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**PWR Blowdown Heat Transfer
Separate-Effects Program—Thermal-
Hydraulic Test Facility Experimental
Data Report for Test 177**

V. D. Clemons
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**OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

Prepared for the U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
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PWR BLOWDOWN HEAT TRANSFER SEPARATE-EFFECTS PROGRAM — THERMAL-HYDRAULIC TEST FACILITY EXPERIMENTAL DATA REPORT FOR TEST 177

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- 335. TE-185, bundle shroud thermocouple, .633L/LMAX
- 336. EEE-PP, power programmer generator demand voltage
- 337. TE-187, bundle shroud thermocouple, .875L/LMAX
- 338. TE-189, bundle shroud thermocouple, .875L/LMAX
- 339. TE-190, bundle shroud thermocouple, .875L/LMAX
- 340. TE-212, test section outlet line thermocouple
- 341. TE-30B, heat exchanger A outlet thermocouple
- 342. TE-32B, heat exchanger B outlet thermocouple
- 343. TE-34B, heat exchanger C outlet thermocouple
- 344. TE-520B, RBT 4-in. demineralized water header thermocouple
- 345. TE-5B, heat exchanger D outlet thermocouple
- 346. TE-1, pressurizer tank top thermocouple
- 347. TE-2, pressurizer tank exit thermocouple
- 348. TE-29, inlet blowdown plenum thermocouple
- 349. TE-45, outlet blowdown plenum thermocouple
- 350. TE-4B, base primary steady-state thermocouple, RTD
- 351. FE-620, HX B secondary cooling-water flow
- 352. FE-720, HX C secondary cooling-water flow
- 353. FE-550, HX D secondary cooling-water flow
- 354. FE-1A, primary side pump flow
- 355. FE-19, turbine flowmeter, horizontal inlet spool piece
- 356. DE-20, gamma densitometer, horizontal inlet spool piece
- 357. PE-26, transient pressure, horizontal inlet spool piece
- 358. FMFE-22, drag disk, horizontal inlet spool piece
- 359. PDE-21, transient DP, horizontal inlet spool piece

- 360. TE-24, thermocouple, horizontal inlet spool piece
- 361. FE-166, turbine flowmeter, vertical inlet spool piece
- 362. DE-168, gamma densitometer, vertical inlet spool piece
- 363. PDE-204, transient pressure between vertical spool pieces
- 364. FMFE-170, drag disk, vertical inlet spool piece
- 365. PDE-167, transient DP, vertical inlet spool piece
- 366. TE-172, thermocouple, vertical inlet spool piece
- 367. FE-216, turbine flowmeter, vertical outlet spool piece
- 368. DE-218, gamma densitometer, vertical outlet spool piece
- 369. FT-18A, calibrated orifice meter, downstream of HCV-2
- 370. FMFE-220, drag disk, vertical outlet spool piece
- 371. PDE-217, transient DP, vertical outlet spool piece
- 372. TE-222, thermocouple, vertical outlet spool piece
- 373. FE-34, turbine flowmeter, horizontal outlet spool piece
- 374. DE-36, gamma densitometer, horizontal outlet spool piece
- 375. PE-42, transient pressure, horizontal outlet spool piece
- 376. FMFE-38, drag disk, horizontal outlet spool piece
- 377. PDE-35, transient DP, horizontal outlet spool piece
- 378. TE-40, thermocouple, horizontal outlet spool piece
- 379. PE-156, test section inlet plenum transient pressure
- 380. PE-201, test section outlet plenum transient pressure
- 381. PE-44, upstream main HX transient pressure
- 382. PE-76, primary pump section transient pressure
- 383. PT-102, pressurizer steady-state pressure
- 384. PE-106, pressurizer steady-state pressure
- 385. PE-412, pressure suppression receiver, transient pressure
- 386. TE-615, demineralized water 6-in. header steady-state temp.
- 387. PDT-199, test section shroud box steady-state DP
- 388. PDE-200, test bundle transient DP
- 389. TE-627, HX B secondary discharge steady-state temp., RTD
- 390. PDT-48, main HX steady-state DP
- 391. PDE-78, primary pump transient DP
- 392. PE-425, PSS inlet blowdown line transient pressure
- 393. PE-427, PSS outlet blowdown line transient pressure

- 394. TE-727, HX C secondary discharge steady-state temp., RTD
- 395. TE-28B, main HX mixing tee steady-state temp., RTD
- 396. TE-6, heat exchanger D mixing tee temperature
- 397. PDE-46, main HX bypass transient DP
- 398. PE-526, HX A secondary inlet pressure
- 399. PE-16, downstream HCV-2 transient pressure
- 400. PE-27, test section inlet plenum bottom transient pressure
- 401. PE-43, test section outlet plenum bottom transient pressure
- 402. PDT-30, test section steady-state DP
- 403. PT-32, test section outlet steady-state pressure
- 404. SE-72, primary pump speed
- 405. XM-4000I, breakwire detector, inlet break
- 406. XM-4000Ø, breakwire detector, outlet break
- 407. LT-100, steady-state pressurizer liquid level
- 408. FE-522, HX A secondary cooling-water flow
- 409. TE-557, HX D secondary discharge steady-state temp., RTD
- 410. TE-525, HX A secondary discharge steady-state temp., RTD
- 411. TE-210A, test section outlet line steady-state temp., RTD
- 412. EIM-1001B RTD power supply current
- 413. EIM-11S6, rod 1 heater current
- 414. EIE-12S6, rod 2 heater current
- 415. EIE-11S7, rod 3 heater current
- 416. EIE-12S7, rod 4 heater current
- 417. EIE-9S6, rod 5 heater current
- 418. EIE-9S8, rod 6 heater current
- 419. EIE-9S5, rod 7 heater current
- 420. EIE-11S5, rod 8 heater current
- 421. EIE-11S8, rod 9 heater current
- 422. EIE-12S8, rod 10 heater current
- 423. EIE-9S7, rod 11 heater current
- 424. EIE-9S4, rod 12 heater current
- 425. EIE-9S3, rod 13 heater current
- 426. EIE-9S11, rod 14 heater current
- 427. EIE-11S4, rod 15 heater current

- 428. EIE-11S9, rod 16 heater current
- 429. EIE-12S5, rod 17 heater current
- 430. EIE-9S9, rod 18 heater current
- 431. EIE-9S10, rod 19 heater current
- 432. EIE-9S2, rod 20 heater current
- 433. EIE-9S12, rod 21 heater current
- 434. EIE-11S11, rod 22 heater current
- 435. EIE-11S10, rod 23 heater current
- 436. EIE-11S3, rod 24 heater current
- 437. EIE-9S13, rod 25 heater current
- 438. EIE-10S6, rod 26 heater current
- 439. EIE-9S1, rod 27 heater current
- 440. EIE-10S7, rod 28 heater current
- 441. EIE-11S2, rod 29 heater current
- 442. EIE-11S12, rod 30 heater current
- 443. EIE-12S2, rod 31 heater current
- 444. EIE-12S1, rod 32 heater current
- 445. EIE-10S12, rod 33 heater current
- 446. EIE-10S5, rod 34 heater current
- 447. EIE-10S8, rod 35 heater current
- 448. EIE-11S1, rod 36 heater current
- 449. EIE-12S4, rod 37 heater current
- 450. EIE-12S3, rod 38 heater current
- 451. EIE-12S12, rod 39 heater current
- 452. EIE-10S11, rod 40 heater current
- 453. EIE-10S10, rod 41 heater current
- 454. EIE-10S9, rod 42 heater current
- 455. EIE-12S9, rod 43 heater current
- 456. EIE-12S10, rod 44 heater current
- 457. EIE-12S11, rod 45 heater current
- 458. EIE-10S1, rod 46 heater current
- 459. EIE-10S2, rod 47 heater current
- 460. EIE-10S3, rod 48 heater current
- 461. EIE-10S4, rod 49 heater current
- 462. EIE-9, generator 9 current

- 463. EIE-10, generator 10 current
- 464. EIE-11, generator 11 current
- 465. EIE-12, generator 12 current
- 466. EEE-9, generator 9 voltage
- 467. EEE-10, generator 10 voltage
- 468. EEE-11, generator 11 voltage
- 469. EEE-12, generator 12 voltage
- 470. Zero calibration input, channels 0-127
- 471. Zero calibration input, channels 128-255
- 472. Zero calibration input, channels 256-383
- 473. Zero calibration input, channels 384-511
- 474. Full-scale calibration input, channels 0-127
- 475. Full-scale calibration input, channels 128-255
- 476. Full-scale calibration input, channels 256-383
- 477. Full-scale calibration input, channels 384-511
- 478. Spare CCDAS channel
- 479. TE-S3, subchannel 3 thermocouple
- 480. Spare CCDAS channel
- 481. TE-222A, temperature outside wall, vertical outlet
spool piece
- 482. Spare CCDAS channel
- 483. Spare CCDAS channel
- 484. Spare CCDAS channel
- 485. Spare CCDAS channel
- 486. TE-S33, subchannel 33 thermocouple
- 487. TE-S34, subchannel 34 thermocouple
- 488. Spare CCDAS channel
- 489. TE-S38, subchannel 38 thermocouple
- 490. TE-S39, subchannel 39 thermocouple
- 491. TE-S40, subchannel 40 thermocouple
- 492. TE-S41, subchannel 41 thermocouple
- 493. TE-S42, subchannel 42 thermocouple
- 494. Spare CCDAS channel
- 495. TE-S45, subchannel 45 thermocouple
- 496. TE-S49, subchannel 49 thermocouple

- 497. TE-S50, subchannel 50 thermocouple
- 498. TE-S51, subchannel 51 thermocouple
- 499. TE-B1, B/D line thermocouple, 168.5 in. from B/D orifice
- 500. TE-B3, B/D line thermocouple, 132.5 in. from B/D orifice
- 501. TE-S57, subchannel 57 thermocouple
- 502. TE-S59, subchannel 59 thermocouple
- 503. TE-B2, B/D line thermocouple, 150.5 in. from B/D orifice
- 504. Spare CCDAS channel

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PWR BLOWDOWN HEAT TRANSFER SEPARATE-EFFECTS PROGRAM —
THERMAL-HYDRAULIC TEST FACILITY EXPERIMENTAL
DATA REPORT FOR TEST 177

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ABSTRACT

Reduced instrument responses are presented for Thermal-Hydraulic Test Facility (THTF) test 177, which is part of the ORNL Pressurized-Water Reactor (PWR) Blowdown Heat Transfer Separate-Effects Program. The objective of the program is to investigate the thermal-hydraulic phenomenon governing the energy transfer and transport processes that occur during a loss-of-coolant accident in a PWR system.

Test 177 was conducted at the request of Idaho National Engineering Laboratory "for use in the independent assessment of RELAP4/MOD6."¹

The primary purpose of this report is to make the reduced instrument responses during test 177 available. The responses are presented in graphical form in engineering units and have been analyzed only to the extent necessary to assure reasonableness and consistency.

I. INTRODUCTION

The Oak Ridge National Laboratory Pressurized-Water Reactor (ORNL-PWR) Blowdown Heat Transfer Program is a separate-effects study of the relations among the principal variables that can alter the rate of blowdown, the presence of flow reversal and rereversal, the time delay to critical heat flux (CHF), the rate at which dryout progresses, and similar time- and space-related functions that are important in loss-of-coolant accident (LOCA) analyses. Primary test results are obtained from the Thermal Hydraulic Test Facility (THTF), a large nonnuclear pressurized-water loop incorporating a 49-rod electrically heated bundle in a 7 × 7 geometry.

THTF test 177 (conducted September 28, 1978) was the 35th test conducted in the facility with bundle 1 in place. This test was performed

¹C. B. Davis, *Comparison of RELAP4/MOD6 to the THTF Test 177*, CAAP-TR-049, Idaho National Engineering Laboratory (May 1979).

at the request of Idaho National Engineering Laboratory for use in the assessment of RELAP4/MOD6.

The purpose of this report is to provide the reduced instrument responses during test 177 in a readily usable form to the nuclear community in advance of detailed analyses and interpretations. These data are presented on microfiche attached to the back cover of the report. Final analyses and interpretations are scheduled for publication six months after the completion of the test series. The program and the experimental facilities are described in Ref. 2.

II. SYSTEM, PROCEDURES, CONDITIONS, AND EVENTS FOR TEST 177

1. System Configuration and Test Procedure

The Thermal-Hydraulic Test Facility (THTF), shown in Fig. 1, consists of a test section with a 49-rod, 3.66-m-long (12-ft) electrically heated core; a circulation loop comprised of three parallel heat exchangers with bypass, a pressurizer, a pump with bypass, and associated control valves; two rupture assemblies; and a pressure-suppression system. For test 177 the break configuration was a 32% inlet-28% outlet break with a nominal total break area (100%) of 12.54 cm^2 (0.0135 ft^2). The THTF experimental system is described further in Ref. 1.

The electric core was taken to the preblowdown power (82.13 kW/rod) in ~ 20 -kW/rod steps to provide steady-state calibration information. The main heat exchangers were operated to match the core power input. The primary coolant pump was tripped coincident with break initiation; however, the electric core was operated for ~ 13 s into the transient in accordance with a predetermined power program. Rods 19, 24, 39, and 47 were unpowered.

In preparation for the test, the loop was filled with demineralized water and the system pressure checked. Instrumentation and data acquisition checks were performed. During the warmup, data were taken for use in flow and pressure calibrations.

²*Project Description: ORNL-PWR Blowdown Heat Transfer Separate-Effects Program - Thermal-Hydraulic Test Facility (THTF), ORNL/NUREG/TM-2 February 1976).*

Fig. 1. Thermal-Hydraulic Test Facility - MOD 1.

During the test, the THTF was successfully subjected to a double-ended pipe break through the rupture assemblies containing the orifice plates. The effluent from the primary system was injected into the pressure-suppression system, which was maintained at atmospheric pressure.

2. Initial Test Conditions and Sequence of Events

The THTF conditions immediately preceding rupture are given in Tables 1 and 2. The sequence of events relative to the rupture is given in Table 3.

Table 1. Desired vs actual prerupture conditions for test 177

Parameters	Instrument	Desired ^a	Actual ^b
System pressure	PE-201		
MN/m ²		15.444	15.417
psig		2240	2236
Core power, MW	EIE-9, EIE-10, EIE-11, EIE-12, EEE-9, EEE-10, EEE-11, EEE-12	3.696	3.689
Number of unpowered rods		4	4
Core volumetric flow rate	FE-19		
m ³ /s		0.0278	0.0276
gpm		440	438
Test section inlet temperature	TE-162		
K		549.8	549.8
°F		530	530
Test section outlet temperature	TE-212		
K		581.5	581.5
°F		587	587
Pressurizer			
Pressure	PE-106		
MN/m ²		15.162	13.928
psig		2199	2020
Mass liquid water			
kg		54.88	51.70
lb _m		121	114
Coolant pump			
Speed	SE-72		
rps		59.38	59.65
rpm		3563	3579
Pressure differential	P _d E-78		
MN/m ²		4.713	5.302
psid		683.5	769
Pressure between HCV-2 and FCV-18	PE-16		
MN/m ²		17.478	17.340
psig		2535	2515
Pressure differential across main heat exchangers	P _d E-46		
MN/m ²		0.254	0.330
psid		36.8	47.9

^aDesired prerupture conditions are based on programmatic requirements.

^bActual prerupture conditions are based on instrument signals recorded within 10 s of primary system rupture.

Table 2. Prerupture primary-coolant temperature and pressure distribution^a - test 177

Location	Instrument	Temperature [K (°F)]	Pressure [MN/m ² (psig)]
Vertical inlet spool piece	TE-172	550.7 (532)	
Test section inlet	TE-162	549.7 (530)	
Lower plenum	TE-150	551.6 (533)	
Lower plenum	TE-156		15.775 (2288)
Upper plenum	PE-201		15.417 (2236)
Test section outlet	TE-212	581.4 (587)	
Vertical outlet spool piece	TE-222	581.4 (587)	
Pressure differential between vertical spool pieces	PdE-204		0.352 (51.0)
Heat exchanger inlet header	PE-44		15.791 (2290)
Mixed mean temperature downstream heat exchangers	TE-28B	562.0 (522)	
Pressurizer surge line	TE-2	617.4 (652)	
Pressurizer	PE-106		13.928 (2020)
Primary pump section	PE-76		16.468 (2389)
Between main control valves HCV-2, FCV-18	PE-16		17.338 (2515)

^aPrerupture distribution is based on instrument signals recorded within 10 s of primary system rupture.

Table 3. Sequence of events during test 177

Event	Time relative to rupture (s)
Core temperature rise established	-2160
Core power level established	-2460
Analog tapes and CCDAS fast scan started	-20
Blowdown initiated	0
Pump power tripped	0
Core power tripped	+13

III. DATA PRESENTATION

The recorded instrument responses for THTF test 177 have been processed only to the extent necessary to obtain appropriate engineering units and to ensure reasonableness and consistency. In converting the instrument responses to engineering units, a homogeneous fluid has been assumed. Therefore, interpretation or analysis of the data must account for the fact that the instruments may have been subjected to nonhomogeneous fluid conditions during the transient.

The reduced instrument responses presented in this report were recorded by a computer-controlled digital data acquisition system (CCDAS). Further information on this system may be found in Ref. 1.

Figures 2 through 4 provide supportive information for the instrument responses and indicate the relative locations of the detectors in the THTF. Table 4 gives the precision of the recorded instrument responses, and Table 5 groups the measurements by location and provides brief comments regarding the detectors and the recorded responses. Time zero on all graphs is the time of break initiation.

Fig. 2. Identification of THTF heater rod and subchannel locations in bundles 1 and 2.

Fig. 3. Location of thermocouples in THTF bundle 1.

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Fig. 4 (continued)

Table 4. Precision of experimental measurements for test 177

System	Standard deviation ^a
Pressure measurement, MN/m ² (psig)	
CCDAS	0.055 (8.0)
Analog tape system	0.197 (28.5)
Pressure difference measurement, MN/m ² (psid)	
CCDAS	
6.89-MN/m ² (1000-psid) span	0.025 (3.6)
1.38-MN/m ² (200-psid) span	0.005 (0.72)
0.34-MN/m ² (50-psid) span	0.001 (0.18)
Analog tape system	
6.89-MN/m ² (1000-psid) span	0.033 (4.8)
1.38-MN/m ² (200-psid) span	0.007 (0.95)
0.34-MN/m ² (50-psid) span	0.002 (0.24)
Temperature measurement, K (°F)	2.4 (4.3)
Electric core power measurement	
Rod current, A	0.877
Rod voltage, V	0.304
Flow measurement, m ³ /s (gpm)	
FE-19	
Forward	+0.0009 -0.0002 (+13.97) (-2.90)
Reverse	+0.0011 -0.0004 (+16.77) (-5.70)
FE-166	
Forward	+0.0011 -0.0004 (+17.49) (-6.43)
Reverse	+0.0009 -0.0002 (+14.14) (-3.07)
FE-216	
Forward	+0.0008 -0.0001 (-12.88) (-1.81)
Reverse	+0.0009 -0.0002 (+14.46) (-3.39)
FE-34	
Forward	+0.0019 -0.0005 (+30.71) (-8.58)
Reverse	+0.0019 -0.0005 (+29.54) (-7.41)
Momentum flux measurement, kg/m-s ² (lb _m /ft-s ²)	
CCDAS	2264 (1522)
Analog tape system	2554 (1716)
Density measurement @ 961 kg/m ³ (60 lb _m /ft ³), kg/m ³ (lb _m /ft ³)	12.9 (0.81)

^aThe values listed above are conservative. Work currently under way may allow a reduction in these values.

Table 5. Data presentation for test 177

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE	Chromel-Alumel thermocouple	+32 to +1897°F (all)	-0.0027 to +0.0400 V (all)		
<u>Heater Rod Sheath</u>					
LEVEL D					
TE-301AD	Rod 1			5	Instrument failed
TE-304AD	Rod 4			6	
TE-309AD	Rod 9			7	
TE-310AD	Rod 10			8	
TE-312AD	Rod 12			9	Instrument failed
TE-313AD	Rod 13			10	
TE-317AD	Rod 17			11	
TE-318AD	Rod 18			12	
TE-320AD	Rod 20			13	Instrument failed
TE-322AD	Rod 22			14	
TE-323AD	Rod 23			15	
TE-325AD	Rod 25			16	
TE-326AD	Rod 26			17	Unpowered rod
TE-331AD	Rod 31			18	
TE-338AD	Rod 38			19	
TE-339AD	Rod 39			20	
TE-341AD	Rod 41			21	
TE-349AD	Rod 49			22	
LEVEL E					
TE-301AE	Rod 1			23	Instrument failed
TE-304AE	Rod 4			24	Instrument failed
TE-309AE	Rod 9			25	
TE-312AE	Rod 12			26	
TE-313AE	Rod 13			27	
TE-317AE	Rod 17			28	
TE-318AE	Rod 18			29	
TE-320AE	Rod 20			30	
TE-322AE	Rod 22			31	
TE-323AE	Rod 23			32	
TE-324AE	Rod 24			33	Unpowered rod
TE-325AE	Rod 25			34	
TE-326AE	Rod 26			35	
TE-331AE	Rod 31			36	
TE-333AE	Rod 33			37	
TE-338AE	Rod 38			38	
TE-339AE	Rod 39			39	Unpowered rod
TE-341AE	Rod 41			40	
TE-349AE	Rod 49			41	
LEVEL F					
TE-301BF	Rod 1			42	
TE-304BF	Rod 4			43	
TE-309BF	Rod 9			44	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
LEVEL F (continued)					
TE-310BF	Rod 10			45	
TE-312BF	Rod 12			46	
TE-313BF	Rod 13			47	
TE-317BF	Rod 17			48	
TE-320BF	Rod 20			49	
TE-322BF	Rod 22			50	
TE-323BF	Rod 23			51	
TE-324BF	Rod 24			52	Unpowered rod
TE-325BF	Rod 25			53	
TE-326BF	Rod 26			54	
TE-331BF	Rod 31			55	
TE-333BF	Rod 33			56	
TE-338BF	Rod 38			57	
TE-341BF	Rod 41			58	
TE-349BF	Rod 49			59	
LEVEL G					
TE-301BG	Rod 1			60	Instrument failed
TE-304BG	Rod 4			61	
TE-309BG	Rod 9			62	Erratic
TE-310BG	Rod 10			63	
TE-312BG	Rod 12			64	
TE-313BG	Rod 13			65	
TE-317BG	Rod 17			66	
TE-318BG	Rod 18			67	Erratic
TE-320BG	Rod 20			68	
TE-322BG	Rod 22			69	
TE-323BG	Rod 23			70	
TE-325BG	Rod 25			71	
TE-326BG	Rod 26			72	
TE-331BG	Rod 31			73	
TE-333BG	Rod 33			74	
TE-338BG	Rod 38			75	
TE-339BG	Rod 39			76	Unpowered rod
TE-341BG	Rod 41			77	Spurious spike and questionable
TE-349BG	Rod 49			78	Instrument failed
LEVEL H					
TE-301CH	Rod 1			79	
TE-302AH	Rod 2			80	
TE-303AH	Rod 3			81	Spurious spike
TE-304CH	Rod 4			82	Instrument failed
TE-305AH	Rod 5			83	
TE-306AH	Rod 6			84	
TE-307AH	Rod 7			85	
TE-308AH	Rod 8			86	

Table 5. (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
LEVEL H (continued)					
TE-309CH	Rod 9			87	
TE-310CH	Rod 10			88	
TE-311AH	Rod 11			89	Instrument failed
TE-312CH	Rod 12			90	
TE-313CH	Rod 13			91	
TE-314AH	Rod 14			92	
TE-315AH	Rod 15			93	
TE-316AH	Rod 16			94	
TE-317CH	Rod 17			95	
TE-318CH	Rod 18			96	
TE-320CH	Rod 20			97	
TE-321AH	Rod 21			98	
TE-322CH	Rod 22			99	
TE-323CH	Rod 23			100	
TE-324CH	Rod 24			101	Unpowered rod
TE-325CH	Rod 25			102	
TE-326CH	Rod 26			103	
TE-327AH	Rod 27			104	
TE-331CH	Rod 31			105	Instrument failed
TE-333CH	Rod 33			106	
TE-336AH	Rod 36			107	
TE-337AH	Rod 37			108	
TE-338CH	Rod 38			109	
TE-339CH	Rod 39			110	Unpowered rod
TE-341CH	Rod 41			111	
TE-342AH	Rod 42			112	Spurious spike late in transient Spurious spikes
TE-343AH	Rod 43			113	
TE-344AH	Rod 44			114	
TE-345AH	Rod 45			115	
TE-346AH	Rod 46			116	
TE-348AH	Rod 48			117	
TE-349CH	Rod 49			118	
LEVEL I					
TE-301CI	Rod 1			119	
TE-302AI	Rod 2			120	
TE-303AI	Rod 3			121	
TE-304CI	Rod 4			122	
TE-305AI	Rod 5			123	Instrument failed
TE-306AI	Rod 6			124	
TE-307AI	Rod 7			125	Instrument failed
TE-308AI	Rod 8			126	
TE-309CI	Rod 9			127	
TE-310CI	Rod 10			128	
TE-311AI	Rod 11			129	Instrument failed
TE-312CI	Rod 12			130	
TE-313CI	Rod 13			131	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
LEVEL I (continued)					
TE-314AI	Rod 14			132	
TE-315AI	Rod 15			133	
TE-316AI	Rod 16			134	Small spurious spikes late in transient
TE-317CI	Rod 17			135	
TE-318CI	Rod 18			136	
TE-320CI	Rod 20			137	
TE-321AI	Rod 21			138	
TE-322CI	Rod 22			139	
TE-323CI	Rod 23			140	
TE-324CI	Rod 24			141	Instrument failed
TE-325CI	Rod 25			142	
TE-326CI	Rod 26			143	
TE-327AI	Rod 27			144	
TE-328AI	Rod 28			145	
TE-331CI	Rod 31			146	Instrument failed Spurious spike
TE-333CI	Rod 33			147	
TE-336AI	Rod 36			148	
TE-337AI	Rod 37			149	
TE-338CI	Rod 38			150	
TE-339CI	Rod 39			151	Unpowered rod
TE-341CI	Rod 41			152	
TE-342AI	Rod 42			153	
TE-343AI	Rod 43			154	
TE-344AI	Rod 44			155	
TE-345AI	Rod 45			156	
TE-346AI	Rod 46			157	
TE-348AI	Rod 48			158	
TE-349AI	Rod 49			159	
LEVEL II					
TE-301DJ	Rod 1			160	
TE-302CI	Rod 2			161	
TE-304DJ	Rod 4			162	
TE-305CJ	Rod 5			163	
TE-306CJ	Rod 6			164	
TE-307CJ	Rod 7			165	Questionable
TE-308CJ	Rod 8			166	
TE-309DJ	Rod 9			167	
TE-310DJ	Rod 10			168	
TE-312DJ	Rod 12			169	
TE-313DJ	Rod 13			170	
TE-314CJ	Rod 14			171	
TE-316CJ	Rod 16			172	
TE-317CJ	Rod 17			173	
TE-318DJ	Rod 18			174	
TE-320DJ	Rod 20			175	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
	LEVEL J (continued)				
TE-321CJ	Rod 21			176	
TE-322DJ	Rod 22			177	
TE-323DJ	Rod 23			178	
TE-324DJ	Rod 24			179	Unpowered rod
TE-325DJ	Rod 25			180	
TE-326DJ	Rod 26			181	
TE-327CJ	Rod 27			182	
TE-328CJ	Rod 28			183	
TE-331DJ	Rod 31			184	
TE-333DJ	Rod 33			185	
TE-336CJ	Rod 36			186	
TE-337CJ	Rod 37			187	
TE-338DJ	Rod 38			188	Small spurious spike late in transient
TE-339DJ	Rod 39			189	Unpowered rod
TE-340CJ	Rod 40			190	
TE-341DJ	Rod 41			191	
TE-342CJ	Rod 42			192	
TE-343CJ	Rod 43			193	Questionable
TE-344CJ	Rod 44			194	
TE-345CJ	Rod 45			195	
TE-346CJ	Rod 46			196	
TE-349DJ	Rod 49			197	
	LEVEL K				
TE-301DK	Rod 1			198	
TE-304DK	Rod 4			199	
TE-309DK	Rod 9			200	
TE-310DK	Rod 10			201	
TE-312DK	Rod 12			202	Instrument failed
TE-313DK	Rod 13			203	
TE-317DK	Rod 17			204	
TE-318DK	Rod 18			205	
TE-320DK	Rod 20			206	
TE-322DK	Rod 22			207	
TE-323DK	Rod 23			208	
TE-324DK	Rod 24			209	Unpowered rod
TE-325DK	Rod 25			210	
TE-326DK	Rod 26			211	
TE-331DK	Rod 31			212	
TE-333DK	Rod 33			213	
TE-338DK	Rod 38			214	Instrument failed
TE-339DK	Rod 39			215	Unpowered rod
TE-341DK	Rod 41			216	
TE-349DK	Rod 49			217	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
	LEVEL L				
TE-301EL	Rod 1			218	
TE-302CL	Rod 2			219	
TE-303CL	Rod 3			220	
TE-304EL	Rod 4			221	
TE-305CL	Rod 5			222	
TE-306CL	Rod 6			223	
TE-307CL	Rod 7			224	Instrument failed
TE-308CL	Rod 8			225	
TE-309EL	Rod 9			226	
TE-310EL	Rod 10			227	
TE-311CL	Rod 11			228	
TE-312EL	Rod 12			229	
TE-313EL	Rod 13			230	
TE-316CL	Rod 16			231	
TE-317EL	Rod 17			232	
TE-318EL	Rod 18			233	
TE-320EL	Rod 20			234	
TE-321CL	Rod 21			235	
TE-322EL	Rod 22			236	
TE-323EL	Rod 23			237	
TE-324EL	Rod 24			238	Unpowered rod
TE-325EL	Rod 25			239	
TE-326EL	Rod 26			240	
TE-327CL	Rod 27			241	Instrument failed
TE-328CL	Rod 28			242	
TE-331EL	Rod 31			243	
TE-333EL	Rod 33			244	
TE-336CL	Rod 36			245	
TE-337CL	Rod 37			246	
TE-338EL	Rod 38			247	Small spurious spikes
TE-339EL	Rod 39			248	Unpowered rod
TE-341EL	Rod 41			249	
TE-342CL	Rod 42			250	
TE-343CL	Rod 43			251	Small spurious spikes
TE-344CL	Rod 44			252	
TE-345CL	Rod 45			253	Small spurious spikes
TE-346CL	Rod 46			254	
TE-348CL	Rod 48			255	
TE-349EL	Rod 49			256	
	LEVEL M				
TE-301EM	Rod 1			257	
TE-304EM	Rod 4			258	
TE-309EM	Rod 9			259	
TE-325EM	Rod 25			260	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
	LEVEL N				
TE-301FN	Rod 1			261	
TE-304FN	Rod 4			262	
TE-325FN	Rod 25			263	
	LEVEL O				
TE-301FO	Rod 1			264	
TE-304FO	Rod 4			265	
TE-309FO	Rod 9			266	
TE-310EO	Rod 10			267	
TE-312EO	Rod 12			268	Instrument failed
TE-317EO	Rod 17			269	
TE-318EO	Rod 18			270	
TE-320EO	Rod 20			271	
TE-322EO	Rod 22			272	
TE-323EO	Rod 23			273	
TE-324EO	Rod 24			274	Unpowered rod
TE-325FO	Rod 25			275	
TE-326FO	Rod 26			276	
TE-331EO	Rod 31			277	
TE-333EO	Rod 33			278	Spurious spikes early in transient
TE-338EO	Rod 38			279	
TE-339EO	Rod 39			280	
TE-341EO	Rod 41			281	
TE-349EO	Rod 49			282	
<u>Heater Rod Center</u>					
	LEVEL E				
TE-301ME	Rod 1			283	
TE-304ME	Rod 4			284	
TE-318ME	Rod 18			285	
TE-322ME	Rod 22			286	Small spurious spikes early in transient
TE-326ME	Rod 26			287	
TE-331ME	Rod 31			288	
TE-338ME	Rod 38			289	
TE-349ME	Rod 49			290	
	LEVEL F				
TE-301MF	Rod 1			291	
TE-304MF	Rod 4			292	Small spurious spikes
TE-322MF	Rod 22			293	Small spurious spikes
TE-326MF	Rod 26			294	Small spurious spike
TE-338MF	Rod 38			295	Small spurious spike
TE-349MF	Rod 49			296	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
BUNDLE TEMPERATURE (continued)					
<u>Heater Rod Center</u> (continued)					
	LEVEL G				
TE-301MG	Rod 1			297	
TE-310MG	Rod 10			298	
TE-313MG	Rod 13			299	Small spurious spikes
TE-317MG	Rod 17			300	Instrument failed
TE-318MG	Rod 18			301	Small spurious spikes
TE-322MG	Rod 22			302	Small spurious spikes
TE-323MG	Rod 23			303	Questionable
TE-325MG	Rod 25			304	
TE-326MG	Rod 26			305	
TE-338MG	Rod 38			306	
TE-349MG	Rod 49			307	Small spurious spike
	LEVEL H				
TE-304MH	Rod 4			308	
TE-309MH	Rod 9			309	
TE-318MH	Rod 18			310	Small spurious spike
TE-322MH	Rod 22			311	Instrument failed
TE-338MH	Rod 38			312	
	LEVEL J				
TE-301MJ	Rod 1			313	Small spurious spikes late in transient
TE-310MJ	Rod 10			314	
TE-317MJ	Rod 17			315	
TE-323MJ	Rod 23			316	
TE-324MJ	Rod 24			317	Unpowered rod; spurious spike
TE-326MJ	Rod 26			318	
TE-338MJ	Rod 38			319	
SPOOL PIECE INSTRUMENTS					
<u>Temperature</u>	Chromel-Alumel thermocouples	+32 to +1897°F	-0.0027 to +0.0400 V		
TE-24	Horizontal inlet			360	Spurious spikes
TE-172	Vertical inlet			366	
TE-222	Vertical outlet			372	
TE-40	Horizontal outlet			378	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
SPOOL PIECE INSTRUMENTS (continued)					
<u>Pressure</u>		0 to +3000 psig	0.0 to +5.0 V		
PE-26	Horizontal inlet			357	
PE-42	Horizontal outlet			375	
<u>Pressure Drop</u>		-200 to +200 psid	-5.0 to +5.0 V		
PDE-21	Horizontal inlet			359	
PDE-167	Vertical inlet			365	
PDE-217	Vertical outlet			371	
PDE-35	Horizontal outlet			377	
<u>Flow</u>					
FE-19	Horizontal inlet	-2000 to +2000 gpm	-5.0 to +5.0 V	355	Instrument signal lost after 18 s
FE-166	Vertical inlet	-2000 to +2000 gpm	-5.0 to +5.0 V	361	
FE-216	Vertical outlet	-2000 to +2000 gpm	-5.0 to +5.0 V	367	
FE-34	Horizontal outlet	-4000 to +4000 gpm	-5.0 to +5.0 V	373	
<u>Momentum Flux</u>		-250,000 to +250,000 lb _m /ft ² -s ²	-5.0 to +5.0 V		
FMFE-22	Horizontal inlet			358	Zero shifted
FMFE-170	Vertical inlet			364	Zero shifted
FMFE-220	Vertical outlet			370	Zero shifted
FMFE-38	Horizontal outlet			376	
<u>Fluid Density</u>		0 to +62.4 lb _m /ft ³	0.0 to +10.0 V		
DE-20	Horizontal inlet			356	Zero shifted
DE-168	Vertical inlet			362	
DE-218	Vertical outlet			368	
DE-36	Horizontal outlet			374	Erratic
TEST SECTION TEMPERATURE	Chromel-Alumel thermocouples	+32 to +1897°F	-0.0027 to +0.0400 V		
<u>Bundle Shroud</u>					
TE-175	0.142L/LMAX			325	Instrument failed
TE-176	0.142L/LMAX			326	Instrument failed
TE-177	0.142L/LMAX			327	Instrument failed
TE-178	0.142L/LMAX			328	Instrument failed
TE-179	0.388L/LMAX			329	Erratic
TE-180	0.388L/LMAX			330	Instrument failed
TE-181	0.388L/LMAX			331	Instrument failed
TE-182	0.388L/LMAX			332	Instrument failed
TE-183	0.633L/LMAX			333	Instrument failed

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
TEST SECTION TEMPERA- TURE (continued)					
<u>Bundle Shroud (continued)</u>					
TE-184	0.633L/LMAX			334	Instrument failed
TE-185	0.633L/LMAX			335	Erratic
TE-187	0.875L/LMAX			337	Instrument failed
TE-189	0.875L/LMAX			338	Erratic
TE-190	0.875L/LMAX			339	Erratic
<u>Bundle Subchannel</u>					
TE-S3	Spare CCDAS channel			478	No signal
	Subchannel 3			479	Instrument failed
	Spare CCDAS channel			480	No signal
TE-222A	Temperature outside wall, vertical outlet spool piece			481	
	Spare CCDAS channel			482	No signal
	Spare CCDAS channel			483	No signal
	Spare CCDAS channel			484	No signal
	Spare CCDAS channel			485	No signal
TE-S33	Subchannel 33			486	Instrument failed
TE-S34	Subchannel 34			487	Instrument failed
TE-S38	Spare CCDAS channel			488	No signal
	Subchannel 38			489	Questionable
TE-S39	Subchannel 39			490	
TE-S40	Subchannel 40			491	Spurious spikes
TE-S41	Subchannel 41			492	Instrument failed
TE-S42	Subchannel 42			493	Instrument failed
TE-S45	Spare CCDAS channel			494	No signal
	Subchannel 45			495	Spurious spikes
TE-S49	Subchannel 49			496	
TE-S50	Subchannel 50			497	
TE-S51	Subchannel 51			498	Spurious spikes
TE-S57	Subchannel 57			501	Spurious spikes
TE-S59	Subchannel 59			502	Spurious spikes
	Spare CCDAS channel			504	No signal
<u>Test Section</u>					
TE-162	Inlet line T/C			320	
TE-150	Bottom flange T/C			321	
TE-151	Bottom flange T/C			322	
TE-152	Bottom flange T/C			323	
TE-153	Bottom flange T/C			324	Instrument failed
TE-212	Outlet line T/C			340	
TE-210A	Outlet line RTD (steady state)	+32 to +800°F	+0.2 to +0.52 V	411	Instrument failed

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
TEST SECTION					
PRESSURE					
PE-156	Inlet plenum	0 to +3000 psig	0.0 to +5.0 V	379	Spurious spike early in transient
PE-201	Outlet plenum	0 to +3000 psig	0.0 to +5.0 V	380	
PE-27	Inlet plenum bottom	0 to +3000 psig	0.0 to +5.0 V	400	
PE-43	Outlet plenum bottom	0 to +3000 psig	0.0 to +5.0 V	401	
PT-32	Outlet steady state	+500 to +2500 psig	+1.0 to +5.0 V	403	
TEST SECTION					
PRESSURE DROP					
PDT-199	Shroud box steady-state differential pressure	0 to +50 psid	+1.0 to +5.0 V	387	Zero shifted
PDE-200	Bundle transient differential pressure	-200 to +200 psid	-5.0 to +5.0 V	388	Zero shifted
PDT-30	Test section steady-state differential pressure	0 to +50 psid	+1.0 to +5.0 V	402	Zero shifted
PDE-204	Transient pressure between vertical spool pieces	-200 to +200 psid	-5.0 V to +5.0 V	363	Zero shifted
PRESSURIZER					
INSTRUMENTS					
Temperature					
TE-1	Tank top T/C	+32 to +1897°F	-0.0027 to +0.0400 V	346	
TE-2	Tank exit T/C	+32 to +1897°F	-0.0027 to +0.0400 V	347	
Pressure					
PT-102	Steady-state pressure	+500 to +2500 psig	+1.0 to +5.0 V	383	Spurious spikes
PE-106	Vapor transient pressure	0 to +3000 psig	0 to +5.0 V	384	
LEVEL					
LT-100	Steady-state liquid level	0 to +150 in.	+1.0 to +5.0 V	407	
HEATER ROD POWER					
Heater Current					
EIE-11S6	Rod 1			413	
EIE-12S6	Rod 2			414	
EIE-11S7	Rod 3			415	
EIE-12S7	Rod 4			416	
EIE-9S6	Rod 5			417	
EIE-9S8	Rod 6			418	
EIE-9S5	Rod 7			419	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
HEATER ROD POWER (continued)					
<u>Heater Current (continued)</u>					
EIE-11S5	Rod 8			420	
EIE-11S8	Rod 9			421	
EIE-12S8	Rod 10			422	
EIE-9S7	Rod 11			423	
EIE-9S4	Rod 12			424	
EIE-9S3	Rod 13			425	
EIE-9S11	Rod 14			426	
EIE-11S4	Rod 15			427	
EIE-11S9	Rod 16			428	
EIE-12S5	Rod 17			429	
EIE-9S9	Rod 18			430	
EIE-9S10	Rod 19			431	Unpowered rod
EIE-9S2	Rod 20			432	
EIE-9S12	Rod 21			433	
EIE-11S11	Rod 22			434	
EIE-11S10	Rod 23			435	
EIE-11S3	Rod 24			436	Unpowered rod
EIE-9S13	Rod 25			437	
EIE-10S6	Rod 26			438	
EIE-9S1	Rod 27			439	
EIE-10S7	Rod 28			440	
EIE-11S2	Rod 29			441	
EIE-11S12	Rod 30			442	
EIE-12S2	Rod 31			443	
EIE-12S1	Rod 32			444	
EIE-10S12	Rod 33			445	
EIE-10S5	Rod 34			446	
EIE-10S8	Rod 35			447	
EIE-11S1	Rod 36			448	
EIE-12S4	Rod 37			449	
EIE-12S3	Rod 38			450	
EIE-12S12	Rod 39			451	Unpowered rod
EIE-10S11	Rod 40			452	
EIE-10S10	Rod 41			453	
EIE-10S9	Rod 42			454	
EIE-12S9	Rod 43			455	
EIE-12S10	Rod 44			456	
EIE-12S11	Rod 45			457	
EIE-10S1	Rod 46			458	
EIE-10S2	Rod 47			459	Unpowered rod
EIE-10S3	Rod 48			460	
EIE-10S4	Rod 49			461	
GENERATOR POWER					
<u>Generator Current</u>		0 to +10,000 A	0.0 to +5.0 V		
EIE-9	Generator 9 current			462	
EIE-10	Generator 10 current			463	
EIE-11	Generator 11 current			464	
EIE-12	Generator 12 current			465	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
GENERATOR POWER (continued)					
<u>Generator Voltage</u>		0 to +285 V	0.0 to +10.0 V		
EEE-PP	Power programmer generator demand voltage			336	
EEE-9	Generator 9 voltage			466	
EEE-10	Generator 10 voltage			467	
EEE-11	Generator 11 voltage			468	
EEE-12	Generator 12 voltage			469	
HEAT EXCHANGER INSTRUMENTS					
<u>Primary Side</u>	Outlet Line Thermocouples	+32 to +1897°F	-0.0027 to +0.0400 V		
TE-30B	Heat exchanger A			341	
TE-32B	Heat exchanger B			342	
TE-34B	Heat exchanger C			343	
TE-5B	Heat exchanger D			345	Instrument failed
TE-6	Heat exchanger D mixing tee temp.			396	
TE-28B	Main HX mixing tee steady-state temp., RTD	+32 to +800°F	+0.2 to +0.52 V	395	
<u>Secondary Side</u>	Secondary discharge steady-state temp., RTD	+32 to +500°F	+0.2 to +0.4 V		
TE-525	Heat exchanger A			410	Instrument failed
TE-627	Heat exchanger B			389	Reads low; spurious spikes
TE-727	Heat exchanger C			394	Spurious spikes
TE-557	Heat exchanger D			409	Instrument failed
<u>Heat Exchanger Secondary Flow</u>					
FE-522	Heat exchanger A	0 to +150 gpm	+0.2 to +1.0 V	408	Spurious spikes
FE-620	Heat exchanger B	0 to +150 gpm	+0.2 to +1.0 V	351	
FE-720	Heat exchanger C	0 to +150 gpm	+0.2 to +1.0 V	352	Spurious spike
FE-550	Heat exchanger D	0 to +50 gpm	+0.2 to +1.0 V	353	
<u>Heat Exchanger Pressure</u>					
PE-44	Upstream main HX transient pressure	0 to +3000 psig	0.0 to +5.0 V	381	
PE-526	HX A secondary inlet pressure	0 to +350 psig	0.0 to +5.0 V	398	
<u>Pressure Drop</u>					
PDT-48	Main HX steady-state pressure drop	0 to +24 psid	+1.0 to +5.0 V	390	
PDE-46	Main HX bypass transient pressure drop	-200 to +200 psid	-5.0 to +5.0 V	397	

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
PRIMARY PUMP INSTRUMENTS					
FE-1A	Primary side pump flow	0 to +800 gpm	+1.0 to +5.0 V	354	Spurious spike early in transient
PE-76	Pump suction transient pressure	0 to +3000 psig	0 to +5.0 V	382	
PDE-78	Primary pump transient pressure drop	-1000 to +1000 psid	-5.0 to +5.0 V	391	
SE-72	Primary pump speed	+100 to +5400 rpm	0 to +5.0 V	404	
TE-4B	Base primary steady-state temp., RTD	+32 to +800°F	+0.2 to +0.52 V	350	Instrument failed
PE-16	Downstream HCV-2 transient pressure	0.0 to +3000 psig	0.0 to +5.0 V	399	Spurious spike early in transient
FT-18A	Calibrated orificemeter, downstream of HCV-2	0.0 to 1400 gpm	+1.0 to +5.0 V	369	
PRESSURE SUPPRESSION SYSTEM INSTRUMENTS					
PE-412	Pressure suppression receiver transient pressure	0 to +200 psig	0 to +5.0 V	385	Instrument failed
PE-425	PSS inlet blowdown line transient pressure	0 to +3000 psig	0 to +5.0 V	392	Questionable
PE-427	PSS outlet blowdown line transient pressure	0 to +3000 psig	0 to +5.0 V	393	Questionable
PE-29	Inlet blowdown plenum T/C	+32 to +1897°F	-0.0027 to +0.0400 V	348	
TE-45	Outlet blowdown plenum T/C	+32 to +1897°F	-0.0027 to +0.0400 V	349	
TE-B1	B/D line outlet temp. measurement, 24 in. from PS	+32 to +1897°F	-0.0027 to +0.0400 V	499	
TE-B3	B/D line outlet temp. measurement, 42 in. from PS	+32 to +1897°F	-0.0027 to +0.0400 V	500	
TE-B2	B/D line outlet temp. measurement, 60 in. from PS	+32 to +1897°F	-0.0027 to +0.0400 V	503	
DEMINERALIZED WATER SYSTEM					
TE-520B	RBT 4-in. demineralized water header T/C	+32 to +1897°F	-0.0027 to +0.0400 V	344	Instrument failed
TE-615	Demineralized water 6-in. header steady-state temp., RTD	+32 to +500°F	+0.2 to +0.4 V	386	Instrument failed
GENERAL INSTRUMENTATION (ELECTRICAL)					
<u>Breakwire Detectors</u>					
XM-40001	Inlet break	0.0 to +5.0 V	0.0 to +5.0 V	405	
XM-40000	Outlet break	0.0 to +5.0 V	0.0 to +5.0 V	406	
<u>RTD Power</u>					
EIM-1001B	RTD power supply current	2.0 mA	0.400 V	412	Instrument failed

Table 5 (continued)

Measurement	Location and comments	Range		Figure	Measurement comments
		Detector	Data acquisition system		
GENERAL INSTRUMENTATION (ELECTRICAL) (continued)					
<u>Data Acquisition</u>					
<u>Calibration Signals</u>					
Zero cal. input	Channels 0-127	0.0 mV	0.0 mV	470	
Zero cal. input	Channels 128-255	0.0 mV	0.0 mV	471	
Zero cal. input	Channels 256-383	0.0 mV	0.0 mV	472	
Zero cal. input	Channels 384-511	0.0 mV	0.0 mV	473	
Full-scale cal. input	Channels 0-127	35.00 mV	35.00 mV	474	
Full-scale cal. input	Channels 128-255	35.00 mV	35.00 mV	475	
Full-scale cal. input	Channels 256-383	35.00 mV	35.00 mV	476	
Full-scale cal. input	Channels 384-511	35.00 mV	35.00 mV	477	

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PWR BLOWDOWN HEAT TRANSFER SEPARATE-EFFECTS PROGRAM — THERMAL-HYDRAULIC
TEST FACILITY EXPERIMENTAL DATA REPORT FOR TEST 177

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