INTERIM REPORT

Accession No. TFBP-TR-311

Contract Program or Project Title: LOFT PROGRAM

Subject of this Document: (Title) "Power-Cooling-Mismatch Test Series, Test PCM-7 EOS"

Type of Document: Experimental Data

Author(s):

Date of Document: February 1979

Responsible NRC Individual and NRC Office or Division:

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Prepared for
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

INTERIM REPORT

FORM EG&G 1844
(Rev. 5-77)

DOCUMENT REVISION REQUEST

(1) OPER. NO _____

PAGE 1 OF 4

(2) REQUESTER	(3) DRR DATE	(4) DRR NO
D. T. Sparks	4/15/80	TFBP-241

(5) DOCUMENT NO. (IF APPLICABLE)	DOCUMENT TITLE	DOCUMENT ISSUE DATE
TFBP-TR-311	Power-Cooling-Mismatch Test Series, Test PCM-7 EOS	February 1979

(6) CHECK APPLICABLE BLANK
PERMANENT CHANGE XX TEMPORARY CHANGE _____ BULLETIN _____

(7) MANAGER APPROVAL _____ DATE _____

(8) PRINT OR TYPE PROPOSED CHANGE — NUMBER EACH CHANGE SEQUENTIALLY IN 1ST COLUMN AND RECORD PAGE AND STEP OR PARAGRAPH NUMBER FOR EACH CHANGE.

(9) FOR WRITER'S USE

ITEM	PAGE	STEP OR PARA.	INSTRUCTIONS: REWRITE PARAGRAPH(S) OR FOR EXTENSIVE CHANGES ATTACH REVISED COPY AND STATE "REVISE PER ATTACHED COPY" FOR NEW DOCUMENT, ATTACH ROUGH DRAFT AND STATE "PREPARE NEW (SP, DOP, ETC.) PER ATTACHED DRAFT"
1	5	Fig. 1	Replace Figure 1 with attached figure.
2	6	1	Replace Item (1) with attached.
3	14	Table III	Delete one 0.58 m cladding T/C on Rod 207-1, and hot and cold leg spool piece RTDs.
4	17	Table IV	Under Instrument for fuel rod 207-1, "Cladding T/Cs (4)" should read "Cladding T/Cs (3)". Delete hot and cold leg spool piece RTDs.
5	26	Lines 4 & 5	"Approximately 30 seconds." should read "2 to 5 minutes."
6	26	Line 6	"30 seconds" should read " 2 to 5 minutes."
7	26	Para. 1	Replace paragraph 1 "following the two ... failure propagation." with attached paragraph.
8	26	Para. 2	Replace paragraph 2 "following film ... nuclear operation." with attached paragraph.

USE CONTINUATION SHEET AS REQUIRED

NEXT ANTICIPATED NEED FOR DOCUMENT WITH THIS REVISION INCORPORATED: DATE/EVENT _____

(10) JUSTIFICATION: (REASON FOR CHANGE — NUMBER TO CORRESPOND TO ITEM NO. ABOVE):

1,2,3,4,12,13,16,17,18,19,20 - As fabricated instrument changes.

5,6,7,8 - Allow more comprehensive evaluation of test results relative to experiment objectives.

(11) OTHER DOCUMENTATION AFFECTED:

DOC. NO.	DRR NO.	DATE COMPLETED

(12) ORIGINATING DRR NO: _____

(13) REVIEW

NAME/SIGNATURE	ORG.	DATE	NAME/SIGNATURE	ORG	DATE	NAME/SIGNATURE	(14) REVIEW CODE	ORG.	DATE
[signature]	2810	4/23/80						QUALITY DIV	
R K Whitford	2810	4/24/80						SAFETY DIV	
[illegible]	2[illegible]	[illegible]						PRAC	

(15) COMMENTS:

(16) ADDITIONAL DRRS IN THIS DOCUMENT REVISION

(17) DOCUMENT CONTROLLER	(18) RELEASE DATE	(19) DRR COMPLETED DATE

DOCUMENT REVISION REQUEST
(CONTINUATION SHEET)

OPER. NO. _____

FORM EG&G-1844A
(Rev. 5-77)

DRR NO. TFBP-241

DOCUMENT NO. (IF APPLICABLE) | DOCUMENT TITLE | DOCUMENT ISSUE DATE

TFBP-TR-311 Power-Cooling-Mismatch Test Series, Test PCM-7 EOS | February 1979

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9	29	Table VIII	Item 3 criteria "...pressure increase greater than 1.4 MPa" should read "... pressure increase greater than 5 MPa."	
10	30	Para. 1	Replace "(p > 1.4 MPa)" with "(p > 5 MPa)".	
11	31	Para. 2	Delete 3rd sentence "All those ... becomes inoperable."	
12	32 & 33	Table IX	Replace Table IX with attached table.	
13	34	Fig.4	Replace "5. CLADTMP 315-68SD 01" with "5. CLADTMP 225-68 01" and "17. CLADTMP 045-68 05" with "17. CLADTMP 045-68SD 05".	
14	36	Para. 4	Last sentence "Average test rod ... system personnel." should read "Average test rod ... system personnel, or as provided by the LWR fuels research project engineer using a SPND vs. power regression."	
15	37 & 38	Table X	Replace Table X with attached.	
16	48 & 49	Check list #2	Delete "CLADTMP 315-68SD 01 ___K ..."; designations for Rod 207-5 cladding TCs should be "CLADTMP 045-6805, CLADTMP 135-68SD05, CLADTMP 225-6305, and CLADTMP 315-68 SD05".	
17	51 & 52	Check list #3	Delete "CLADTMP 315-68SD 01 ___K ..."; Designations for Rod 207-5 cladding TCs should be "CLADTMP 045-6805, CLADTMP 135-68 SD05, CLADTMP 225-63 05, and CLADTMP 315-68 SD05".	
18	54 & 55	Check list #4	Delete "CLADTMP 315-68 SD01 ___K ..."; designations for Rod 207-5 cladding TCs should be "CLADTMP 045-5805, CLADTMP 135-68SD05, CLADTMP 225-6305, and CLADTMP 315-68 SD05".	
19	57 & 58	Check list #5	Same as 16.	
20	60 & 61	Check list #6	Same as 16.	
21	31	Para. 3	Delete 2nd sentence "The surveillance ... during cooldown".	

10. JUSTIFICATION:

9 and 10 - Restriction not required.

11 and 21- Surveillance system not required for PCM-7.

14 - Provides consistency with previous tests.

15 - Plot requirements redefined.

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(CONTINUATION SHEET)

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22	36	Para. 1	3rd sentence, delete "for the Experimental Data Report".	
23	16	Para. 2	The 5th and 6th sentences "Appendix A... or his alternate." is changed to read "Appendix A contains check lists, consistent with Table IV, which will be used by TFBP personnel to evaluate instrument performance. Sign offs by the TFBP project engineer (or alternate) should be incorporated in the Experiment Operating procedure corresponding to these check lists."	
24	23	Para. 4	2nd sentence "to ensure ... at 750K." will read "to ensure... incidental CHF, a minimum of 8 cladding thermocouples (0.68 m elevation) will be attached to a reactor scram circuit set to activate at 750 K with a delay time of about 2 seconds to preclude shutdown as a result of noise signals."	
25	24	Para. 1	Final sentence "Following the ... the test begins." Will read "Following preconditioning, the reactor will be shut down to remove the scram actuation from the cladding surface thermocouples."	
26	35	Para. 2	Delete paragraph "An on-line ... Data Section."	
27	35	Para. 3	Insert sentence between 2nd and 3rd sentences to read "Thermocouple readings will be taken at the outlet of the respective reference junctions."	

JUSTIFICATION

22 - EDR will not be published for PCM-7.

23 - New requirement.

24 - Only 8 positions currently available.

25 - Required to remove scram circuitry.

26 - Not required.

27 - Will provide meaningful comparison with DARS.

DOCUMENT REVISION REQUEST

(CONTINUATION SHEET)

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28	36	4.2.1	First sentence "within 48 hours" is changed to "as soon as practical."	
29	46	Para. 1	"The check lists ... operating procedure." will read "The check lists provided in this appendix will be used by TFBP personnel to evaluate instrument performance during Test PCM-7."	
30	48-62	Check lists 2-6	Delete references to hot and cold leg RTDs.	

JUSTIFICATION

28 - 48 hour requirement may not be realistic.

29 - Not required in DOP.

30 - Hot and cold leg spool piece RTDs not installed for PCM-7.

Item 7

Page 26, Paragraph 1

Following the two DNB scoping flow reductions, the shroud coolant flowrate will be adjusted to 97% of the minimum observed to initiate film boiling during the scoping reductions, and the test rod power increased from 30 kW/m to 57 kW/m at a rate of 5 kW/m per minute. If no film boiling indication has been observed after five minutes at constant conditions, the test rod power will be reduced to 30 kW/m, the flowrate reduced by 3%, and the test rod power again increased to 57 kW/m at a rate of 5 kW/m per minute. This procedure will be continued until the first indication of film boiling in the cluster is observed. The test conditions will be held constant for two minutes after the first indication of film boiling to allow evaluation of film boiling propagation within the cluster. If the center rod measurements do not indicate film boiling, the coolant flow will be reduced 3% and the test conditions held constant for two minutes. Additional flow reductions (3%) followed by two minute hold periods may be required to induce film boiling on the central fuel rod. Test conditions will be held constant after establishing film boiling conditions on the center fuel rod for three minutes following indication of failure of any fuel rod. If rod failure is detected prior to establishing film boiling on the center rod, the flow will be reduced sufficiently to induce film boiling on the center rod and held constant for three minutes. The specified test operation will allow evaluation of film boiling and fuel rod failure propagation.

Item 8

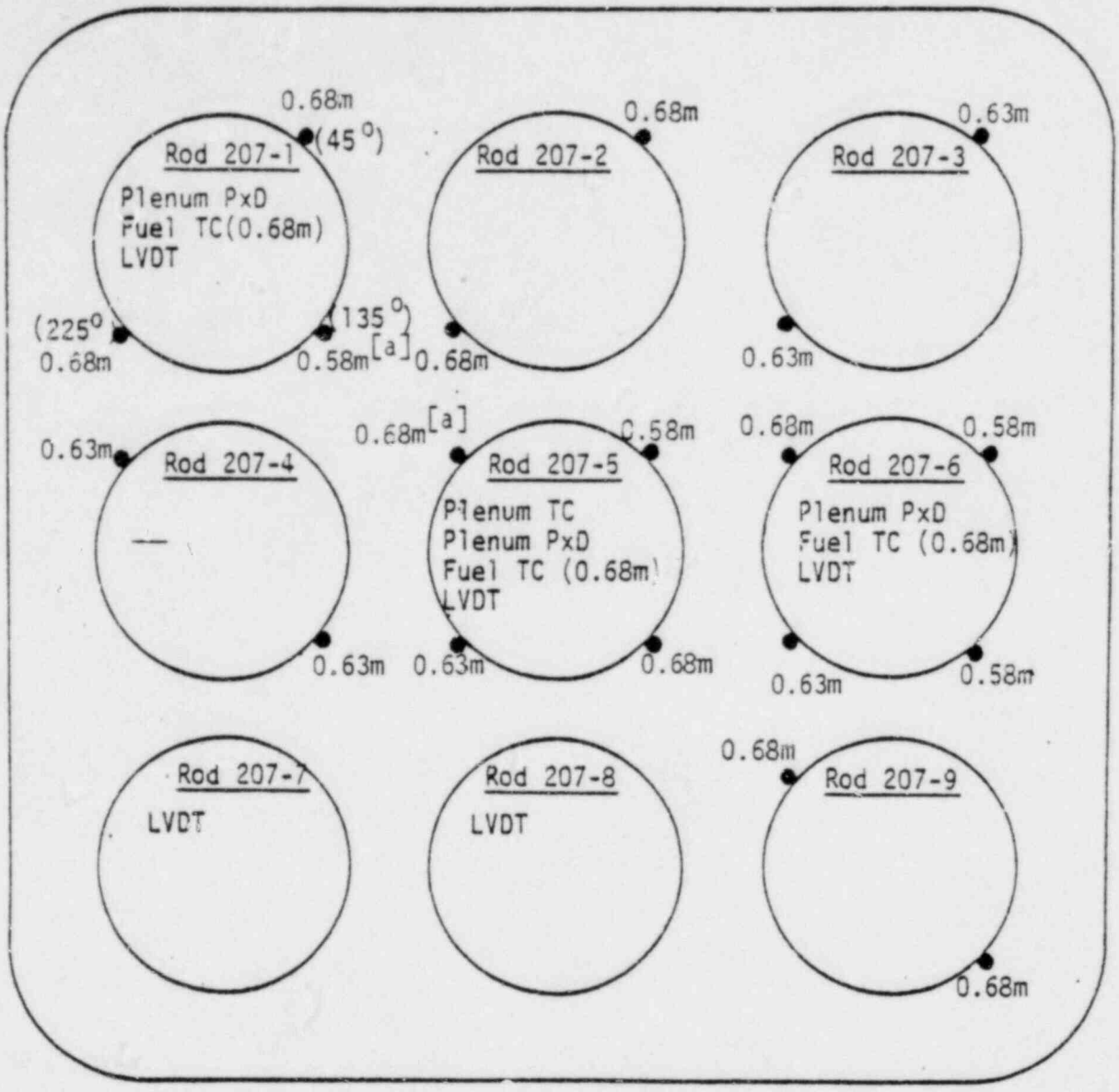
Page 26, Paragraph 2

Following film boiling operation, the coolant flowrate will be increased in small increments until rewet of all fuel rods is obtained, or the shroud coolant flowrate exceeds 4.5 ℓ/s. During the flow increases, the inlet temperature and test rod power will be held constant. Flowrate increases of 3 to 5% followed by a 10 to 15 second hold are required for the rewet sequence. If rewet has not been achieved on all fuel rods at the 4.5 ℓ/s flowrate limit, the power will be reduced until rewet is attained. The reactor will then be scrammed to terminate nuclear operations.

Item 2

Page 6, Paragraph 1

(*) Rods 207-5 and 207-6 will each have four cladding surface thermocouples located circumferentially and axially as shown in Figure 1. Rod 207-1 will have three thermocouples located as shown on Figure 1. Rods 207-2, 207-3, 207-4 and 207-9 will each have two thermocouples located as shown on Figure 1. Sixteen of the cladding thermocouples are 1.17 mm outside diameter (spaded junction), titanium sheathed, platinum-rhodium (Type S) thermocouples. The other three will be small diameter (0.71 mm OD) thermocouples, one on Rod 207-1 and two on Rod 207-5. These cladding thermocouples are zircaloy sheathed, BeO insulated, W5%Re/W26%Re wires.



[a] Indicates location of the small diameter (0.71 mm) thermocouples

Fig. 1 Schematic of Test PCM-7 nine-rod cluster, showing the locations of the fuel rod instrumentation with respect to the bottom of the fuel stack.

TABLE IX

TEST PCM-7 INSTRUMENT IDENTIFICATION, DATA CHANNEL RECORDING AND DISPLAY REQUIREMENTS

Instrument Group	Measurement	Instrument	Location[a]	PBF/DARS Identifier		Recording Ranges	Frequency Response Required: Narrow Band	Frequency Response Required: PBF/DARS	Data Recorded on Strip Chart
Fuel Rod 207-1	Fuel Rod Elongation	LVDT	Upper End of Rod	CLAD DSP	01	-5 to 25 mm	100 Hz	Yes	Yes
	Fuel Rod Pressure	Kaman 17 MPa PXD	Fuel Rod Plenum	ROD PRES	01	0 to 17 MPa	100 Hz	Yes	
	Fuel Centerline Temp.	W 5% Re/W 26% Re TC	Fuel C_L 0.68 m	FUEL TMP	000-68 1	300 to 3500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	045° - 0.68 m	CLAD TMP	045-68 1	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	W 5% Re/W 26% Re TC	135° - 0.58 m	CLAD TMP	135-5851	300 to 2500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	Type S TC	225° - 0.68 m	CLAD TMP	225-68 1	300 to 2500 K	10 Hz	Yes	Yes
Fuel Rod 207-2	Cladding Surface Temp.	Type S TC	045° - 0.68 m	CLAD TMP	045-63 3	300 to 2500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	Type S TC	225° - 0.68 m	CLAD TMP	225-63 2	300 to 2500 K	10 Hz	Yes	Yes
Fuel Rod 207-3	Cladding Surface Temp.	Type S TC	045° - 0.63 m	CLAD TMP	045-63 3	300 to 2500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	Type S TC	225° - 0.63 m	CLAD TMP	225-63 3	300 to 2500 K	10 Hz	Yes	Yes
Fuel Rod 207-4	Cladding Surface Temp.	Type S TC	135° - 0.63 m	CLAD TMP	135-63 4	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	315° - 0.63 m	CLAD TMP	315-63 4	300 to 2500 K	10 Hz	Yes	Yes
Fuel Rod 207-5	Fuel Rod Elongation	LVDT	Upper End of Rod	CLAD DSP	05	-5 to 25 mm	100 Hz	Yes	Yes
	Fuel Rod Pressure	KAMAN 17 MPa PXD	Fuel Rod Plenum	ROD PRES	05	0 to 17 MPa	100 Hz	Yes	Yes
	Plenum Temperature	W5% RE/W 26% Re	Fuel Rod Plenum	PLNM TMP	05	300 to 1000 K	10 Hz	Yes	
	Fuel Centerline Temp.	W 5% Re/W 26% Re TC	Fuel C_L 0.68 m	FUEL TMP	000-68 5	300 to 3500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	W5%Re/W 26% Re TC	045° - 0.58 m	CLAD TMP	045-58 5	300 to 2500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	Type S TC	135° - 0.68 m	CLAD TMP	135-6855	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	W 5% Re/W 26% Re TC	225° - 0.63 m	CLAD TMP	225-63 5	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	315° - 0.68 m	CLAD TMP	315-6855	300 to 2500 K	10 Hz	Yes	
Fuel Rod 207-6	Fuel Rod Elongation	LVDT	Upper End of Rod	CLAD DSP	06	-5 to 25 mm	100 Hz	Yes	Yes
	Fuel Rod Pressure	KAMAN 17 MPa PXD	Fuel Rod Plenum	ROD PRES	06	0 to 17 MPa	100 Hz	Yes	
	Fuel Centerline Temp.	W5% Re/W 26% Re	Fuel C_L 0.68 m	FUEL TMP	000-68 6	300 to 3500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	045° - 0.58 m	CLAD TMP	045-5856	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	135° - 0.58 m	CLAD TMP	135-5856	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	225° - 0.63 m	CLAD TMP	225-63 6	300 to 2500 K	10 Hz	Yes	
	Cladding Surface Temp.	Type S TC	315° - 0.68m	CLAD TMP	315-68 6	300 to 2500 K	10 Hz	Yes	
Fuel Rod 207-7	Fuel Rod Elongation	LVDT	Upper End of Rod	CLAD DSP	07	-5 to 25 mm	100 Hz	Yes	Yes
Fuel Rod 207-8	Fuel Rod Elongation	LVDT	Upper End of Rod	CLAD DSP	08	-5 to 25 mm	100 Hz	Yes	Yes
Fuel Rod 207-9	Cladding Surface Temp.	Type S TC	135° - 0 m	CLAD TMP	135-68 4	300 to 2500 K	10 Hz	Yes	Yes
	Cladding Surface Temp.	Type S TC	315° - 0.68 m	CLAD TMP	315-68 4	300 to 2500 K	10 Hz	Yes	Yes

TABLE IX (continued)

Instrument Group	Measurement	Instrument	Location[a]	PBF/DARS Identifier	Recording Ranges	Frequency Response Required: Narrow Band	Frequency Response Required: PBF/DARS	Data Recorded on Strip Chart
Test Train	Coolant Pressure	EG&G 17 MPa PXD	Lower Test Assembly	SYS PRES LO-17 01	0 to 17 MPa	100 Hz	Yes	Yes
	Coolant Pressure	EG&G 69 MPa PXD	Upper Test Assembly	SYS PRES HI-69 02	0 to 69 MPa	100 Hz	Yes	
	Coolant Inlet Temperature	Type K TC	Flow Shroud Inlet	INLET TMP 0001	300 to 900 K	10 Hz	Yes	Yes
	Coolant Inlet Temperature	Type K TC	Flow Shroud Inlet	INLET TMP 0002	300 to 900 K	10 Hz	Yes	
	Coolant Outlet Temperature	Type K TC	Flow Shroud Outlet	OUT TMP 0001	300 to 900 K	10 Hz	Yes	
	Coolant Outlet Temperature	Type K TC	Flow Shroud Outlet	OUT TMP 0002	300 to 900 K	10 Hz	Yes	
	Shroud Pressure Drop	ΔP PXD	Shroud Inlet and Outlet	SHRD DEL PRS	0 to 79 KPa	10 Hz	Yes	
	Shroud Coolant Temp. Rise	Type T ΔT TC	Top & Bottom Fuel Shroud	DEL TMP SHR 0001	0 to 35 K	10 Hz	Yes	
	Shroud Coolant Temp. Rise	Type T ΔT TC	Top & Bottom Fuel Shroud	DEL TMP SHR 0002	0 to 35 K	10 Hz	Yes	
	Shroud Coolant Temp. Rise	Type T ΔT TC	Top & Bottom Fuel Shroud	DEL TMP SHR 0003	0 to 35 K	10 Hz	Yes	Yes
	Shroud Coolant Temp. Rise	Type T ΔT TC	Top & Bottom Fuel Shroud	DEL TMP SHR 0004	0 to 35 K	10 Hz	Yes	
	Recombined Coolant Temp. Rise	Type T ΔT TC	Top & Bottom of Assembly	DEL TMP ASM 0005	0 to 25 K	10 Hz	Yes	Yes
	Recombined Coolant Temp. Rise	Type T ΔT TC	Top & Bottom of Assembly	DEL TMP ASM 0006	0 to 25 K	10 Hz	Yes	
	Recombined Coolant Temp. Rise	Type T ΔT TC	Top & Bottom of Assembly	DEL TMP ASM 0007	0 to 25 K	10 Hz	Yes	
	Recombined Coolant Temp. Rise	Type T ΔT TC	Top & Bottom of Assembly	DEL TMP ASM 0008	0 to 25 K	10 Hz	Yes	
	Coolant Flow, IPT	Flow Turbine	Inlet Spool Piece	IC FLOW IN IC-01	0 to 15 l/s	100 Hz	Yes	Yes
	Coolant Flow, Assembly	Flow Turbine	Upper Test Train	ASSEM FLOW IPT-02	0 to 15 l/s	100 Hz	Yes	
	Coolant Flow, Shroud	Flow Turbine	Lower Shroud Extention	FLOWRATE LO 01	0 to 5 l/s	100 Hz	Yes	
	Coolant Flow, Shroud	Flow Turbine	Lower Shroud Extention	FLOWRATE UP 02	0 to 5 l/s	100 Hz	Yes	Yes
	Neutron Flux No. 1[b]	SPND	Shroud, 90° - 0.152 m	NEUT FLX 090-01	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux NO. 2	SPND	Shroud, 90° - 0.304 m	NEUT FLX 090-02	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 3	SPND	Shroud, 90° - 0.457 m	NEUT FLX 090-03	0.1 to 150 nA	10 Hz	Yes	Yes
	Neutron Flux No. 4	SPND	Shroud, 90° - 0.610 m	NEUT FLX 090-04	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 5	SPND	Shroud, 90° - 0.762 m	NEUT FLX 090-05	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 6	SPND	Shroud, 270° - 0.152 m	NEUT FLX 270-06	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 7	SPND	Shroud, 270° - 0.304 m	NEUT FLX 270-07	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 8	SPND	Shroud, 270° - 0.457 m	NEUT FLX 270-08	0.1 to 150 nA	10 Hz	Yes	Yes
	Neutron Flux No. 9	SPND	Shroud, 270° - 0.610 m	NEUT FLX 270-09	0.1 to 150 nA	10 Hz	Yes	
	Neutron Flux No. 10	SPND	Shroud, 270° - 0.762 m	NEUT FLX 270-10	0.1 to 150 nA	10 Hz	Yes	
Fission Product Detection System	Gross Gamma Rate	Gamma Detector	FPDS	FPGAMMA FPG01	10 to 10^6 cts/s	100 Hz	Yes	Yes
	Gross Gamma Rate	Gamma Detector	FPDS	FPGAMMA FPG02	10 to 10^6 cts/s	100 Hz	Yes	
	Gross Gamma Rate	Gamma Detector	FPDS	FPGAMMA FPG03	10 to 10^6 cts/s	100 Hz	Yes	
	Gross Neutron Rate	Neutron Detector	FPDS	FPNEUT FPN04	10 to 10^6 cts/s	100 Hz	Yes	Yes
	FPDS Sample Temp.	Type K TC	FPDS	FPTEMP FPT01	300 to 700 K	100 Hz	Yes	
	FPDS Flow Rate	Turbine Flowmeter	FPDS	FPFLOW FPF01	0 to 63 cm^3/s	100 Hz	Yes	
	FPDS Flow Rate	Turbine Flowmeter	FPDS	FPFLOW FPF02	0 to 63 cm^3/s	100 Hz	Yes	
Plant	IPT Delta Pressure	ΔP PXD	Plant	IPT DELP PT01	0 to 2.0 MPa	100 Hz	Yes	
	System Pressure	PXD	Plant	SYS PRES PT02	0 to 17 MPa	100 Hz	Yes	
	Loop Flow	Venturi	Plant	LOOP FLOW PT03	0 to 62 l/s	10 Hz	Yes	
	Coolant Temperature	RTD	Inlet Spool Piece	IC TMP INLET IC03	300 to 900 K	10 Hz	Yes	
	Core Power	Ion Chamber	Plant	REAC POW PPS1	0 to 30 MW	10 Hz	Yes	
	Core Power	Ion Chamber	Plant	REAC POW PPS2	0 to 30 MW	10 Hz	Yes	
	Core Power	Ion Chamber	Plant	REAC POW NMS 02 PT	0 to 30 MW	10 Hz	Yes	
	Core Power	Ion Chamber	Plant	REAC POW NMS 03 PT	0 to 30 MW	10 Hz	Yes	
	Core Power	Ion Chamber	Plant	REAC POW NMS 04 PT	0 to 30 MW	10 Hz	Yes	

a. All elevations measured from bottom of fuel stack.
b. SPND's will require channels for gamma compensation and polarity.

TABLE X

PLOTS FOR PCM-7 QUICK LOOK REPORT

Plot	Vertical Axis Parameter	Vertical Axis Range	Horizontal Axis Parameter	Horizontal Axis Range/Units	Page Orientation[b]	Test Phase Covered
1.	Rod Elevation	0 to 1.0 m	NEUT FLX 090 03 NEUT FLX 270 08	0 - 100 nA @ 5, 10, 15 & 20 MW	Vertical	Power Calibration
2.	Reactor Power	0 to 25 MW	Time	Minutes[a]	Horizontal	DNB
	Average Test Rod Power	0 to 60 kW/m	Time	Minutes		
3.	CLAD DSP 01	-2 to 10 mm	Time	Minutes	Horizontal	DNB
	CLAD DSP 05	-2 to 10 mm				
	CLAD DSP 06	-2 to 10 mm				
	CLAD DSP 07	-2 to 10 mm				
	CLAD DSP 08	-2 to 10 mm				
4.	Average Test Rod Power	500 to 60 kW/m	Time	Minutes	Horizontal	DNB
	FUEL TMP 000-68 1	500 to 3500 K				
	FUEL TMP 000-68 5	500 to 3500 K				
	FUEL TMP 000-68 6	500 to 3500 K				
5.	CLAD TMP 045-68 1	500 to 2000 K	Time	Minute	Horizontal	DNB
	CLAD TMP 135-58S1	500 to 2000 K				
	CLAD TMP 225-68 1	500 to 2000 K				
6.	CLAD TMP 045-68 2	500 to 2000 K	Time	Minute	Horizontal	DNB
	CLAD TMP 225-68 2	500 to 2000 K				
	CLAD TMP 135-68 9	500 to 2000 K				
	CLAD TMP 315-68 9	500 to 2000 K				
7.	CLAD TMP 045-63 3	500 to 2000 K	Time	Minute	Horizontal	DNB
	CLAD TMP 225-63 3	500 to 2000 K				
	CLAD TMP 135-63 4	500 to 2000 K				
	CLAD TMP 315-63 4	500 to 2000 K				

TABLE X (continued)

Plot	Vertical Axis Parameter	Vertical Axis Range	Horizontal Axis Parameter	Horizontal Axis Range/Units	Page Orientation	Test Phase Covered
8.	CLAD TMP 045-58 5	500 to 2000 K	Time	Minute	Horizontal	DNB
	CLAD TMP 135-6855	500 to 2000 K				
	CLAD TMP 225-63 5	500 to 2000 K				
	CLAD TMP 315-6855	500 to 2000 K				
9.	CLAD TMP 045-58	500 to 2000 K	Time	Minute	Horizontal	DNB
	CLAD TMP 135-58	500 to 2000 K				
	CLAD TMP 225-63	500 to 2000 K				
	CLAD TMP 315-68	500 to 2000 K				
10.	FUEL TMP 000-68 5	500 to 3500 K	Time	Minutes	Horizontal	DNB
	FRAP-T4 Fuel TMP (0.68 m)	500 to 3500 K				
11.	Average Test Rod Power	0 to 60 kW/m	Time	Minutes	Horizontal	DNB
	ROD PRES 01	0 to 20 MPa				
	ROD PRES 05	0 to 20 MPa				
	ROD PRES 06	0 to 20 MPa				
12.	CLAD TMP 135-6855	500 to 2000 K	Time	Minutes	Horizontal	DNB
	CLAD TMP 315-6855	500 to 2000 K				
	FRAP-T4 CLAD TMP (0.68 m)	500 to 2000 K				
13.	CLAD TMP 135-6855	500 to 2000 K	Time	Minutes	Horizontal	DNB
	CLAD TMP 315-6855	500 to 2000 K				
	CLAD TMP 315-6856	500 to 2000 K				
14.	CLAD DSP 05	-2 to 10 mm	Time	Minutes	Horizontal	DNB
	FRAP-T4 CLAD DSP 05	-2 to 10 mm				
	Average Test Rod Power	0 to 60 kW/m				

TABLE X (continued)

Plot	Vertical Axis Parameter	Vertical Axis Range	Horizontal Axis Parameter	Horizontal Axis Range/Units	Page Orientation	Test Phase Covered
15.	SYS PRES LO-17 1	10 to 20 MPa	Time	Minutes	Horizontal	DNB
	INLT TMP 0001	500 to 700 K				
	OUT TMP 0002	500 to 700 K				
	IC FLOW IN IC-01	0 to 15 l/s				
16.	INLT TMP 0001	500 to 700 K	Time	Minutes	Horizontal	DNB
	INLT TMP 0002	500 to 700 K				
	FLOWRATE LO 01	0 to 5 l/s				
	FLOWRATE UP 02	0 to 5 l/s				
17.	IC FLOW IN IC-01	0 to 15 l/s	Time	Minutes	Horizontal	DNB
	ASM FLOW IPT 02	0 to 15 l/s				
	Average Test Rod Power	0 to 60 kW/m				
18.	CLAD TMP 045-68 1	500 to 2000 K	Time	Minutes	Horizontal	DNB
	CLAD TMP 225-68 1	500 to 2000 K				
	CLAD TMP 135-68 9	500 to 2000 K				
	CLAD TMP 315-68 9	500 to 2000 K				
19.	Average Test Rod Power	0 to 60 kW/m	Time	Minutes	Horizontal	DNB
	FPGAMMA FPG 01					
	FPGAMMA FPG 02					
	FPGAMMA FPG 03					
	FP NEUT FPN04					
20.	CLAD DSP 01	-2 to 10 mm	Time	Minutes	Horizontal	DNB
	ROD PRES 01	0 to 20 MPa				
	CLAD TMP 045-68 1	500 to 2000 K				
	CLAD TMP 225-68 1	500 to 2000 K				
	FUEL TMP 000-68 1	500 to 3500 K				

TABLE X (continued)

Plot	Vertical Axis Parameter	Vertical Axis Range	Horizontal Axis Parameter	Horizontal Axis Range/Units	Page Orientation	Test Phase Covered
21.	CLAD DSP 05	-2 to 10 mm	Time	Minutes	Horizontal	DNB
	ROD PRES 05	0 to 20 MPa				
	CLAD TMP 135-6855	500 to 2000 K				
	CLAD TMP 315-6855	500 to 2000 K				
	FUEL TMP 000-68 5	500 to 3500 K				
22.	CLAD DSP 06	-2 to 10 mm	Time	Minutes	Horizontal	DNB
	ROD PRES 06	0 to 20 MPa				
	CLAD TMP 315-68 6	500 to 2000 K				
	CLAD TMP 225-63 6	500 to 2000 K				
	FUEL TMP 000-68 6	500 to 3500 K				
23.	CLAD TMP 135-5851	500 to 2000 K	Time	Minutes	Horizontal	DNB
	CLAD TMP 045-5865	500 to 2000 K				
	CLAD TMP 045-58 6	500 to 2000 K				
	CLAD TMP 135-58 6	500 to 2000 K				
24.	CLAD TMP 045-63 3	500 to 2000 K	Time	Minutes	Horizontal	DNB
	CLAD TMP 225-63 3	500 to 2000 K				
	CLAD TMP 135-63 4	500 to 2000 K				
	CLAD TMP 315-63 4	500 to 2000 K				
	CLAD TMP 225-63 5	500 to 2000 K				
	CLAD TMP 225-63 6	500 to 2000 K				
25.	NEUT FLX 090 03	0 to 150 na	Test Rod Power	0 to 60 kW/m	Horizontal	Power Cal and Preconditioning
	NEUT FLX 270 08	0 to 150 na				
26.	INLT TMP 001	500 to 650 K	Time	Hours	Horizontal	Entire Test
	FLOWRATE 0 01	0 to 5 l/s				
	TEST ROD PEAK POWER	0 to 60 kW/m				
	REACTOR POWER	0 to 25 MW				

a. Zero time should coincide with the initial indication of DNB.
b. Plots are to be full-page, oriented vertically or horizontally.