

THE BABCOCK & WILCOX COMPANY
POWER GENERATION GROUP

To |
G. A. MEYER, MANAGER, T-H ENGINEERING UNIT

5
THE-79-171

From |
J. A. WEIMER, T-H ENGINEERING UNIT, EXT. 3136

805 663.5

Cust. |

File No.
or Ref.

Subj. |
RESPONSE TO THERMOCOUPLE REQUEST

Date
APRIL 5, 1979

This letter is copy and customer and the subject only.

Past experience with thermocouples show two basic things. First, they track fairly steady when core condition are not changing (ie. 100% steady state conditions). Secondly, they respond to local changes relatively accurate. A one to two degree change in thermocouple reading has occurred many times without any obvious core change (or local change) conditions. Greater deltas than 2°F usually indicate another measurable local or core change.

The two mechanisms for thermocouple changes are obviously power distribution or flow distribution. A few random local changes are usually due to local power changes. A large area group change indicate flow redistribution.

Assuming local flow blockages (in the center of the core a decrease in thermocouple reading would occur if and when the blockage was decreased and if the "hot" conditions were due to local heat sources (ie. fuel pellets) the temperature would decrease as the source burned out. Furthermore, as blockage decreases in one region of the core the outlet flow distribution would tend to flatten causing temperature increases in other portions of the core.

JAW/sgb

- cc: J. S. Tulenko
- FE Unit Managers
- J. F. Burrow

7907260546

549175

HP

DISTRIBUTION

Letter item 143

C. T. ROMBOUGH (X 3748)

FILE NO. OR REF

REASON FOR INCREASING
I/C THERMOCOUPLE READINGS

DATE
4/5/79 10:30 AM

DISTRIBUTION

J. T. MAYER G. A. Moyer

T. L. WILSON

E. T. CHULICK

R. N. KUBIK

Don Roy has requested a detailed response from B+W as to the reason for an increase in thermocouple readings seen in certain locations at TME-2. Attached is the data that has been gathered so far regarding the problem. Please review this data as quickly as possible and provide a response to me by 1 PM today. I have additional data at my desk if you feel you need it. Thank you for your help.

C. T. Romough

POOR ORIGINAL

549176

POWER GENERATION GROUP	
To	D. H. ROY
	ADS 662.5
Dust.	File No. or Ref.
Subj.	Date
REQUEST FOR B&W'S VIEW OF INCREASING INCORE THERMOCOUPLE READINGS	APRIL 5, 1979


This letter is cover and customer and not subject only.

NOTES TO ANSWER TO BILL LOWE'S REQUEST TO D. H. ROY AT 0735 ON APRIL 4 REGARDING B&W'S IDEAS AND OUR CONCERNS REGARDING SOME THERMOCOUPLES SLOWLY INCREASING IN TEMPERATURE

The responses provided is inadequate for transmission to GPU. We should take the following steps:

- (1) Report the increases as we see them in the data - assembly location, temperature change per unit time over some time interval.
- (2) Provide the uncertainty value which we would assign for these locations.
- (3) Have our radiochemists get in touch with expert fuel material people to determine if there are any break away chemical reactions or any other explanation which might be provided to explain the temperature behavior which is observed.

It is not necessary to state that we will continue to monitor thermocouple changes and report them promptly as GPU is also tracking them routinely.


D. H. Roy 0635

DHR:dmd

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Telecon from Bill Lowe to D. H. Roy
at 0735

April 4, 1979

Telecon from Bill Lowe at 0735 informed us that over the past 36 hours some trace in thermocouple readings have been observed, it varies from assembly to assembly with some going up by as much as 9°F. The absolute temperature still is o.k. but they do not like the trend. It could be associated with changes in coolant temperature and or pressurizer level.

He requested that we consider various possibilities for this behavior including a break away chemical reaction. We told him that our data for thermocouple readings at the 0523 hour measurement was just coming in, we will take action to determine whether there is a chemical reaction which can account for this and try to correlate with changes in the state of the reactor.

Signed D. H. Roy

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FROM

FILE NO OR REF

SUBJ

DATE

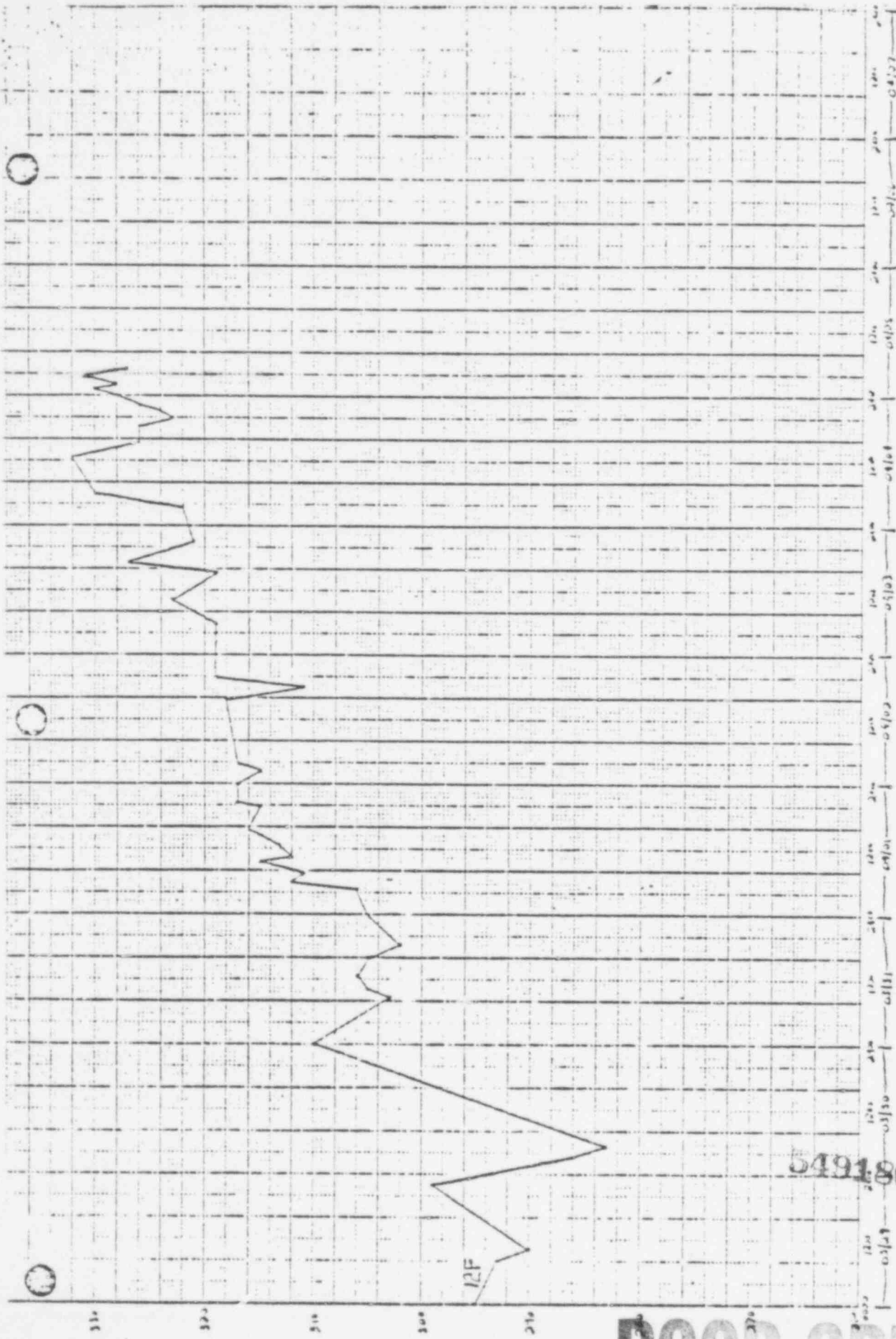
The following detectors have shown a steady increase in temperature from 0900, 3/31 to 0500, 4/5 (116 hours)

LOCATION	T/C at 0900, 3/31	T/C at 0500 4/5	Net increase (°F)
12F	303	327	24
11G	427	445	18
13H	310	320	10
11L	302	335	33
13F	298	307	9
13C	290	297	7

Attached is a map of T/C changes for 30 locations between 0900, 3/31 + 0500, 4/5. Also attached is a graph of the behavior of location 12F.

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12F

67 1320

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Change in T/C reading from 0900, 3/31 to 0500, 4/5

SPND STRING NUMBERS AND LOCATIONS - 177 FA CORE

X STRING NO.

				31	30									
				+2										
				32			24	23					32	
							-1						+7	
				33				27						31
								-53						
			34		7		5		26					
					-47		-37		-6					
		35			6	4				24	22			
					-20	-18				+24	+9			
	36		9	8			3		25		22			
	+2		-8	-6			-45		+18		+1			
2			10			1	2				21			
			0			-302	-1				+10			
			11						19	20				
									-59					
	38	39			12				18		50			
									+33					
		40			13		16	17						49
							-20	-3						+3
			41			14	15							
						-30								
			42	43					47		48			
											549181			
					44									
					0									
						45	46							

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2 3 4 5 6 7 8 9 10 11 12 13 14 15

Evaluate fuel pin contact with Incore thermal couples

The evaluation was performed assuming all the pellets from one grid span are evenly distributed across the upstream grid. Average temperature of the UO_2 mass is $\sim 1500^{\circ}F$. Enough heat is generated to produce boiling in the annulus between the instrument string and the guide tube and possibly some superheat. Heat would be transferred to the instrument string which could be transferred axially by conduction to the thermal couple. This would produce a T-C reading higher than the surrounding coolant. This indicates that it is possible that a conglomerate of pellets with the proper size and location could produce T-C readings in the range of temperatures which are being recorded ($100-600^{\circ}F$ above coolant temperature).

C. D. Morgan

M. Montgomery *M. Montgomery*

G. A. Meyer *G. A. Meyer*

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549183