

ATTACHMENT # 4

DATA BASE DESCRIPTION
FOR THE
QUALIFIED SAFETY PARAMETER DISPLAY SYSTEM
FOR
TURKEY POINT, UNITS 3 & 4

QA Status: Verified

The safety related design information contained in this document has been reviewed and satisfies (where applicable) the items contained on check-list(s) 2, and 1 of the Quality Assurance of Design Manual. This review is so certified.

Independent Reviewer *Sam M. Miller*

DATA BASE DESCRIPTION NUMBER 16081-ICE-3219, REVISION 00

Nuclear Power Systems
COMBUSTION ENGINEERING, INC.
Windsor, Connecticut

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Page 1 of 28



RECORD OF REVISIONS

NO.	DATE	PAGES INVOLVED	PREPARED BY	INDEPENDENTLY REVIEWED BY	APPROVALS
00	1-13-83	All	E.W.Starkweather	B.L. Mathies	K.R. Rohde J.L. Pucak



ABSTRACT

This document describes the data base for the Qualified Safety Parameter Display System for Turkey Point, Units 3 & 4. This document has been quality assured according to the QADP, Revision 16.

NOTES

- (1) The input range is from a Type K (chromel-alumel) thermocouple. Signal values are obtained from Reference 5.

References:

- 1) A. W. Wilk, letter V-362 to T. P. Gates, November 12, 1982.
- 2) A. W. Wilk, letter V-333 to T. P. Gates, (File F 22056) August 11, 1982.
- 3) A. W. Wilk, letter V-341 to T. P. Gates, September 9, 1982.
- 4) B. L. Mathies, "HJTCS Reactor Vessel Level Constants for Turkey Point Units 3 and 4", Recorded Calculation 16081-ICE-36189, Revision 00, September 20, 1982.
- 5) ASTM Special Technical Publication 470, "Manual on the Use of Thermocouples in Temperature Measurement", August 1970.



DATA CONSTANTS
(FOR BOTH CHANNELS UNLESS NOTED)

<u>CONSTANT ID</u>	<u>DESCRIPTION</u>	<u>VALUE</u>	<u>UNITS</u>	<u>REF</u>
CINV ₁ *	Percent liquid inventory for sensor 1	67	%	4
CINV ₂	2	33	%	4
CINV ₃	3	19	%	4
CINV ₄	4	23	%	4
CINV ₅	5	18	%	4
CINV ₆	6	12	%	4
CINV ₇	7	12	%	4
CINV ₈	8	16	%	4
P _m	Maximum power to heaters	100	%	
T _{HB}	Breakpoint heated junction temperature for controllers 1 and 2	1100	°F	
T _{HM}	Minimum heated junction temperature for controllers 1 and 2	1400	°F	
DT _{UB}	Breakpoint differential temperature for controllers 1 and 2	500	°F	
DT _{UM}	Minimum differential temperature for controllers 1 and 2	700	°F	

* Sensors 1-2 in Head; 3-8 in Plenum.



SPDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 7 of 28MANUEL A

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE							SET- POINTS	DBND	REFERENCE
				III LO	ENGINEERING	UNITS	ELECTRICAL	UNITS	DISPLAY	UNITS CONV			
TE-3-413A	THOT 1A	HOT LEG TEMPERATURE		III	750	°F	10	V			≥ 610	3°F	1
		LOOP A		LO	0		0				≤ 540	3°F	
TE-3-423A	THOT 2A	HOT LEG TEMPERATURE		III	750	°F	10	V			≥ 610	3°F	1
		LOOP B		LO	0		0				≤ 540	3°F	
TE-3-433A	THOT 3A	HOT LEG TEMPERATURE		III	750	°F	10	V			≥ 610	3°F	1
		LOOP C		LO	0		0				≤ 540	3°F	
TE-3-410A	TCOLD 1A	COLD LEG TEMP		III	750	°F	10	V			≥ 555	3°F	1
		LOOP A		LO	0		0				≤ 540	3°F	
TE-3-420A	TCOLD 2A	COLD LEG TEMP		III	750	°F	10	V			≥ 555	3°F	1
		LOOP B		LO	0		0				≤ 540	3°F	
TE-3-430A	TCOLD 3A	COLD LEG TEMP		III	750	°F	10	V			≥ 555	3°F	1
		LOOP C		LO	0		0				≤ 540	3°F	
PT-3-404	PRESSA	COOLANT SYSTEM PRESS		III	3000	PSIG	10	V			≥ 2310	30	1
				LO	0		0				≤ 1910	30	



SPDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3 & 4Page 8 of 28CHANNEL A

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE		ELECTRICAL	UNITS	DISPLAY	UNITS CONV	SET- POINTS	DDHD	REFERENCE
				HI	LO							
TE-3-6493A	TH1A	HJTC TEMPERATURE	III	2300	0F	50.99	mV					1
		LEVEL 1 - HEATED	LO	32		0						
TE-3-6493B	TU1A	HJTC TEMPERATURE	III	2300	0F	50.99	mV			2700	50F	1
		LEVEL 1 - UNHEATED	LO	32		0						
TE-3-6494A	TH2A	HJTC TEMPERATURE	III	2300	0F	50.99	mV					1
		LEVEL 2 - HEATED	LO	32		0						
TE-3-6494B	TU2A	HJTC TEMPERATURE	III	2300	0F	50.99	mV			2700	50F	1
		LEVEL 2 - UNHEATED	LO	32		0						
TE-3-6495A	TH3A	HJTC TEMPERATURE	III	2300	0F	50.99	mV					1
		LEVEL 3 - HEATED	LO	32		0						
TE-3-6495B	TU3A	HJTC TEMPERATURE	III	2300	0F	50.99	mV			2700	50F	1
		LEVEL 3 - UNHEATED	LO	32		0						
TE-3-6496A	TH4A	HJTC TEMPERATURE	III	2300	0F	50.99	mV					1
		LEVEL 4 - HEATED	LO	32		0						
TE-3-6496B	TU4A	HJTC TEMPERATURE	III	2300	0F	50.99	mV			2700	50F	1
		LEVEL 4 - UNHEATED	LO	32		0						
TE-3-6497A	TH5A	HJTC TEMPERATURE	III	2300	0F	50.99	mV					1
		LEVEL 5 - HEATED	LO	32		0						
TE-3-6497B	TU5A	HJTC TEMPERATURE	III	2300	0F	50.99	mV			2700	50F	1

5FDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 384

Page 9 of 28

ANIEL A

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16081-ICE - 1219, Rev 00

DCS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3 & 4Page 10 of 28.SHEET A

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE				DISPLAY	UNITS CONV	SET- POINTS	DBHD	REFERENCE
				III LO	ENGINEERING	UNITS	ELECTRICAL	UNITS				
TE-3-1E(T-1)	CET1A A8	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		A-8 (core location)	LO		32		0			≤ 540	50°F	
TE-3-4E(T-4)	CET2A E4	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		E-4	LO		32		0			≤ 540	50°F	
TE-3-5E(T-5)	CET3A E7 (CET3A N11)	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		E-7 (N-11) *	LO		32		0			≤ 540	50°F	
TE-3-11E(T-11)	CET4A F11	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		F-11	LO		32		0			≤ 540	50°F	
TE-3-17E(T-17)	CET5A J10	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		J-10	LO		32		0			≤ 540	50°F	
TE-3-18E(T-18)	CET6A J12	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		J-12	LO		32		0			≤ 540	50°F	
TE-3-21E(T-21)	CET7A K8	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		K-8	LO		32		0			≤ 540	50°F	
TE-3-27E(T-27)	CET8A C8	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		C-8	LO		32		0			≤ 540	50°F	
TE-3-28E(T-28)	CET9A C12	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
		C-12	LO		32		0			≤ 540	50°F	
TE-2-24E(T-24)	CET10A D3	CORE EXIT TEMP	III		2300	°F	50.99	mV		2650	50°F	1, 2, 3
										≤ 540	50°F	



16081-101 - 3219 , Rev 00

PLANT DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 11 of 28INSTRUMENT
AS NUMBER

PID

VARIABLE NAME

SENS
TYPEHI
LO

ENGINEERING

UNITS

ELECTRICAL

UNITS

DISPLAY

UNITS
CONVSFT-
PO TS

DBHD

REFERENCE

TE-3-30E(T-30)

CET11A D5

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

D-5

LO

32

0

2650

50°F

TE-3-32E(T-32)

CET12A E10

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

E-10

LO

32

0

2650

50°F

TE-3-33E(T-33)

CET13A F13

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

F-13

LO

32

0

2650

50°F

TE-3-34E(T-34)

CET14A G2

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

G-2

LO

32

0

2650

50°F

TE-3-35E(T-35)

CET15A G8

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

G-8

LO

32

0

2650

50°F

TE-3-36E(T-36)

CET16A G15

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

G-15

LO

32

0

2650

50°F

TE-3-37E(T-37)

CET17A H3

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

H-3

LO

32

0

2650

50°F

TE-3-38E(T-38)

CET18A H5

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

H-5

LO

32

0

2650

50°F

TE-3-40E(T-40)

CET19A H11

CORE EXIT TEMP

III

2300

°F

50.99

mV

2650

50°F

1, 2, 3

H-11

LO

32

0

2650

50°F

2300

°F

50.99

mV

2650

50°F

1, 2, 3





16081-ICE-3219, Rev 00.

QSPDS DATA BASE: CALCULATED VARIABLES

CHANNEL A

INADEQUATE CORE COOLING INPUTS (continued)

Page 13 of 28

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16081-ICE-3219, Rev 00

QSPDS DATA BASE: CALCULATED VARIABLES

INADEQUATE CORE COOLING INPUTS (continued)
PLANT

Page 14 of 28

CHANNEL A

[illegible]



INADEQUATE CORE COOLING INPUTS (continued)

PLANTPage 15 of 28

QSPDS DATA BASE: CALCULATED VARIABLES

CHANNEL A

[illegible]



QSPDS DATA BASE: CALCULATED VARIABLES

INADEQUATE CORE COOLING INPUTS (continued)

Page 16 of 28

CHANNEL A

[illegible]

INADEQUATE CORE COOLING INPUTS (continued)

Page 17 of 28

A

[illegible]



SPDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 18 of 28CHANNEL B

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE						UNITS CONV	SET- POINTS	DDHD	REFERENCE
				HI LO	ENGINEERING	UNITS	ELECTRICAL	UNITS	DISPLAY				
TE-3-413 B	THOT 1 B	HOT LEG TEMPERATURE		HI	750	°F	10	V			610	3°F	1
		LOOP A		LO	0		0				≤540	3°F	
TE-3-423 B	THOT 2 B	HOT LEG TEMPERATURE		HI	750	°F	10	V			≥610	3°F	1
		LOOP B		LO	0		0				≤540	3°F	
TE-3-433 B	THOT 3 B	HOT LEG TEMPERATURE		HI	750	°F	10	V			≥610	3°F	1
		LOOP C		LO	0		0				≤540		
TE-3-410 B	TCOLD 1 B	COLD LEG TEMP		HI	750	°F	10	V			≥555	3°F	1
		LOOP A		LO	0		0				≤540	3°F	
TE-3-420 B	TCOLD 2 B	COLD LEG TEMP		HI	750	°F	10	V			≥555	3°F	1
		LOOP B		LO	0		0				≤540	3°F	
TE-3-430 B	TCOLD 3 B	COLD LEG TEMP		HI	750	°F	10	V			≥555	3°F	1
		LOOP C		LO	0		0				≤540	3°F	
PT-3-406	PRESS B	COOLANT SYSTEM PRESS		HI	3000	PSIG	10	V			≥2310	30	1
				LO	0		0				≤1910	30	



SPDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 19 of 28CHANNEL B

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE								SET- POINTS	DBND	REFERENCE
				HI LO	ENGINEERING	UNITS	ELECTRICAL	UNITS	DISPLAY	UNITS CONV				
TE-3-6501A	TH1B	HJTC TEMPERATURE		III	2300	°F	50.99	mV						1
		LEVEL 1 - HEATED		LO	32		0							
TE-3-6501B	TU1B	HJTC TEMPERATURE		III	2300	°F	50.99	mV			2700	5°F		1
		LEVEL 1 - UNHEATED		LO	32		0							
TE-3-6502A	TH2B	HJTC TEMPERATURE		III	2300	°F	50.99	mV						1
		LEVEL 2 - HEATED		LO	32		0							
TE-3-6502B	TU2B	HJTC TEMPERATURE		III	2300	°F	50.99	mV			2700	5°F		1
		LEVEL 2 - UNHEATED		LO	32		0							
TE-3-6503A	TH3B	HJTC TEMPERATURE		III	2300	°F	50.99	mV						1
		LEVEL 3 - HEATED		LO	32		0							
TE-3-6503B	TU3B	HJTC TEMPERATURE		III	2300	°F	50.99	mV			2700	5°F		1
		LEVEL 3 - UNHEATED		LO	32		0							
TE-3-6504A	TH4B	HJTC TEMPERATURE		III	2300	°F	50.99	mV						1
		LEVEL 4 - HEATED		LO	32		0							
TE-3-6504B	TU4B	HJTC TEMPERATURE		III	2300	°F	50.99	mV			2700	5°F		1
		LEVEL 4 - UNHEATED		LO	32		0							
TE-3-6505A	TH5B	HJTC TEMPERATURE		III	2300	°F	50.99	mV						1
		LEVEL 5 - HEATED		LO	32		0							
TE-3-6505B	TU5B	HJTC TEMPERATURE		III	2300	°F	50.99	mV			2700	5°F		1
		LEVEL 5 - UNHEATED		LO	32		0							



16081-ICE-3'19, Rev 00

DS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 20 of 28INSTRUMENT
AS NUMBER

PID

VARIABLE NAME

SENS
TYPEIII
LO

ENGINEERING

UNITS

ELECTRICAL

UNITS

DISPLAY

UNITS
CONVSET-
POINT

DBND

REFERENCE

TE-3-6506A

TH6B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

1

LEVEL 6 - HEATED

LO

32

0

TE-3-6506B

TH6B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

2700

5°F

1

LEVEL 6 - UNHEATED

LO

32

0

TE-3-6507A

TH7B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

1

LEVEL 7 - HEATED

LO

32

0

TE-3-6507B

TH7B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

2700

5°F

1

LEVEL 7 - UNHEATED

LO

32

0

TE-3-6508A

TH8B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

1

LEVEL 8 - HEATED

LO

32

0

TE-3-6508B

TH8B

HJTC TEMPERATURE

III

2300

°F

50.99

mV

2700

5°F

1

LEVEL 8 - UNHEATED

LO

32

0



16081-ICE-3219, Rev 00

-DS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3&4Page 21 of 28MODEL B

INSTRUMENT TAG NUMBER	PID	VARIABLE NAME	SENS TYPE	RANGE					UNITS CONV	SET- POINTS	DBND	REFERENCE
				III LO	ENGINEERING	UNITS	ELECTRICAL	UNITS				
TE-3-2E(T-2)	CET1BB5	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		B-5	LO		32		0			≤ 540	50°F	
TE-3-3E(T-3)	CET2BB10	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		B-10	LO		32		0			≤ 540	50°F	
TE-3-6E(T-6)	CET3BE12	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		E-12	LO		32		0			≤ 540	50°F	
TE-3-7E(T-7)	CET4BE14	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		E-14	LO		32		0			≤ 540	50°F	
TE-3-8E(T-8)	CET5BF3	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		F-3	LO		32		0			≤ 540	50°F	
TE-3-9E(T-9)	CET6BF5	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		F-5	LO		32		0			≤ 540	50°F	
TE-3-10E(T-10)	CET7BF9	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		F-9	LO		32		0			≤ 540	50°F	
TE-3-12E(T-12)	CET8BG1	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		G-1	LO		32		0			≤ 540	50°F	
TE-3-13E(T-13)	CET9BG6	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		G-6	LO		32		0			≤ 540	50°F	
TE-3-14E(T-14)	CET10BH8	CORE EXIT TEMP	III	LO	2300	°F	50.99	mV		≥ 650	50°F	1, 2, 3
		H-8	LO		32		0			≤ 540	50°F	



16081-ICE-3219, Rev 00

PDS DATA BASE: ANALOG INPUTS

PLANT TURKEY POINT 3 & 4Page 22 of 28INSTRUMENT
NO. B

INSTRUMENT NO.	PID	VARIABLE NAME	SENS TYPE	RANGE				UNITS CONV	SET- POINTS	DBND	REFERENCE
				III LO	ENGINEERING	UNITS	ELECTRICAL	UNITS	DISPLAY		
TE-3-15E(T-15)	CET11BH15	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		H-15	LO	32		0			≤ 540	5°F	
TE-3-16E(T-16)	CET12BJ2	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		J-2	LO	32		0			≤ 540	5°F	
TE-3-19E(T-19)	CET13BK3	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		K-3	LO	32		0			≤ 540	5°F	
TE-3-20E(T-20)	CET14BK5	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		K-5	LO	32		0			≤ 540	5°F	
TE-3-22E(T-22)	CET15BK11	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		K-11	LO	32		0			≤ 540	5°F	
TE-3-23E(T-23)	CET16BM19	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		M-9	LO	32		0			≤ 540	5°F	
TE-3-24E(T-24)	CET17BN6	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		N-6	LO	32		0			≤ 540	5°F	
TE-3-25E(T-25)	CET18BP8	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		P-8	LO	32		0			≤ 540	5°F	
TE-3-26E(T-26)	CET19BR7	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		R-7	LO	32		0			≤ 540	5°F	
TE-3-31E(T-31)	CET20BE8	CORE EXIT TEMP	III	2300	°F	50.99	mV		≥ 650	5°F	1, 2, 3
		E-8	LO	32		0			≤ 540	5°F	





QSPDS DATA BASE: CALCULATED VARIABLES

INADEQUATE CORE COOLING INPUTS (continued)

PLANT

Page 24 of 28

CHANNEL 8

[illegible]





INADEQUATE CORE COOLING INPUTS (continued)
PLANT

QSPDS DATA BASE: CALCULATED VARIABLES

CHANNEL B

Page 26 of 28

[illegible]



QSPDS DATA BASE: CALCULATED VARIABLES

INADEQUATE CORE COOLING INPUTS (continued)

PLANT

Page 27 of 28

CHANNEL B

[illegible]



16081-ICE-3219, Rev 00

QSPDS DATA BASE: CALCULATED VARIABLES

INADEQUATE CORE COOLING INPUTS (continued)
PLANT

Page 28 of 28

CHANNEL B

[illegible]

