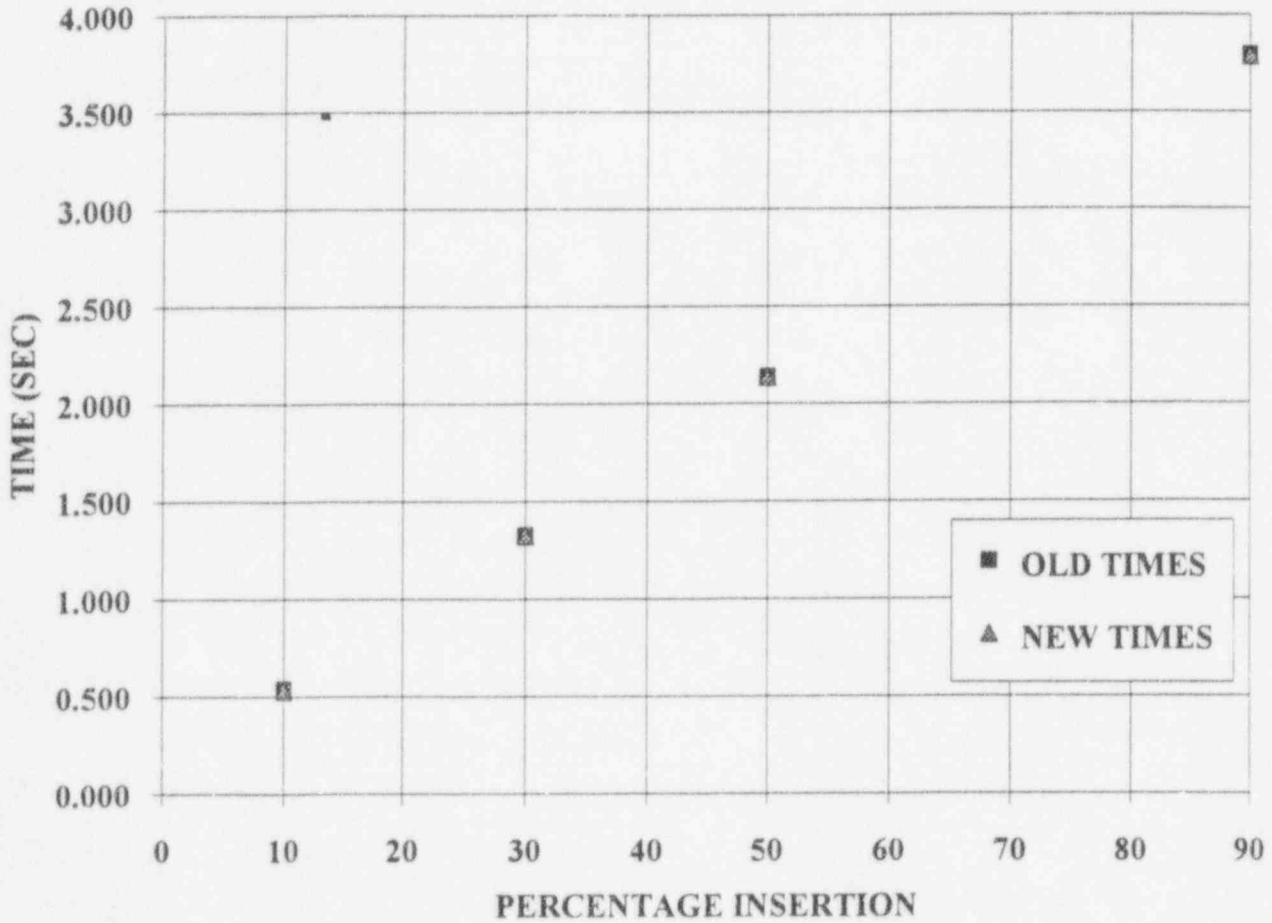


FIGURE 2

TECH SPEC 3.3.C.2

ROD POSITION		OLD TIMES (SEC)				
NOTCH	%	TS TIMES	DEL TIMES	OLD TIMES	NEW TIMES	DEL TIME
DO 44	10	0.58	0.042	0.538	0.534	-0.004
DO 34	30	1.35	0.023	1.327	1.324	-0.003
DO 24	50	2.12	-0.017	2.137	2.134	-0.003
DO 04	90	3.71	-0.083	3.793	3.790	-0.003

COMPARISON OF OLD AND NEW SCRAM TIMES FOR  
TS 3.3.C.2





Attachment 7

Letter to J. S. Charnley from G. C. Lainas dated March 22, 1986;  
Subject: Acceptance for Referencing of Licensing Topical Report  
NEDE-23011-P-A, "GE Generic Licensing Reload Report, "  
Supplement to Amendment 11 - MFN - 029-086