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Data Report of ROSA/LSTF Experiment TR-LF-15

–Accident Management Actions during Station Blackout Transient with Pump Seal LOCA–

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An experiment denoted as TR-LF-15 was conducted on June 11, 2014 using the Large Scale Test Facility (LSTF) in the Rig of Safety Assessment-V (ROSA-V) Program. The ROSA/LSTF experiment TR-LF-15 simulated accident management (AM) actions during a station blackout transient with TMLB' scenario with pump seal loss-of-coolant accident (LOCA) in a pressurized water reactor (PWR). This scenario is featured by loss of auxiliary feedwater functions. The pump seal LOCA was simulated by a 0.1% cold leg break. The test assumptions included total failure of both high pressure injection system and low pressure injection system of emergency core cooling system (ECCS). Also, it was presumed non-condensable gas (nitrogen gas) inflow to the primary system from accumulator (ACC) tanks of ECCS.

When steam generator (SG) secondary-side collapsed liquid level dropped to a certain low liquid level, the primary pressure turned to rise. After the SG secondary-side became voided, the safety valve of a pressurizer cyclically opened which led to loss of primary coolant. Core uncovery thus took place owing to core boil-off at high pressure. When an increase of 10 K was confirmed in cladding surface temperature of simulated fuel rods, SG secondary-side depressurization was started as the first AM action. At that time, the safety valves in both SGs were fully opened. Primary depressurization was initiated by completely opening the pressurizer safety valve as the second AM action with some delay after the first AM action onset. When the SG secondary-side pressure lowered to 1.0 MPa following the first AM action, water was injected into the secondary-side of both SGs via feedwater lines with low-head pumps as the third AM action. A reduction in the primary pressure was accelerated because the heat removal from the SG secondary-side system resumed shortly after the third AM action initiation. The whole core was quenched by the recovery in the core liquid level due to coolant injection from the ACC system into both cold legs. The primary depressurization rate reduced on account of accumulation of nitrogen gas in the SG U-tubes.

This report summarizes the test procedures, conditions, and major observations in the ROSA/LSTF experiment TR-LF-15.

Keywords: PWR, LSTF, Station Blackout, Pump Seal LOCA, Accident Management Actions, Steam Generator, Primary Depressurization, Accumulator, Gas Inflow, ECCS

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ROSA/LSTF 実験 TR-LF-15 データレポート
－ポンプシール冷却材喪失事故を伴う全交流電源喪失時のアクシデントマネジメント策－

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(2023 年 8 月 23 日受理)

ROSA-V 計画において、大型非定常実験装置(LSTF)を用いた実験(実験番号:TR-LF-15)が 2014 年 6 月 11 日に行われた。ROSA/LSTF TR-LF-15 実験では、加圧水型原子炉(PWR)のポンプシール冷却材喪失事故(LOCA)を伴う、補助給水機能喪失を特徴とする TMLB’のシナリオでの全交流電源喪失時のアクシデントマネジメント(AM)策を模擬した。ポンプシール LOCA は、0.1%低温側配管破断により模擬した。このとき、非常用炉心冷却系(ECCS)である高圧注入系及び低圧注入系の全故障とともに、ECCS の蓄圧注入タンクから一次系への非凝縮性ガス(窒素ガス)の流入を仮定した。

蒸気発生器(SG)二次側水位が特定の低水位まで低下すると、一次系圧力は上昇に転じた。SG 二次側水位喪失後、加圧器の安全弁が周期的に開いたため、一次冷却材の喪失につながった。故に、高圧条件でボイルオフによる炉心露出が生じた。模擬燃料棒被覆管表面温度の 10K の上昇を確認した時点で、SG 二次側減圧を一番目の AM 策として開始した。この AM 策では、両 SG の安全弁を開放した。また、一番目の AM 策開始後少し遅れた時点で、加圧器の安全弁の開放による一次系減圧を二番目の AM 策として開始した。さらに、一番目の AM 策に従い SG 二次側圧力が 1.0MPa に低下した時点で、低水頭ポンプによる給水ラインから両 SG 二次側への注水を三番目の AM 策として開始した。三番目の AM 策の開始直後、SG 二次系からの除熱が再開したため、一次系圧力の低下が促進された。蓄圧注入系から両低温側配管への冷却材注入による炉心水位の回復により、全炉心はクエンチした。窒素ガスが SG U 字管内に蓄積したため、一次系の減圧率は低下した。

本報告書は、ROSA/LSTF TR-LF-15 実験の手順、条件および実験で観察された主な結果をまとめたものである。

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Acronyms and Abbreviations

AC	Alternating Current
ACC	Accumulator
CET	Core Exit Temperature
AFW	Auxiliary Feedwater
AM	Accident Management
ATLAS	Advanced Thermal-hydraulic Test Loop for Accident Simulation
ECCS	Emergency Core Cooling System
LOCA	Loss-of-coolant Accident
LSTF	Large Scale Test Facility
NEA	Nuclear Energy Agency
OECD	Organisation for Economic Co-operation and Development
PWR	Pressurized Water Reactor
PZR	Pressurizer
ROSA	Rig-of-Safety Assessment
SBO	Station Blackout
SG	Steam Generator
TMLB’	T (transient event) M (failure of secondary system relief valves and power conversion system) L (failure of secondary system relief valves and auxiliary feedwater system) B’ (failure to recover either on-site or off-site electric power within about 1-3 h following initiating transient which is loss of off-site AC power)
UCP	Upper Core Plate

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1. Introduction

Some experimental investigations [1]-[3] have been performed for a station blackout (SBO) transient with TMLB' scenario [4] in a pressurized water reactor (PWR). These tests utilized the Large Scale Test Facility (LSTF) [5] in the Rig-of-Safety Assessment-V (ROSA-V) Program. The LSTF simulates a Westinghouse-type four-loop 3423 MW (thermal) PWR by a full-height and 1/48 volumetrically-scaled two-loop system. The TMLB' scenario involves prolonged complete loss of AC power, unavailability of turbine-driven auxiliary feedwater (AFW), and malfunction of relief valves in primary and steam generator (SG) secondary-side systems. The AC power includes the off-site power and the on-site emergency diesel generator power.

An LSTF experiment denoted as TR-LF-15 was carried out on June 11, 2014, simulating accident management (AM) actions during a PWR SBO transient with the TMLB' scenario with pump seal loss-of-coolant accident (LOCA). The TR-LF-15 test also focuses on effects of the pump seal LOCA on the primary pressure, core uncovery, etc. during the SBO transient.

In the new regulatory requirements in Japan, the SBO transient with the pump seal LOCA was postulated as one of events, which should be evaluated the effectiveness of measures against core damage [6]. The primary coolant pump is equipped with multistage shaft seals to avoid leakage of primary coolant from the shaft. Cold seal water is injected into the front of the 1st stage shaft seal closest to the impeller exploiting a seal water injection pump. This prevents the hot primary coolant from reaching the pump seals directly during the normal operation. When SBO happens, the seal water injection pump stops, thereby causing that the hot primary coolant may attain the pump seals. The primary coolant pump seals may thus be damaged because they become hot. This would give rise to the pump seal LOCA (i.e., loss of primary coolant from the pump seals). Meanwhile, attempts have been made to reduce leakage from the pump seals in the SBO sequence by deploying passive thermal shutdown seals for the primary coolant pump [7]-[9].

A 0.1% cold leg break was made to simulate the pump seal LOCA [10]. The experiment assumed total failure of both high pressure injection system and low pressure injection system of emergency core cooling system (ECCS). Additionally, non-condensable gas (nitrogen gas) ingress to the primary system from accumulator (ACC) tanks of ECCS was supposed. When a rise of 10 K was confirmed in cladding surface temperature of simulated fuel rods during core uncovery, SG secondary-side depressurization was launched as the first AM action. This SG secondary-side depressurization was done by fully opening the safety valves in both SGs. Primary depressurization was taken by completely opening the safety valve of a pressurizer (PZR) as the second AM action with some delay after the first AM action onset. When the SG secondary-side pressure dropped to 1.0 MPa following the first AM action, water was injected into the secondary-side of both SGs through feedwater lines employing low-head pumps as

the third AM action.

The TR-LF-15 test objectives were as follows; (i) to elucidate thermal-hydraulic phenomena involved, (ii) to clarify the AM actions effectiveness for both core cooling and primary depressurization, and (iii) to provide experimental data for the assessment of thermal-hydraulic safety analysis computer codes. The LSTF test data would be useful to define the conditions of counterpart testing by means of other integral test facilities, such as ATLAS (Advanced Thermal-hydraulic Test Loop for Accident Simulation) [11]. The aim of the counterpart testing is to address scaling problems through thermal-hydraulic phenomena. In this regard, Japan Atomic Energy Agency have provided the LSTF test data on a 1% small-break LOCA at the top of a pressure vessel with AM actions and nitrogen gas inflow [12] for the counterpart testing in the ATLAS-related OECD/NEA Project.

This report summarizes the test procedures, conditions, and major observations in the ROSA/LSTF experiment TR-LF-15. All the experimental data were processed carefully and qualified to acquire the best possible accuracy.

2. Overview of LSTF

Figure 2-1 shows a schematic view of the LSTF that simulates a typical 3423 MW (thermal) four-loop Westinghouse-type PWR with a two-loop system model by full height and 1/48 in volume [5]. The reference PWR of the LSTF is Tsuruga Unit-2 of Japan Atomic Power Company. The LSTF is composed of a pressure vessel, PZR, and primary loops. Each loop includes an active SG, primary coolant pump, crossover leg, hot leg, and cold leg. The crossover leg is a primary piping that connects the primary coolant pump to the SG. Loops with and without PZR are designated as loop-A and loop-B, respectively. The hot leg and cold leg, 207 mm in inner-diameter each, are sized to conserve the volumetric scale (2/48) and the ratio of length to square root of pipe diameter to better simulate flow regime transitions in the primary loops [13]. Each SG is furnished with 141 full-size U-tubes (inner-diameter of 19.6 mm each), inlet and outlet plena, boiler section, steam separator, steam dome, steam dryer, main steam line, four downcomer pipes, and other internals (see pp.260-273 in Ref. [5]). Six U-tubes are instrumented for each SG. Tubes 1 and 6 are short tubes (Type 1; see p.267 in Ref. [5]), Tubes 2 and 5 are medium tubes (Type 5), and Tubes 3 and 4 are long tubes (Type 9). The LSTF represents the reference PWR bypasses involving eight upper-head spray nozzles (inner-diameter of 3.4 mm each) (see p.202 in Ref. [5]) and the hot leg nozzle (see p.196 in Ref. [5]) leakage. The spray nozzles allow bypass flow that amounts to 0.3% of the total core flow rate during the initial steady state, while bypass area of the hot leg nozzle is set to allow 0.2% bypass flow for each loop. The LSTF core, 3.66 m in active height, mainly consists of 1008 electrically heater rods in 24 rod bundles to simulate the fuel rod assembly and 96 non-heating tie rods to simulate control rod guide thimble (see p.220 in Ref. [5]). The angle of the PZR surge line to the hot leg is 45°. All the types of ECCS fitted to the reference PWR are installed in the LSTF. Nitrogen gas is used for pressurization of ACC tanks of ECCS.

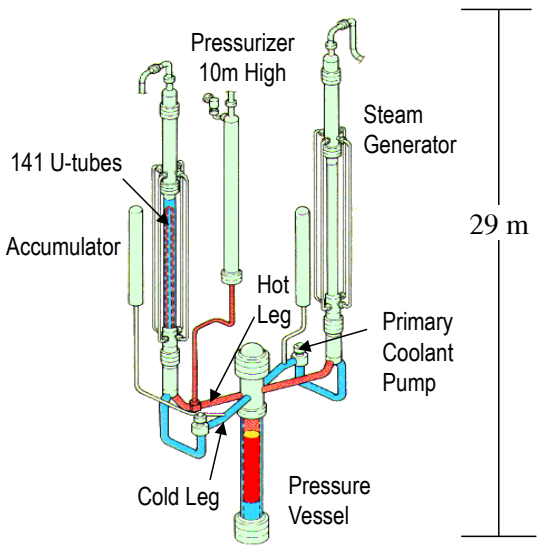

Fig. 2-1 Schematic view of the Large Scale Test Facility (LSTF)

3. Test Conditions and Procedures

With respect to the break, ECCS, and control logic, following assumptions were posed to the TR-LF-15 test conditions.

The assumption related to the break for simulating the pump seal LOCA is the following;

1) Break size (flow area) corresponds to 0.1% of the volumetrically-scaled (1/48) cross-sectional area of the reference PWR cold leg. As presented in **Fig. 3-1**, the break is simulated by using a 3.2 mm inner-diameter sharp-edge orifice. The break orifice is fixed at the downstream of a horizontal pipe. This pipe is connected to a vertical pipe attached to a cold leg break nozzle placed at the top of a cold leg in loop without PZR.

The assumptions concerning the ECCS are as follows;

2) Total failure of both high pressure injection system and low pressure injection system
3) When the primary pressure reduces to 4.51 MPa, ACC system is actuated in both loops. Coolant is injected from the ACC system into both cold legs. The ACC coolant injection flow rate ratio of loop with PZR to loop without PZR is designed to become 1:1. The ACC coolant injection temperature is 320 K.
4) For each loop, non-condensable gas (nitrogen gas) inflow to the primary system from the ACC tank takes place owing to failure of the ACC system isolation after the ACC coolant injection initiation.

The assumptions regarding the control logic are as below;

5) Relief valves in the primary and SG secondary-side systems are unavailable.
6) A scram signal is generated at time zero, causing closure of SG main steam stop valve, termination of SG main feedwater, and manual closure of SG main steam isolation valves.
7) When an increase of 10 K is confirmed in cladding surface temperature of simulated fuel rods during core uncovery, SG secondary-side depressurization is started as the first AM action. In this SG secondary-side depressurization, the safety valves in both SGs are fully opened because the relief valves in both SGs are unable to use.
8) Primary depressurization is initiated by completely opening the safety valve of PZR as the second AM action with some delay after the first AM action onset. This is because the relief valve of PZR cannot be utilized.
9) When the SG secondary-side pressure lowers to 1.0 MPa through the first AM action, water is injected into the secondary-side of both SGs via feedwater lines exploiting low-head pumps as the third AM action. In this test, AFW pump in the SG secondary-side system is employed as an alternative for the low-head pump. The water injection flow rate into each SG secondary-side is fixed to about 0.75 kg/s until the SG secondary-side collapsed liquid level achieves around 12 m. The water injection flow rate into each SG secondary-side is controlled to keep the SG secondary-side collapsed liquid level at around 12 m thereafter.

The water injection temperature into each SG secondary-side is 310 K.

10) Thresholds of maximum cladding surface temperature for the LSTF core protection system are as follows;
958K=70%, 961K=35%, 966K=13%, 977K=5%, 1003K=0%, of pre-determined value.

3.1 Initial Steady State and Boundary Conditions

The specified initial steady state and boundary conditions are listed in **Table 3-1**. Initial steady state conditions such as PZR pressure, fluid temperatures in the hot leg and cold leg were 15.6 MPa, 598 K and 563 K respectively (to be indicated in **Table 4-1**), according to the reference PWR conditions.

The LSTF initial core power is limited to 10 MW, on account of a limitation in the capacity of power supply. The 10 MW power corresponds to 14% of the volumetrically-scaled (1/48) PWR nominal core power (3423 MW). Radial peaking factor for all high-, mean-, and low-power rod bundles is 1.00 in “Case 1” (see p.228 in Ref. [5]) shown in **Table 3-1**. Namely, the radial core power profile is flat. Axial core power profile is a 9-step chopped cosine with a peaking factor of 1.495 (see p.227 in Ref. [5]). To attain the prototypical initial fluid temperatures with this core power, core flow rate was set to 14% of the 1/48-scaled nominal flow rate. Initial SG secondary-side pressure was raised to 7.3 MPa to limit the primary-to-secondary heat transfer rate to 10 MW, while 6.1 MPa is nominal value in the reference PWR. Initial PZR liquid level was about 7.4 m that is equivalent to about 66% of the PZR vessel height (see p.396 in Ref. [5]). Initial SG secondary-side collapsed liquid level was about 10.2 m that corresponds to the SG medium tube height.

Backup heaters in the PZR mitigate system heat losses. Power of the PZR backup heaters was 33.8 kW as the initial condition. The PZR backup heater power turned off when the PZR liquid level became below 2.3 m. Many regions of the LSTF are provided with trace heaters to mitigate environmental heat losses.

The configuration of the break unit is drawn in **Fig. 3-1**. The break was simulated by utilizing a 3.2 mm inner-diameter sharp-edge orifice No.1 (see p.307 in Ref. [5]). The orifice was mounted at the downstream of a horizontal pipe (inner-diameter of 87.3 mm). This pipe was joined to a vertical pipe (inner-diameter of 87.3 mm) fitted to a cold leg break nozzle (N-7i; see p.96 and pp.239-240 in Ref. [5]) positioned at the top of a cold leg in loop without PZR. The orifice flow area was consistent with 0.1% of the 1/48-scaled cross-sectional area of the reference PWR cold leg. Venturi flow meter (FE-570-BU; see p.303 in Ref. [5]) was installed in the break unit for the purpose of qualitatively monitoring the break flow rate during the test.

For controlling ACC water injection volume (see p.322 in Ref. [5]), the specified initial water level and volume above the standpipe were 1.58 m and 1.12 m^3 respectively for both loops.

The specified initial volume of non-condensable gas (nitrogen gas) in the ACC tank was 0.46 m^3 for both loops. The angle of the coolant injection from the ACC tank into the cold leg via the ECCS nozzle (N-14a or N-14b; see p.83 and pp.239-240 in Ref. [5]) is 90° for loop with PZR (loop-A) and 45° for loop without PZR (loop-B) (see pp.397-398 in Ref. [5]).

3.2 Test Procedures

Table 3-2 shows the specified control logic, operation set points, and conditions. The experiment was launched at time zero by opening a break valve located downstream of the break orifice at the cold leg in loop without PZR, as well as the generation of a scram signal.

Table 3-3 shows the specified rotation speed ratio of primary coolant pump. Simultaneously with the break, the rotation speed of primary coolant pumps was raised up to about 1470 rpm in 4 s. This better simulates pressure and temperature transients in the reference PWR. The specified pump rotation speed was decreased to zero at 268 s (i.e., 250 s after the initiation of the pump coastdown at 18 s).

A scram signal was generated at time zero. This caused the closure of the SG main steam stop valve, the termination of the SG main feedwater, and the manual closure of the SG main steam isolation valves. **Table 3-4** shows the pre-determined core power decay curve. The core power decay curve was defined by adding heat losses to the calculation result of the core power with the RELAP5 code considering delayed neutron fission power and stored heat in PWR fuel rod [14]. The core power was held at the initial value of 10 MW for 18 s until the scaled PWR core decay power dropped to 10 MW. The LSTF core power began a decay afterwards according to the specified core power.

In this test, the (existing) relief valve of PZR was exploited as an alternative for the safety valve of PZR. Therefore, the PZR safety valve was simulated by employing a 6.83 mm inner-diameter sharp-edge orifice. Set point pressures for opening and closure of the simulated PZR safety valve were 17.26 MPa and 17.06 MPa respectively, referring to the corresponding pressures for the PZR safety valve in the reference PWR.

In this test, the (existing) relief valves in both SGs were used as an alternative for the safety valves in both SGs. Hence, the SG safety valve was simulated by utilizing a 16.2 mm inner-diameter sharp-edge orifice. Set point pressures for opening and closure of the simulated SG safety valves were 8.68 MPa and 7.69 MPa respectively, by reference to the corresponding pressures for the SG safety valves in the reference PWR.

The ACC system is activated in both loops at the primary pressure of 4.51 MPa according to the reference PWR. The ACC coolant injection flow rate ratio of loop with PZR to loop without PZR was intended to become 1:1 (to be plotted in **Fig. 4-12**). The ACC coolant injection

temperature is 320 K, which is the same as that in the reference PWR.

Relating to the third AM action, water was injected into the secondary-side of both SGs through feedwater lines at the SG secondary-side pressure of 1.0 MPa. The water injection exploited the (existing) AFW pump in the SG secondary-side system as an alternative for low-head pump. The operator manually injected water into each SG secondary-side by monitoring the narrow-range (0-1 kg/s) feedwater flow rate [Tag Name; FE520B-PAA (for secondary-side of SG in loop with PZR), FE530B-PAB (for secondary-side of SG in loop without PZR)] (see pp.257-258 in Ref. [5]). The water injection flow rate into each SG secondary-side was set to about 0.75 kg/s until the SG secondary-side collapsed liquid level reached around 12 m (to be set out in **Fig. 4-9**). This value of about 0.75 kg/s was nearly equivalent to the volumetrically-scaled AFW flow rate of the reference PWR. The water injection flow rate into each SG secondary-side was regulated to maintain the SG secondary-side collapsed liquid level at around 12 m thereafter. The water injection temperature into each SG secondary-side was 310 K, which was the same as the AFW injection temperature in the reference PWR.

3.3 Instrumentation

Instruments are equipped in the LSTF to understand and evaluate thermal-hydraulic responses during simulated accidents and transients.

3.3.1 Measured Data

A list of available experimental data is shown in **Table A-1**, which is composed of Sequential No., Function ID., Tag Name, measurement location, range, unit, and uncertainty. The Tag Name is a fixed naming unique to each measurement. The alphabetical prefix in the Function ID. and Tag Name represents the kind of variable or the kind of measurement as follows;

TE, fluid temperature,

DT, differential temperature,

TW, heater rod and structure temperature,

FE, flow rate measured with conventional (differential pressure) flow meters,

PE, pressure,

MI, miscellaneous instrumented-signal (power, pump rotation speed, etc.),

LE, liquid level,

DP, differential pressure,

DE, fluid density measured with gamma-ray densitometer.

After the experiment, data from these measurements are processed to obtain the “secondary” data, such as area-averaged fluid density derived from measurement with three-beam gamma-

ray densitometer. These data are stored with Function ID. starting with a prefix of “RC”. The measurement uncertainty is assessed according to the accuracy of the relevant instrument.

3.3.2 Data Conversion, Reduction, and Calibration

The instrumented-signals are recorded in volts by the data logger of DARWIN system (Yokogawa Electric Co.), and are converted into engineering units utilizing appropriate conversion equations and factors. Differential pressure (DP) cell is a device that measures the differential pressure between two inputs. Some parameters such as flow rate (FE) and liquid level (LE) that employ DP cell data require the calculation of the single-phase coolant density based on local pressure and fluid temperature data using steam table.

DP cell data for both the differential pressures and liquid levels are corrected on the basis of a similar calibration test for static pressure effect, which is performed separately. Three-valve manifold is operated for each of DP cells to obtain zero calibration data for 200 s twice at a little before the break valve opening and at a little after the closure of the break valve.

The applicability of flow rates measured with the conventional flow meters employing venturi, orifice or nozzle and DP cell is limited in principle to either single-phase liquid or vapor flow. In addition, the accuracy is poor when the readings are below about 20% of the measurement range. This is explained by the fact that the flow rate is proportional to the square root of the measured DP. For example, a zero level drift of 1% in the DP cell output may result in the flow rate reading of 10% of the measurement range especially when the actual flow rate is nearly equal to zero. It is thus good to pay attention when the flow rate is below about 20% of the measurement range even though the data are corrected based on a calibration test for static pressure effect.

Two-phase flow instruments, such as gamma-ray densitometers, use certain conversion equations considering attenuation effects of gamma-ray that goes through coolant flow.

After the data acquisition, some experimental data are calibrated. The high-range pressure data in the PZR and the upper plenum, for example, are corrected on the basis of a zero level shift using the low-range pressure data first, and then all the density data are calibrated at two points with different fluid conditions.

3.3.3 Data Qualification

The experimental data are qualified manually. Thermocouple data are reviewed by employing pre-test ambient temperature data for anomalous readings, and are mutually compared with readings of instruments in the same vicinity. Pressure transducers are checked for zero level drift as well as any other suspicious behaviors. The outputs of conductance probe, power meters, pump speed and vibration meters, and valve position indicators are individually

reviewed for inconsistent readings.

The flow meters, DP transducers, gamma-ray densitometers, and drag disk transducers require extensive manual qualification efforts. The validity of the flow meters and differential pressure data mostly depends on whether the reading is in the sensitive range of the measurement or not. The data from these instruments are presented with appropriate corrections based on calibration data for each transducer.

Available experimental data are “Good” defined as follows. “Good” means that the type of data has been reviewed manually, and is presumed to lie within the range and uncertainty values of the instruments based on the design specification which are published in the reference [5]. However, certain measurements may be affected by various extraneous factors such as flow velocity, flow regime, and wall effects. **Table A-1** shows the list of available experimental data qualified as “Good” for LSTF TR-LF-15 (Run ID named to be LFF).

Table 3-1 Specified initial steady state and boundary conditions (1/2)

Core	Initial core power	10 MW
	Radial core power profile	Case 1 (i.e., flat)
	Axial core power profile	9-step chopped cosine, peaking factor = 1.495
Primary Loops	Initial hot leg fluid temperatures	598.1 K
	Initial cold leg fluid temperatures	562.4 K
	Initial mass flow rate	24.3 kg/s / loop
	Initial downcomer-to-hot leg bypass	0.049 kg/s / loop
Pressurizer (PZR)	Initial pressure	15.5 MPa
	Initial liquid level	7.2 m
	Inner-diameter of safety valve orifice	6.83 mm
	Safety valve open / closure	Primary pressure = 17.26 / 17.06 MPa
Steam Generators (SGs)	Initial secondary-side pressure	7.3 MPa
	Initial secondary-side liquid level	10.3 m
	Initial main steam flow rate	2.74 kg/s
	Initial main feedwater flow rate	2.74 kg/s
	Main feedwater temperature	495.2 K
	Inner-diameter of safety valve orifice	16.2 mm
	Safety valve open / closure	SG secondary-side pressure = 8.68 / 7.69 MPa

Table 3-1 Specified initial steady state and boundary conditions (2/2)

Break

Location	Cold leg in loop without PZR (see **Fig. 3-1**)
Type	Sharp-edge orifice
Inner-diameter of orifice	3.2 mm

ECCS

High pressure injection system		Not actuated
Accumu-lator (ACC) system	Initiation of system	Primary pressure = 4.51 MPa
	Water temperature	320 K
	Initial water level above tank bottom in both loops	6.8 m
	Standpipe level above tank bottom in both loops	5.22 m
	Initial water volume above standpipe in both loops	1.12 m^3*
	Initial gas volume in both loops	0.46 m^3
	Cross-sectional flow area above standpipe	0.7085 m^2
	Orifice diameter (d) in loops with / without PZR	38.2 mm / 35.0 mm
	Connecting pipe diameter (D) in both loops	97.1 mm
	Contraction ratio (d/D) in loops with / without PZR	0.393 / 0.360
	Coolant injection flow rate ratio of loop with PZR to loop without PZR	1:1
	Injection location	Cold legs in both loops
Low pressure injection system		Not actuated

* (6.8－5.22 [m])×0.7085 [m^2] ≒ 1.12 [m^3]

LSTF Core Protection System Logic

Control of core power to	Maximum cladding surface temperature reaches
70%	958 K
35%	961 K
13%	966 K
5%	977 K
0% (core power trip)	1003 K

Table 3-2 Specified control logic, operation set points, and conditions

Event	Condition
Break	Time zero
Generation of scram signal	Time zero
Initiation of primary coolant pump rotation speed simulation	Time zero
Initiation of core power decay curve simulation	Generation of scram signal
Closure of SG main steam stop valve	Generation of scram signal
Manual closure of SG main steam isolation valves	Generation of scram signal
Termination of SG main feedwater	Generation of scram signal
PZR backup heater off	PZR liquid level < 2.3 m
Initiation of SG secondary-side depressurization by fully opening safety valves in both SGs as first AM action	Confirmation of cladding surface temperature rise of 10 K during core uncovery
Initiation of primary depressurization by completely opening safety valve of PZR as second AM action	Some delay after first AM action onset
Initiation of water injection into secondary-side of both SGs via feedwater lines as third AM action	SG secondary-side pressure = 1.0 MPa
Initiation of ACC system in both loops	Primary pressure = 4.51 MPa

Table 3-3 Specified pump rotation speed ratio

Time (s)	Rotation speed ratio	Time (s)	Rotation speed ratio	Time (s)	Rotation speed ratio
0	0.550	38	0.370	98	0.125
4	1.000	48	0.280	108	0.110
18	1.000	58	0.220	118	0.100
20	0.850	68	0.185	268	0.000
23	0.730	78	0.160		
28	0.540	88	0.140		

Table 3-4 Pre-determined core power decay curve

Time (s)	Power (MW)	Time (s)	Power (MW)	Time (s)	Power (MW)
0	10	150	2.589	2000	1.404
18	10	200	2.429	3000	1.262
20	8.316	300	2.246	4000	1.169
30	5.532	400	2.166	5000	1.103
40	4.670	500	2.079	6000	1.052
50	4.072	600	1.998	8000	0.980
60	3.704	800	1.743	10000	0.929
80	3.209	1000	1.653	20000	0.795
100	2.929	1500	1.508	50000	0.657

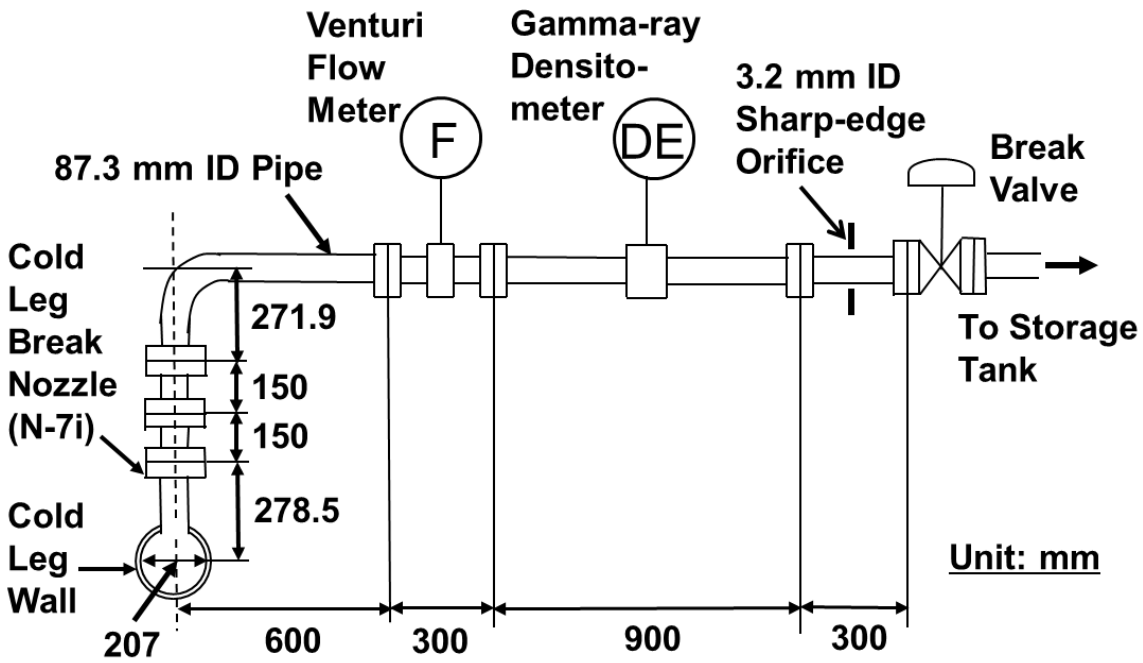

Fig. 3-1 Configuration of break unit

4. Experimental Results

4.1 Initial and Boundary Conditions

Initial steady state conditions achieved in the experiment were in reasonable agreement with the specified values, as mentioned in **Table 4-1**. The measured values indicated are those averaged for the last 60 s prior to the onset of the break. Initial SG re-circulation ratio estimated from the measured flow rates in the downcomer and SG main steam line was 6.5 in loop with PZR (loop-A) and 6.3 in loop without PZR (loop-B). **Table 4-2** shows the chronology of major events until 28833 s when the break valve was closed.

4.2 Thermal-hydraulic Responses Concerning Boundary Conditions

As presented in **Fig. 4-1**, the core power began to decay at 20 s. The core power was controlled to the pre-determined value until 28818 s when the core power turned off. This is because the peak cladding temperature of 790 K was below the pre-determined threshold of 958 K for the LSTF core protection system (to be depicted in **Figs. 4-25 through 4-28**).

As noted in **Fig. 4-2**, the power value of the PZR backup heaters was initially kept constant at 33.8 kW. The PZR backup heater power turned off by 529 s because the PZR liquid level became below 2.3 m (as set out in **Fig. 4-3**). The PZR liquid level degraded immediately and monotonously after the break. The PZR became voided by 760 s.

Figures 4-4 and 4-5 show the primary coolant pump rotation speed and the primary loop mass flow rate measured by using a venturi flow meter at each primary coolant pump suction leg, respectively. The pump rotation speed started an increase simultaneously with the break, and attained about 1470 rpm in 4 s. The pump coastdown initiated at 19 s. The pump rotation speed reduced thereafter, which led to a decrease in the primary loop mass flow rate. Single-phase natural circulation continued until liquid levels formed in hot legs (to be plotted in **Fig. 4-38**) after the primary coolant pumps stopped. When the primary loop mass flow rate became zero, natural circulation mode changed from two-phase natural circulation into reflux condensation. The primary loop mass flow rate oscillated during the time period of the coolant injection from the ACC system into both cold legs (to be presented in **Fig. 4-12**).

Figures 4-6 and 4-7 show the SG main steam and feedwater flow rates, respectively. The SG main steam was terminated by the closure of the SG main steam stop valve [Valve No.; AOV (air-operated valve) -220] (see p.113 in Ref. [5]) at 1 s, following the scram signal. The main feedwater injection into the secondary-side of both SGs was terminated by the closure of the SG main feedwater line valve [Valve No.; AOV-260] (see p.113 in Ref. [5]) at 2 s. The main steam isolation valves of both SGs [Valve No.; AOV-170 and AOV-200] (see pp.111-112 in Ref. [5]) were manually closed at 3 s.

Figures 4-8 and 4-9 show the SG secondary-side collapsed liquid level and water injection flow rate into the SG secondary-side through the feedwater line via alternative utilization of the AFW pump in the SG secondary-side system, respectively. The SG secondary-side liquid level began to rise after the main steam stop valve closure and the main feedwater termination (**Figs. 4-6 and 4-7**). This seems to be attributed to the decrease in the net upward steam flow through the SG boiling section. The SG secondary-side liquid level gradually dropped with some fluctuation owing to cycle opening of the SG safety valves (to be indicated in **Fig. 4-16**). The SG secondary-side liquid level became lost by 8130 s. The water injection into the secondary-side of both SGs was started as the third AM action at 15360 s, and continued thereafter. The liquid level recovered in the SG secondary-side at 15500 s, which resulted in the resumption of the heat removal from the SG secondary-side system. During the time period other than the operation of the AFW pump, flow meter (see pp.257-258 in Ref. [5]) for water counts flow rate in the return line from the AFW pump to the refueling water storage tank. The SG secondary-side liquid level reached around 12 m at 22090 s. Until then the water injection flow rate into the SG secondary-side was about 0.74-0.80 kg/s in loop with PZR and about 0.72-0.78 kg/s in loop without PZR. The water injection flow rate into each SG secondary-side was adjusted to hold the SG secondary-side liquid level at around 12 m thereafter.

Figure 4-10 shows the time-integrated break flow evaluated from the liquid level increase in the storage tank, and the break flow rate derived as the differential of the time-integrated break flow. The break flow rate reduced roughly stepwise. The break flow turned from single-phase liquid to two-phase flow at around 1500 s when liquid levels formed in cold legs (to be depicted in **Fig. 4-40**). The break flow rate increased with the liquid level recovery in the cold legs by coolant from the ACC system (to be mentioned in **Fig. 4-12**). The break flow changed to single-phase vapor at around 20000 s when the cold legs became empty of liquid.

Figure 4-11 shows the liquid level in the ACC tank. **Figure 4-12** gives the coolant injection flow rate from the ACC tank derived from the liquid level history in the ACC tank. Another name for the ACC tank in loop with PZR is ACC-cold tank, while that for the ACC tank in loop without PZR is ACC-hot tank. The coolant injection temperature is 320 K in both the ACC-cold tank and ACC-hot tank, but the heater capacity of the ACC-hot tank is designed to be twice that of the ACC-cold tank. When the primary pressure lowered to 4.51 MPa, the ACC system initiated in both loops at 16210 s. The initial water level above the ACC tank bottom was 6.84 m in both loops. The final water level above the ACC tank bottom was 5.31 m in loop with PZR and 5.29 m in loop without PZR. When the primary pressure dropped to about 1.6 MPa, the ACC system terminated in both loops at 17370 s.

4.3 Transient Thermal-hydraulic Responses

Figure 4-13 shows the PZR liquid level. A monotonous decline in the PZR liquid level started

soon after the break. The PZR once became voided at 760 s. The PZR liquid level recovered with an increase in the primary pressure at 9250 s (to be plotted in **Fig. 4-14**). The PZR liquid level largely rose following periodic opening of the PZR safety valve (to be noted in **Fig. 4-14**), and achieved 10.3 m at 14350 s. The PZR liquid level reduced after the SG inlet plenum became empty of liquid (to be mentioned in **Fig. 4-52**). A steep depression began in the PZR liquid level at 15040 s with the primary depressurization through the complete opening of the PZR safety valve. The PZR liquid level became lost again at 17020 s.

Figures 4-14 and 4-15 show the primary and secondary pressures. The primary pressure initiated a decrease at time zero when the break valve was opened. Very small size of break brought about a slow primary depressurization. The SG secondary-side pressure rapidly raised up to about 8.7 MPa after the closure of the SG main steam isolation valve. **Figure 4-16** shows the flow rate of the SG safety valve that uses the SG relief valve as an alternative. The SG secondary-side pressure fluctuated between 8.68 MPa and 7.69 MPa by cycle opening of the SG safety valves during the time period of around 190-8120 s. The primary pressure once became close to the SG secondary-side pressure. When the SG secondary-side liquid level dropped to about 3 m (**Fig. 4-8**), the primary pressure turned to increase at around 4750 s. This was due to deterioration in the heat removal from the SG secondary-side system. The primary pressure fluctuated between 17.26 MPa and 17.06 MPa because the PZR safety valve periodically opened during the time period of around 13680-15030 s. Loss of primary coolant along with cycle opening of the PZR safety valve induced core uncovery at high pressure (to be depicted in **Figs. 4-25 through 4-28**). When the cladding surface temperature increase of 10 K was confirmed during the core uncovery, SG secondary-side depressurization was taken as the first AM action at 15020 s (**Fig. 4-16**). This SG secondary-side depressurization was made by fully opening the safety valves in both SGs. Primary depressurization was started by completely opening the PZR safety valve as the second AM action at 15040 s. The SG secondary-side and primary pressures considerably decreased immediately after the first and second AM actions, respectively. When the SG secondary-side pressure lowered to 1.0 MPa following the first AM action, water was injected into the secondary-side of both SGs as the third AM action at 15360 s. Just after that, the heat removal from the SG secondary-side system resumed because of the liquid level recovery in the SG secondary-side. Therefore, a reduction in the primary pressure was accelerated. The SG secondary-side pressure once rose, and then declined being followed by the primary pressure decrease. When the primary pressure dropped to 4.51 MPa, the ACC system initiated in both loops at 16210 s (**Fig. 4-12**). When the primary pressure lowered to about 1.6 MPa, the ACC system terminated in both loops at 17370 s. As indicated in **Fig. 4-15**, the primary depressurization rate reduced after around 18200 s. This is because the nitrogen gas accumulated in the SG U-tubes (to be described in **Section 4.3.3**). The nitrogen gas accumulation implies degradation in the

condensation heat transfer in the SG U-tubes. The primary and SG secondary-side pressures were about 1.2 MPa and about 0.6 MPa respectively at 28000 s (**Fig. 4-14**).

4.3.1 Thermal-hydraulic Responses in Pressure Vessel

Liquid level behaviors in upper plenum and core

Figure 4-17 shows the upper plenum collapsed liquid level. The upper plenum liquid level changed in response to the hot leg liquid level (to be presented in **Fig. 4-38**). **Figures 4-18 and 4-19** show the core collapsed liquid level. A significant depression started in the core liquid level at 14800 s after the upper plenum was emptied of liquid. Core uncovery occurred by core boil-off at high pressure at 14950 s (to be noted in **Figs. 4-25 through 4-28**). The liquid level recovered in the core by coolant from the PZR at around 15600 s (**Fig. 4-13**). The core liquid level abruptly increased following the actuation of the ACC system at 16210 s (**Fig. 4-12**). The liquid level recovered in the upper plenum at around 16400 s.

Responses of core exit temperature (CET) and cladding surface temperature of simulated fuel rods

Figures 4-20 and 4-21 show the typical CETs at the center [Tag Name; TE-EX040-B21-UCP, -B24-UCP], peripheral region [TE-EX040-B18-UCP, -B19-UCP], and outer region [TE-EX040-B07-UCP, -B08-UCP] of upper core plate (UCP). The representative CETs account for the first and second highest CETs at each region of UCP. Thickness of UCP is 76.2 mm. The core exit thermocouples are installed 13 mm above the upper surface of UCP. The vertical and radial measurement positions of the CETs are presented in Ref. [5] (pp.377-378) and Ref. [5] (pp.385-386), respectively. The CETs were maintained saturated until 15150 s even after core uncovery began partly at 14950 s (to be set out in **Figs. 4-25 through 4-28**). This was ascribed to condensate falling from hot leg nozzles (see p.196 in Ref. [5]). Subsequently, the CETs started to rise. The peak CET of 735 K was seen at the center [TE-EX040-B21-UCP] of UCP located above the B21 rod bundle at 15515 s. At that time, the CETs at the peripheral region of UCP were higher than those at the outer region of UCP. The CETs were kept saturated again after around 15600 s.

Figures 4-22, 4-23, and 4-24 show the distributions of the CETs at the center, peripheral region, and outer region of UCP, respectively. As for the CETs at the center of UCP (**Fig. 4-22**), the maximum temperature was higher in the order of the CETs located above the B21, B24, and B22 or B23 rod bundles.

Concerning the CETs at the peripheral region of UCP (**Fig. 4-23**), the maximum temperatures located above the B18 and B19 rod bundles were higher than those situated above other rod bundles. The maximum temperatures located above the B09 and B12 rod bundles were higher than those situated above the B10 and B14 rod bundles. Large decreases

appeared in the CETs located above the B11 and B15 rod bundles earlier than in those situated above other rod bundles.

Regarding the CETs at the outer region of UCP (**Fig. 4-24**), the maximum temperatures located above the B07 and B08 rod bundles were slightly higher than those situated above other rod bundles. The CETs located above the B03 and B04 rod bundles greatly dropped earlier than those situated above other rod bundles.

Figures 4-25 through 4-28 show the typical cladding surface temperatures of the simulated fuel rods at Positions 9 through 1. Positions 9, 8, 7, 6, 5, 4, 3, 2, and 1 are placed at 3.610 m, 3.048 m, 2.642 m, 2.236 m, 1.830 m, 1.242 m, 1.108 m, 0.612 m, and 0.050 m respectively above the core bottom (see p.222 in Ref. [5]). The representative cladding surface temperatures stand for the cladding surface temperatures of the rod bundles where the highest temperature emerges at each position. The arrangement of high-, mean-, and low-power rod bundles is presented in Ref. [5] (p.228). The cladding surface temperatures were affected by the axial core power profile (i.e., the 9-step chopped cosine) and the core liquid level behavior (**Figs. 4-18 and 4-19**). No cladding surface temperatures at Positions 2 and 1 rose. During the core uncovery period the cladding surface temperatures at Positions 9, 8, 7, 6, 5, 4, and 3 began to increase at 14950 s, 14950 s, 14990 s, 15090 s, 15170 s, 15280 s, and 15400 s, respectively. The peak cladding temperature of 790 K was observed at Position 7 at 15550 s after the liquid level recovered in the SG secondary-side at 15500 s (**Fig. 4-8**). The cladding surface temperatures at Positions 9, 8, 6, 5, 4, and 3 reached 732 K at 15575 s, 781 K at 15585 s, 787 K at 15555 s, 771 K at 15580 s, 719 K at 15530 s, and 658 K at 15535 s, respectively. The cladding surface temperature at Position 9 initiated a large decrease at 15750 s. After around 15920 s the cladding surface temperatures at Positions 8 and 7 began to decrease, while those at Positions 6, 5, and 4 changed to rise. A great decline in the cladding surface temperature at Position 3 started at 16070 s. The cladding surface temperatures at Positions 6, 5, and 4 began to substantially drop at 16290 s, 16310 s, and 16285 s, respectively. This resulted from a significant increase in the core liquid level following the activation of the ACC system at 16210 s (**Figs. 4-12 and 4-19**). The entire core was quenched by 16320 s due to the core liquid level recovery because of coolant injection from the ACC system into both cold legs.

Figures 4-29, 4-30, 4-31, 4-32, 4-33, 4-34, and 4-35 show the distributions of the cladding surface temperatures of the simulated fuel rods at Positions 9, 8, 7, 6, 5, 4, and 3, respectively. At Position 9 (**Fig. 4-29**), the cladding surface temperature rises of the B17 and B22 rod bundles were earlier than that of the B08 rod bundle. The maximum cladding surface temperature was higher in the order of the B22, B17, and B08 rod bundles. The quenching of the cladding surface was faster in the order of the B08, B17, and B22 rod bundles.

At Position 8 (**Fig. 4-30**), the cladding surface temperature increases of the B10 and B13 rod bundles were earlier than that of the B03 rod bundle. The maximum cladding surface temperature was higher in the order of the B13, B10, and B03 rod bundles. The cladding surface was quenched faster in the order of the B03, B10, and B13 rod bundles.

At Position 7 (**Fig. 4-31**), the cladding surface temperature rises of the B10, B13, B17, and B22 rod bundles were earlier than those of the B03 and B08 rod bundles. The maximum cladding surface temperature of the B13 rod bundle was higher than those of other rod bundles. The maximum cladding surface temperature of the B08 rod bundle was nearly equal to those of the B17 and B22 rod bundles. The maximum cladding surface temperature was higher in the order of the B08, B10, and B03 rod bundles. The quenching of the cladding surface was faster in the order of the B03, B08, B10, B22, B13, and B17 rod bundles.

At Position 6 (**Fig. 4-32**), the cladding surface temperatures of the B03, B10, and B13 rod bundles rose almost simultaneously. The maximum cladding surface temperature was higher in the order of the B13, B10, and B03 rod bundles. The cladding surface was quenched faster in the order of the B03, B10, and B13 rod bundles.

At Position 5 (**Fig. 4-33**), the cladding surface temperatures of the B08, B17, and B22 rod bundles rose at almost the same time. The maximum cladding surface temperature was higher in the order of the B17, B08, and B22 rod bundles. The quenching of the cladding surface was faster in the order of the B08, B22, and B17 rod bundles.

At Position 4 (**Fig. 4-34**), the cladding surface temperatures of the B03, B10, and B13 rod bundles rose almost simultaneously. The maximum cladding surface temperature was higher in the order of the B13, B10, and B03 rod bundles. The cladding surface was quenched faster in the order of the B03, B10, and B13 rod bundles.

At Position 3 (**Fig. 4-35**), the cladding surface temperatures of the B08, B17, and B22 rod bundles rose at almost the same time. No marked difference laid in the maximum cladding surface temperature among the B08, B17, and B22 rod bundles. The quenching of the cladding surface was faster in the order of the B08, B22, and B17 rod bundles.

<u>Coolant behaviors in pressure vessel</u>

Figure 4-36 shows the downcomer collapsed liquid level. The liquid level appeared in the downcomer at 1080 s. A considerable drop initiated in the downcomer liquid level at 14350 s. The liquid level recovered in the downcomer at 16250 s with the coolant injection from the ACC system into the cold legs (**Fig. 4-12**). The downcomer liquid level was held at around 5.5-5.7 m after the termination of the ACC coolant injection at 17370 s.

Figure 4-37 shows the upper-head collapsed liquid level. An abrupt depression started in

the upper-head liquid level at 1270 s. The upper-head liquid level was maintained at around 0.05-0.10 m after 1850 s.

4.3.2 Thermal-hydraulic Responses in Primary Loops

Figures 4-38 and 4-39 show the liquid levels and fluid temperatures in the hot legs, respectively. The hot leg liquid level is estimated from the fluid densities measured by use of a three-beam gamma-ray densitometer. The hot leg fluid became saturated at 880 s almost concurrently with the liquid level formation in the hot leg. The liquid level in the hot leg with an inner-diameter of 0.207 m was kept at around 0.155-0.175 m in both loops at around 2000-14200 s. The hot leg liquid level became lost at 14620 s after an abrupt decrease initiated in the upper plenum liquid level at 14450 s (**Fig. 4-17**). The liquid level recovered in the hot leg by coolant from the PZR (**Fig. 4-13**). The hot leg liquid level rose with the ACC coolant injection into the cold leg (**Fig. 4-12**). The hot leg liquid level was held at around 0.100-0.115 m after the termination of the ACC coolant injection at 17370 s. The hot leg fluid temperature indicated superheating during the two time periods of around 15220-15700 s and around 16100-16500 s. The hot leg fluid temperature showed subcooling after around 17200 s.

Figures 4-40 and 4-41 show the liquid levels and fluid temperatures in the cold legs, respectively. The cold leg liquid level is evaluated from the fluid densities measured by means of a three-beam gamma-ray densitometer. The cold legs were filled with subcooled water until the primary pressure dropped to around 10 MPa (**Fig. 4-14**). The liquid levels formed in the cold legs at around 1500 s. When the liquid level in the cold leg with an inner-diameter of 0.207 m depressed to around 0.17 m, the cold leg fluid became saturated. The cold leg liquid level once became close to zero just before the third AM action start. When the cold leg liquid level rose up to around 0.15 m resulting from the ACC coolant injection (**Fig. 4-12**), the cold leg fluid temperature indicated subcooling. The cold leg fluid temperature increased with a reduction in the cold leg liquid level after the termination of the ACC coolant injection. The cold leg liquid level became close to zero afterwards.

Figures 4-42 and 4-43 show the collapsed liquid levels in the downflow-side and upflow-side of the crossover legs, respectively. The crossover leg downflow-side liquid level started to drop at 12000 s, and then turned to rise at 14300 s. The crossover leg upflow-side liquid level began a decline at 15580 s. During the ACC coolant injection period (**Fig. 4-12**) the liquid levels in the downflow-side and upflow-side of the crossover legs decreased and increased, respectively.

4.3.3 Thermal-hydraulic Responses of Steam Generators

Figures 4-44 through 4-47 show the collapsed liquid levels in the instrumented SG U-tubes. The instrumented SG U-tubes designated as Tubes 1 and 6 are short tubes (Type 1; see p.267

in Ref. [5]), Tubes 2 and 5 are medium tubes (Type 5), and Tubes 3 and 4 are long tubes (Type 9). The liquid level in the upflow-side balanced that in the downflow-side for each SG U-tube. The trend of the liquid level change was comparable for the two same-length SG U-tubes consisting of short, medium, and long tubes. However, the liquid level behaviors in the SG U-tubes were asymmetrical between two loops. Considerable drain of the water column initiated the earliest in Tube 6 and the latest in Tube 2 among the U-tubes of both SGs. The liquid level drop in the downflow-side and upflow-side of the SG U-tubes continued down to the crossover leg downflow-side (**Fig. 4-42**) and the SG inlet plenum (to be plotted in **Fig. 4-52**), respectively. Resultantly, the SG U-tubes became voided. The liquid levels recovered in the downflow-side and upflow-side of the SG U-tubes at around 17350 s and around 17000 s respectively with the ACC coolant injection into the cold legs (**Fig. 4-12**). Non-uniform flow behaviors were found in the SG U-tubes with nitrogen gas ingress. The water column drained faster in Tubes 1 and 6 and slower in Tubes 2 and 5 among the U-tubes of both SGs. At 28000 s the liquid level in each U-tube of SG in loop with PZR remained at a certain liquid level while the U-tubes of SG in loop without PZR were emptied of liquid.

To investigate the accumulating status of nitrogen gas in the SG U-tube, nitrogen gas mole fraction M in the steam-gas mixture is expressed by

$$\mathrm{M} = \frac{P - P_S}{P} \tag{1}$$

where P is the total pressure of the steam-gas mixture that is represented by the PZR pressure (**Fig. 4-14**). P_S is the steam pressure that is equivalent to the steam saturation pressure based on the SG U-tube fluid temperature by assuming 100% relative humidity of saturated steam in the steam-gas mixture. The fluid temperatures in the downflow-side of the SG U-tubes at Position 7 (= at 5.941 m above the SG U-tube bottom) were chosen as the SG U-tube fluid temperatures for evaluating the nitrogen gas mole fraction. This selection took account of the SG U-tube liquid level behaviors (**Figs. 4-44 through 4-47**). **Figures 4-48 and 4-49** show the fluid temperatures at Position 7 in the downflow-side of the SG U-tubes in loops with and without PZR respectively from 18000 s to 20000 s. Here, the fluid temperatures of Tube 1 (one of two short tubes) in loop with PZR and Tube 2 (one of two medium tubes) in loop without PZR were unavailable on account of the bad trends. The tendency of the fluid temperature variation was similar for the identical-length SG U-tubes until around 18400 s. The SG U-tube fluid temperature became the same afterwards. The SG U-tube fluid temperature was lower in loop with PZR than in loop without PZR. **Figures 4-50 and 4-51** show the estimated nitrogen gas mole fractions of the SG U-tubes in loops with and without PZR, respectively. The nitrogen gas mole fractions of the SG U-tubes exceeded zero since around 18200 s. At around 18400 s the nitrogen gas mole fractions of the SG U-tubes in loops with and without PZR were evaluated to be approximately 0.40 and 0.35, respectively. Most of the

nitrogen gas mole fractions of the SG U-tubes gradually increased thereafter. The nitrogen gas mole fraction of the SG U-tube in loop with PZR was generally greater than that in loop without PZR. The reason is that the steam pressure P_s was lower in loop with PZR than in loop without PZR, relying on the SG U-tube fluid temperature. The cold leg in loop without PZR has the break, whereas the break flow area accorded with 0.1% of the 1/48-scaled cross-sectional area of the reference PWR cold leg is very small. However, this may affect the difference in the nitrogen gas mole fractions of the SG U-tubes between the two loops.

Figure 4-52 shows the SG inlet plenum collapsed liquid level. A substantial depression initiated in the SG inlet plenum liquid level at 13700 s. The SG inlet plena became empty of liquid at 14230 s. The liquid levels recovered in the SG inlet plena at around 16560 s with the ACC coolant injection into the cold legs (**Fig. 4-12**).

Figures 4-53 and 4-54 show the SG secondary-side fluid temperatures in loops with and without PZR, respectively. Positions 1, 3, 5, 7, and 9 are placed at 0.811 m, 2.101 m, 3.381 m, 5.941 m, and 8.501 m respectively above the SG U-tube bottom. Depending on the SG secondary-side liquid level (**Fig. 4-8**) the SG secondary-side fluid temperatures at Positions 1, 3, 5, 7, and 9 showed superheating after 8000 s, 6500 s, 5100 s, 4300 s, and 3000 s, respectively. The SG secondary-side fluid temperatures at Positions 1, 3, 5, 7, and 9 were mostly maintained saturated after 15500 s, 17000 s, 17500 s, 18300 s, and 19120 s, respectively.

Table 4-1 Initial steady state conditions

Items	Tag Name (Loops with / without PZR)	Specified (Loops with / without PZR)	Measured *1 (Loops with / without PZR)
Pressure vessel			
Core power (MW)	WE270A-T	10.0±0.07	10.10
Downcomer-to-upper head bypass (%)	None	0.3	Not measured
Primary loop			
Hot leg fluid temperature (K)	TE020C-HLA /TE160C-HLB	598.1±2.75	597.7 / 597.7
Cold leg fluid temperature (K)	TE070C-CLA /TE210C-CLB	562.4±2.75	563.5 / 563.5
Mass flow rate (kg/s / loop)	FE020A-LSA / FE160A-LSB	24.3±1.25	24.83 / 24.75
Downcomer-to-hot leg bypass (kg/s)	FE010-HLA / FE150-HLB	0.049±0.01	0.050 / 0.047
Pressurizer (PZR)			
Pressure (MPa)	PE300A-PR	15.5±0.108	15.62
Liquid level (m)	LE280-PR	7.2±0.25	7.44
Steam generator			
Secondary-side pressure (MPa)	PE430-SGA / PE450-SGB	7.3±0.054	7.31 / 7.35
Secondary-side liquid level (m)	LE430-SGA / LE450-SGB	10.3±0.38	10.26 / 10.24
Steam flow rate (kg/s)	FE440-SGA / FE480-SGB	2.74±0.10	2.63 / 2.67
Main feedwater flow rate (kg/s)	FE430-SGA / FE470-SGB	2.74±0.05	2.70 / 2.69
Main feedwater temperature (K)	TE430-SGA / TE470-SGB	495.2±2.63	497.0 / 496.1
Temperature of water injection into secondary-side through feedwater line (K)	TE880-RWST	310±2.37	311.0
Accumulator system			
Pressure (MPa)	PE650-ACC / PE660-ACH	4.51±0.054	4.57 / 4.55
Temperature (K)	TE660-ACC / TE700-ACH	320±2.3 / 2.4	320.9 / 321.5
Water level above tank bottom (m) *2	LE650-ACC / LE660-ACH	6.8±0.12/0.15	6.81 / 6.81

*1 Averaged for 60 s (-60 to 0 s)

*2 Distance from standpipe top to tank bottom is 5.22 m.

Table 4-2 Chronology of major events until break valve closure

Time (s)	Event
0	Break valve open, scram signal, start of primary coolant pumps rotation speed increase (to 1470 rpm in 4 s)
1	Closure of SG main steam stop valve
2	Termination of SG main feedwater
3	Manual closure of SG main steam isolation valves
19	Initiation of coastdown of primary coolant pumps
20	Initiation of core power decay
190-8120	Cycle opening of safety valves in both SGs
269	Stop of primary coolant pumps
529	PZR backup heater power off
760	PZR liquid level became lost.
8130	Secondary-side of both SGs became empty of liquid.
9250	Initiation of PZR liquid level recovery
13680-15030	Cycle opening of safety valve of PZR
14950	Initiation of increases in cladding surface temperatures at Positions 9 and 8 by core boil-off
15020	Initiation of SG secondary-side depressurization by fully opening safety valves in both SGs as first AM action
15040	Initiation of primary depressurization by completely opening safety valve of PZR as second AM action
15150	Initiation of increase in core exit temperature at center of upper core plate
15360	Initiation of water injection into secondary-side of both SGs through feedwater lines employing AFW pumps as third AM action
15500	Initiation of SG secondary-side liquid level recovery
15515	Peak core exit temperature of 735 K was seen at center of upper core plate.
15550	Peak cladding temperature of 790 K was observed at Position 7.
16210	Initiation of ACC system in both loops
16320	Whole core quench
17020	PZR liquid level became lost again.
17370	Termination of ACC system in both loops
18200	Initiation of degradation in primary depressurization due to nitrogen gas accumulation in SG U-tubes
28818	Core power off
28833	Break valve closure

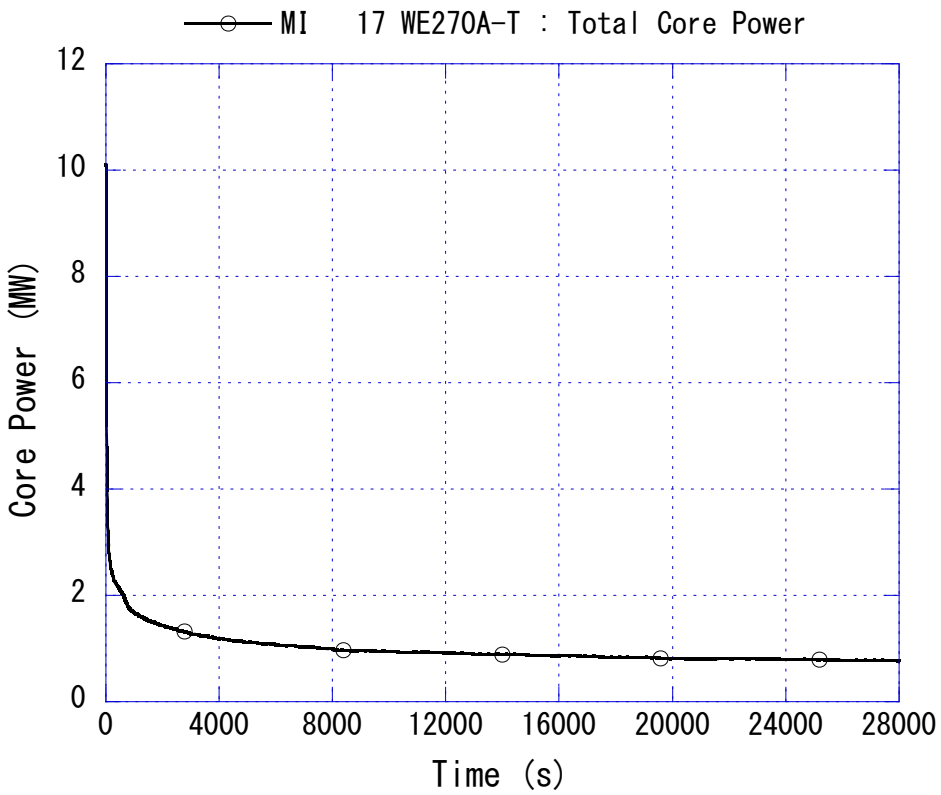

Fig. 4-1 Core power

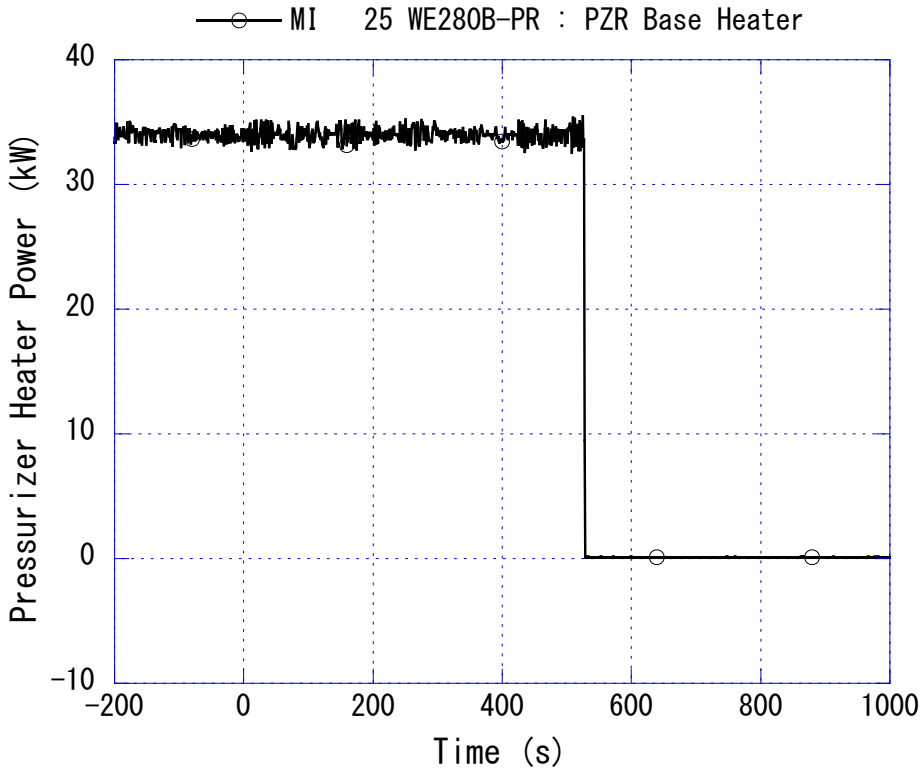

Fig. 4-2 Pressurizer heater power

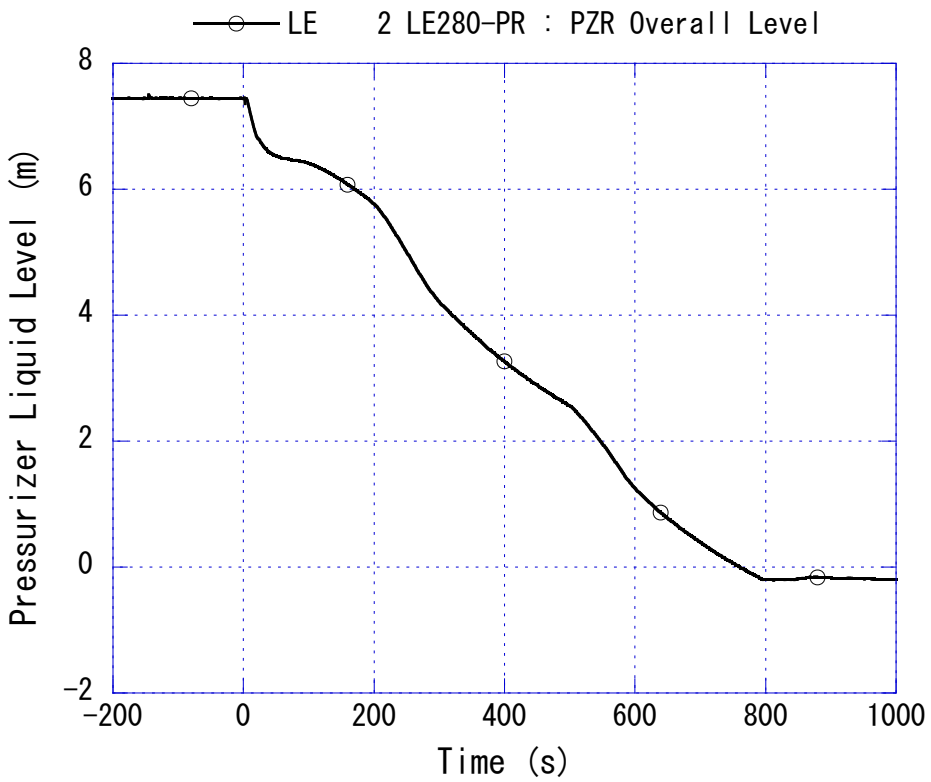

Fig. 4-3 Pressurizer liquid level (-200 to 1000 s)

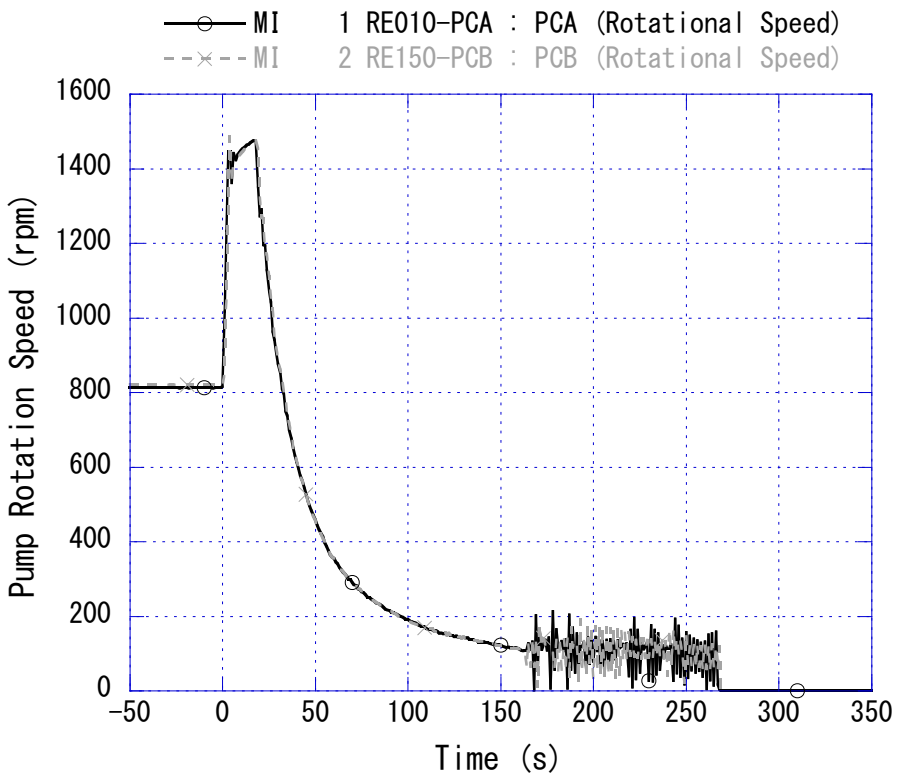

Fig. 4-4 Primary coolant pump rotation speed

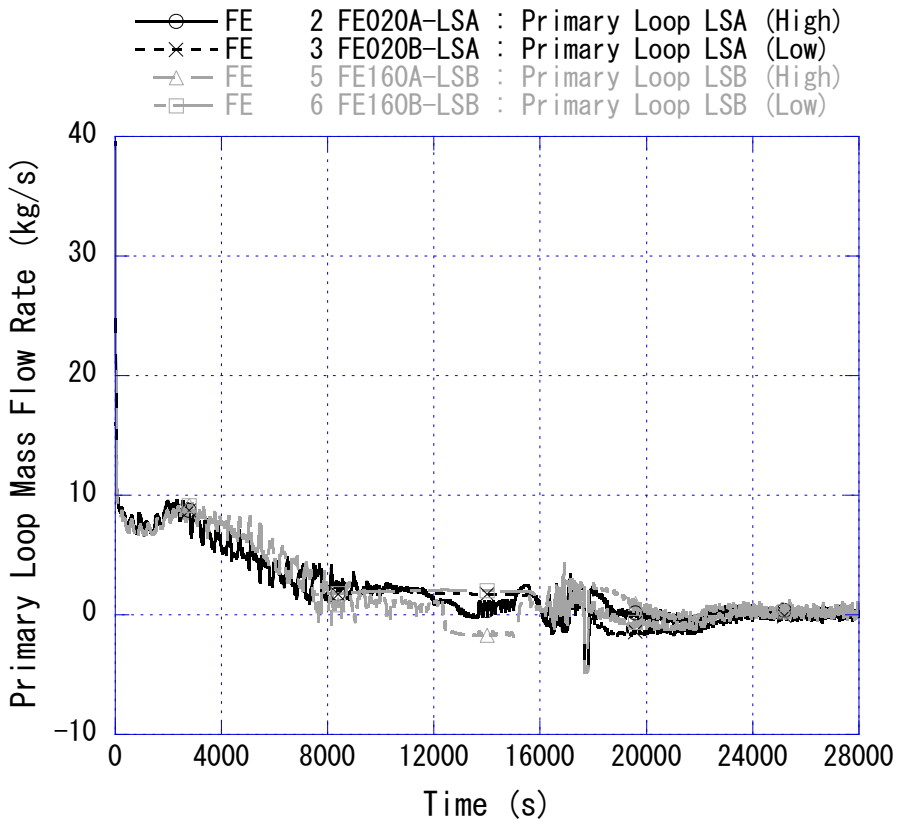

Fig. 4-5 Primary loop mass flow rate

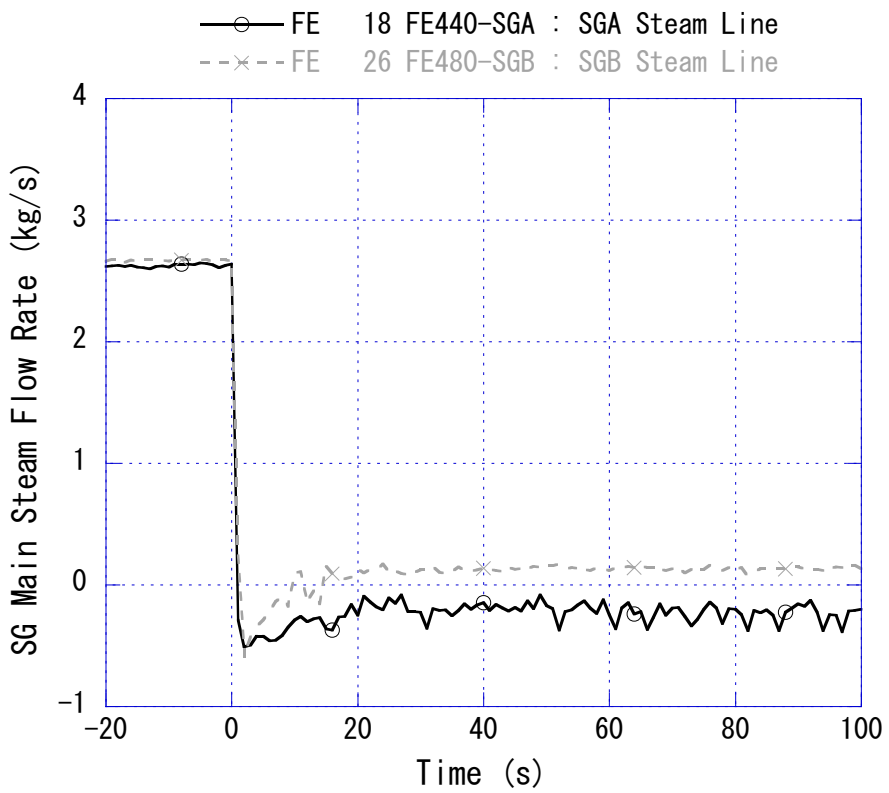

Fig. 4-6 SG main steam flow rate

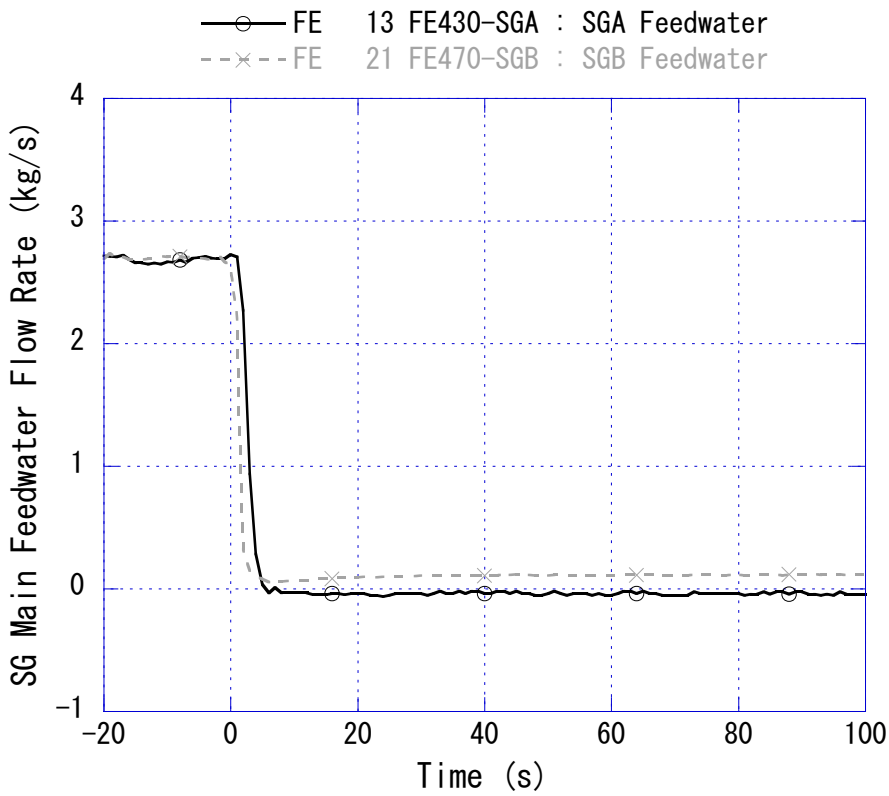

Fig. 4-7 SG main feedwater flow rate

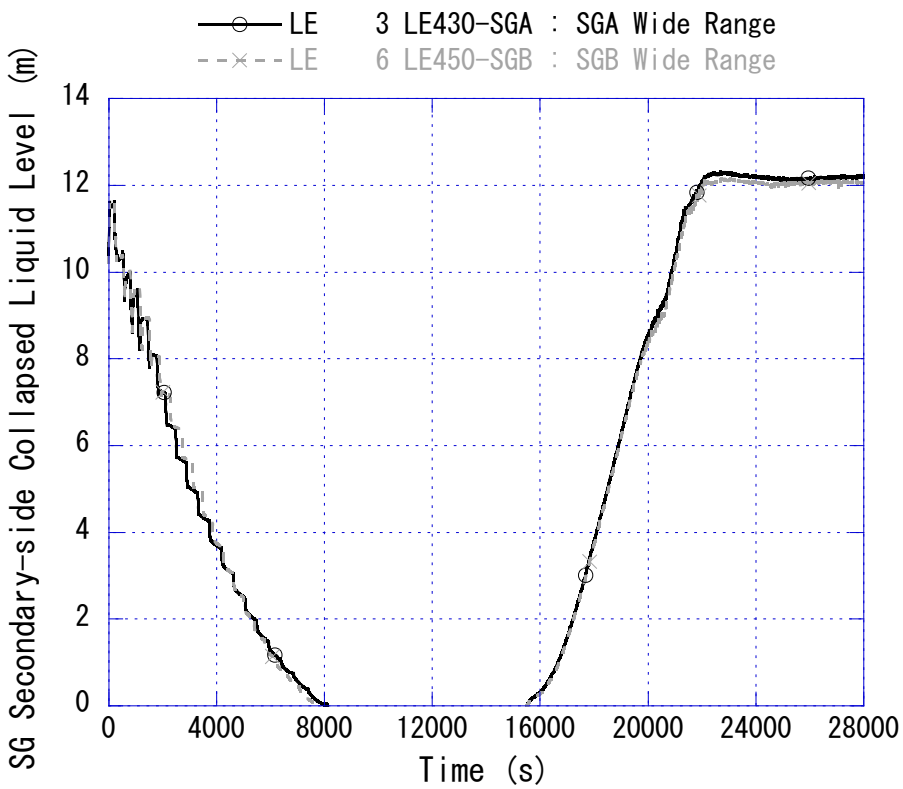

Fig. 4-8 SG secondary-side collapsed liquid level

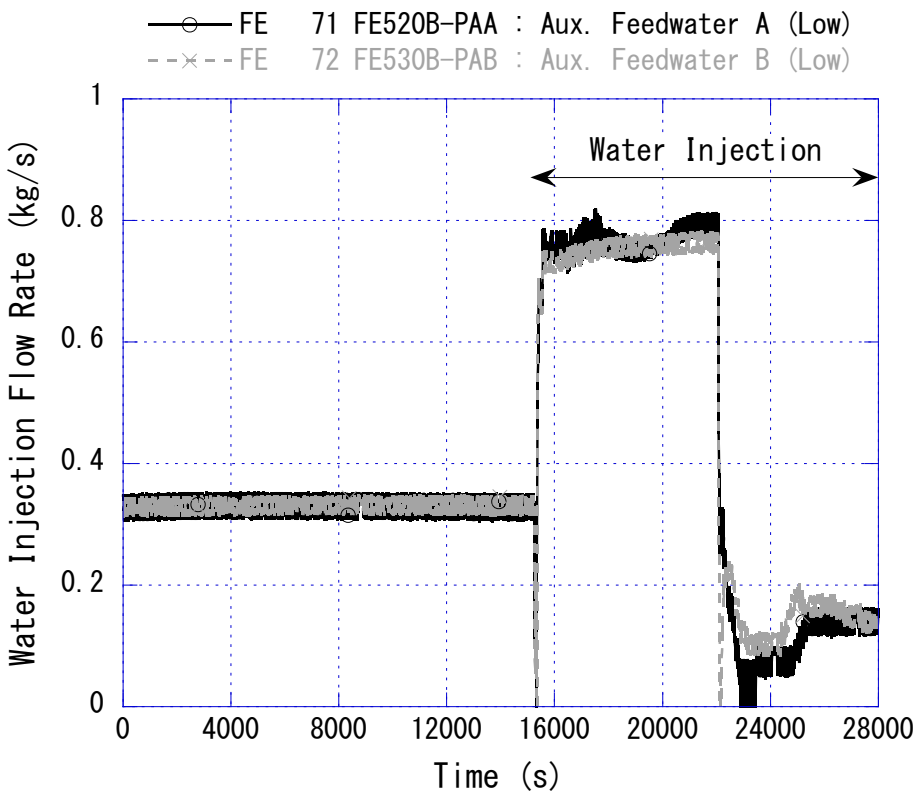

Fig. 4-9 Water injection flow rate into SG secondary-side via AFW pump

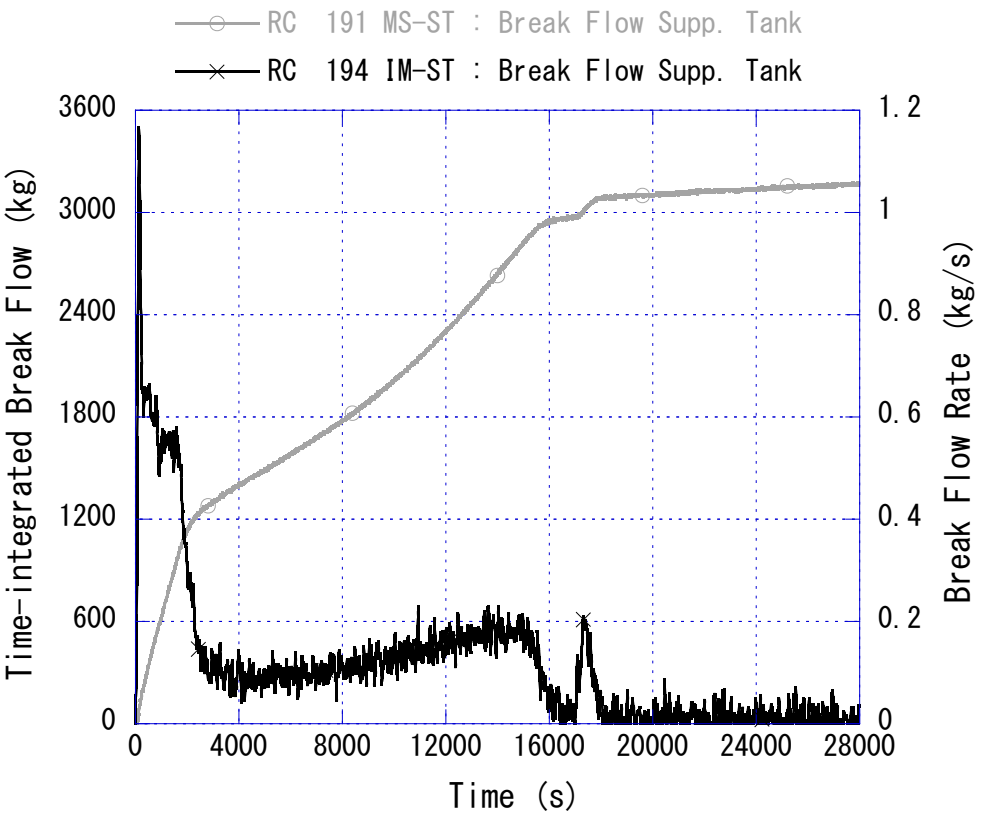

Fig. 4-10 Time-integrated break flow and break flow rate

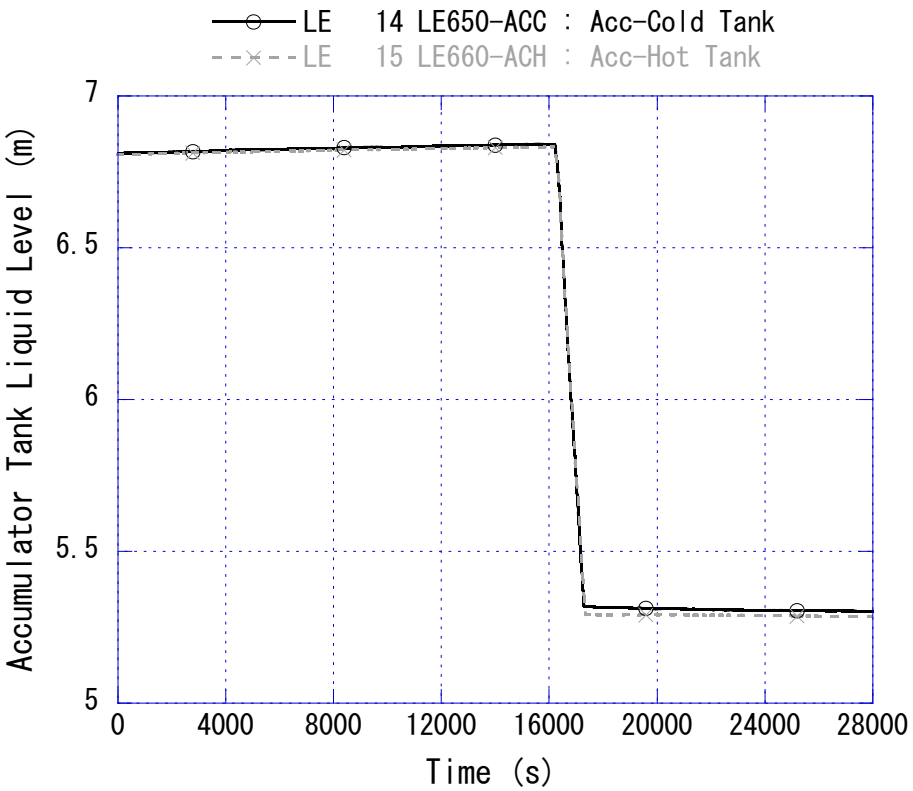

Fig. 4-11 Liquid level in accumulator tank

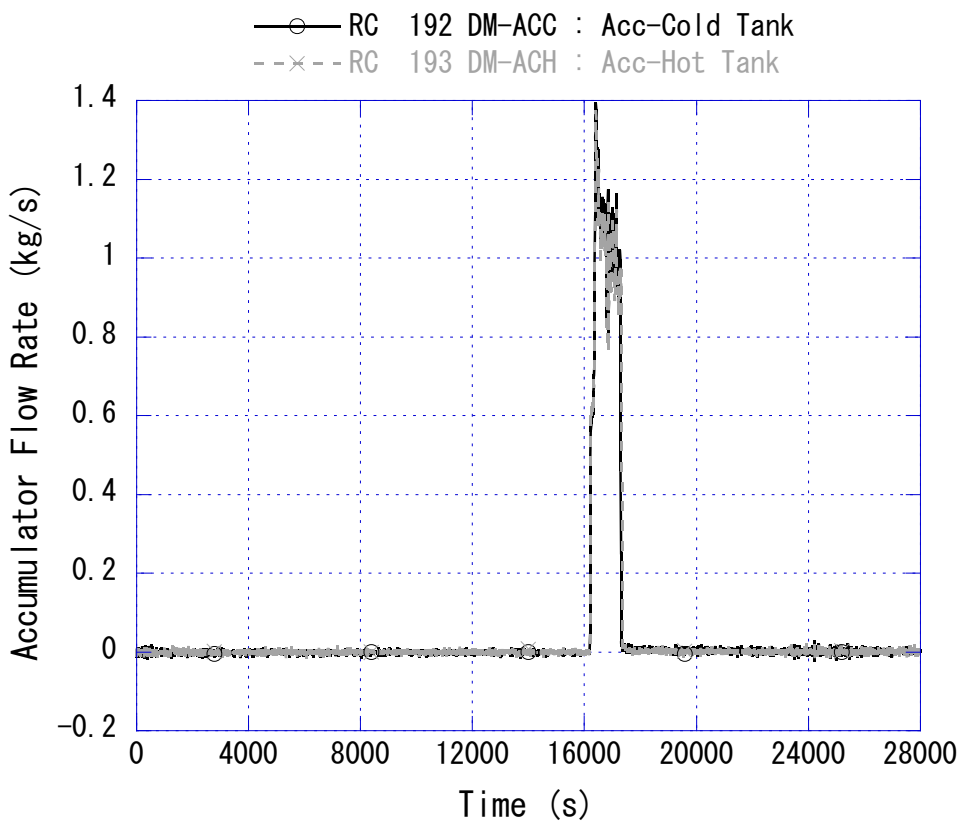

Fig. 4-12 Coolant injection flow rate from accumulator tank

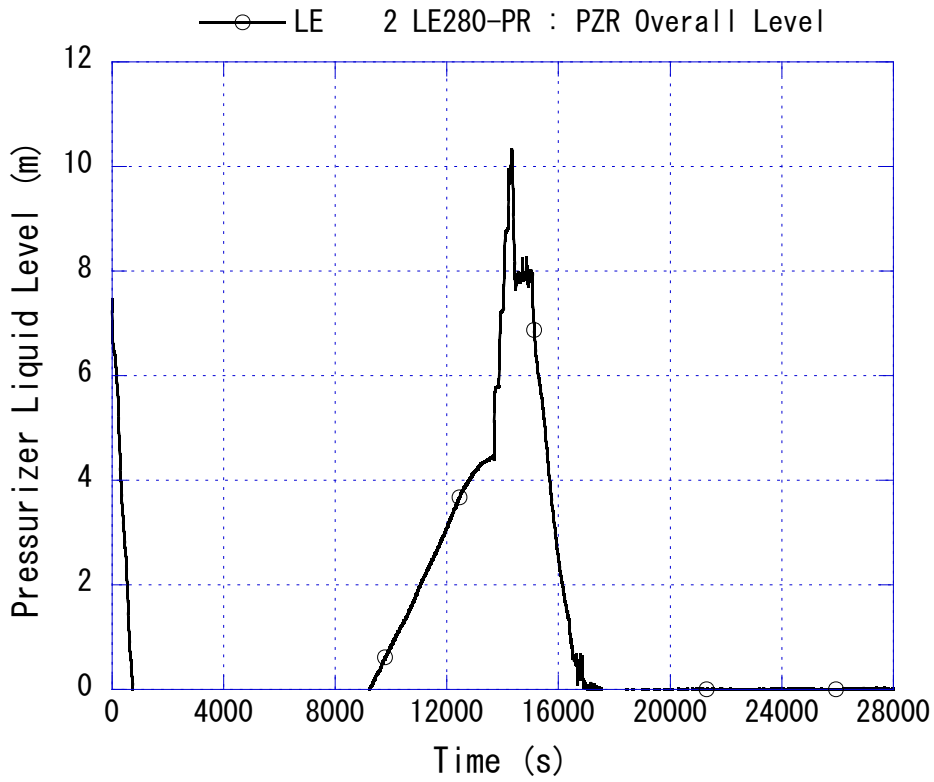

Fig. 4-13 Pressurizer liquid level (0 to 28000 s)

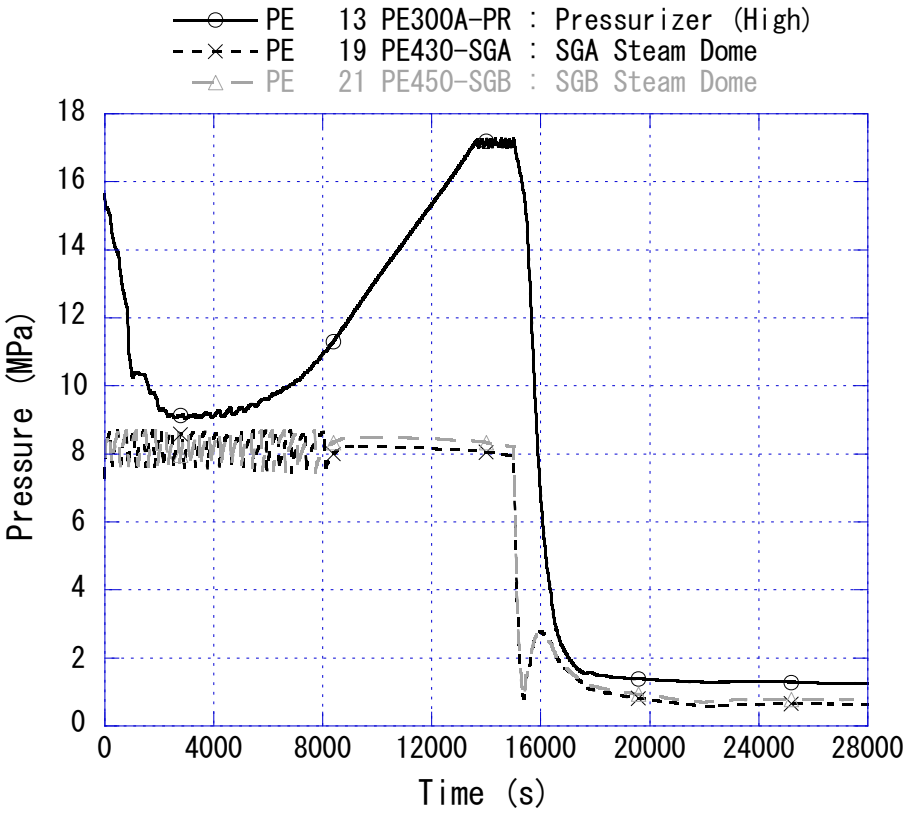

Fig. 4-14 Primary and secondary pressures (0 to 28000 s)

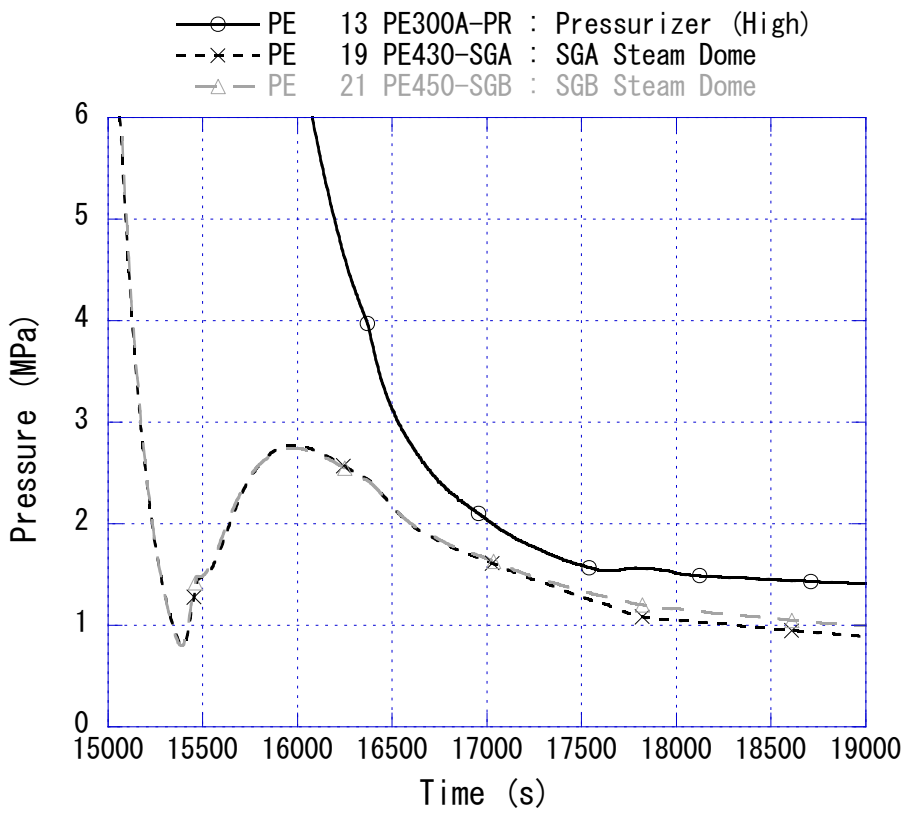

Fig. 4-15 Primary and secondary pressures (15000 to 19000 s)

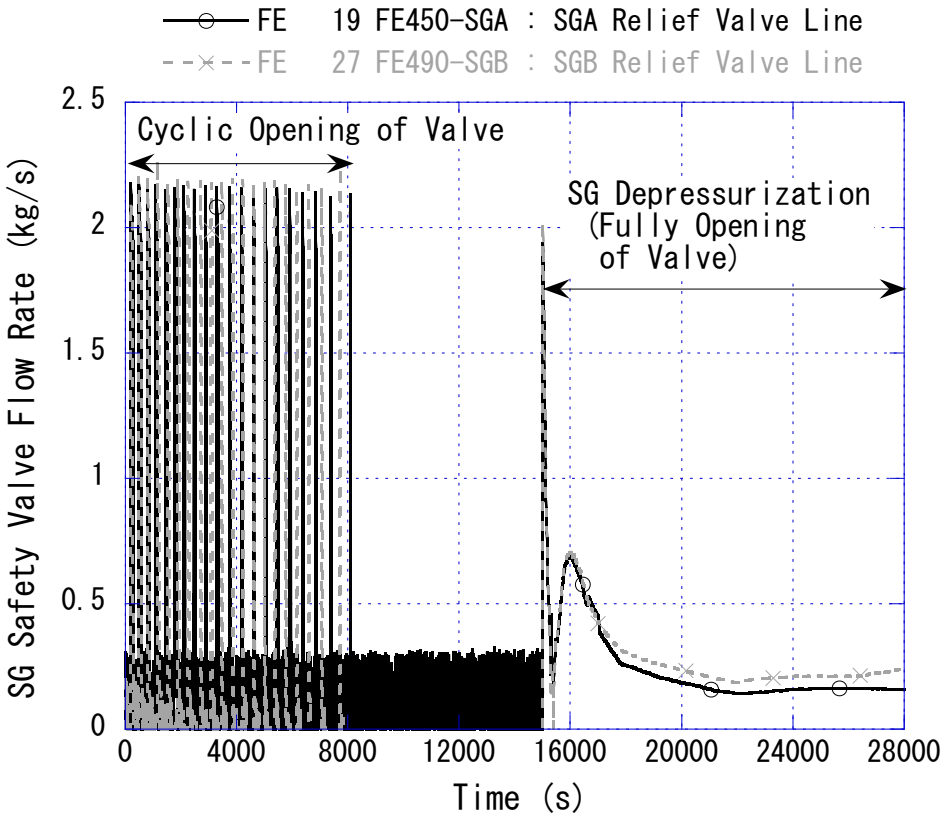

Fig. 4-16 SG safety valve flow rate

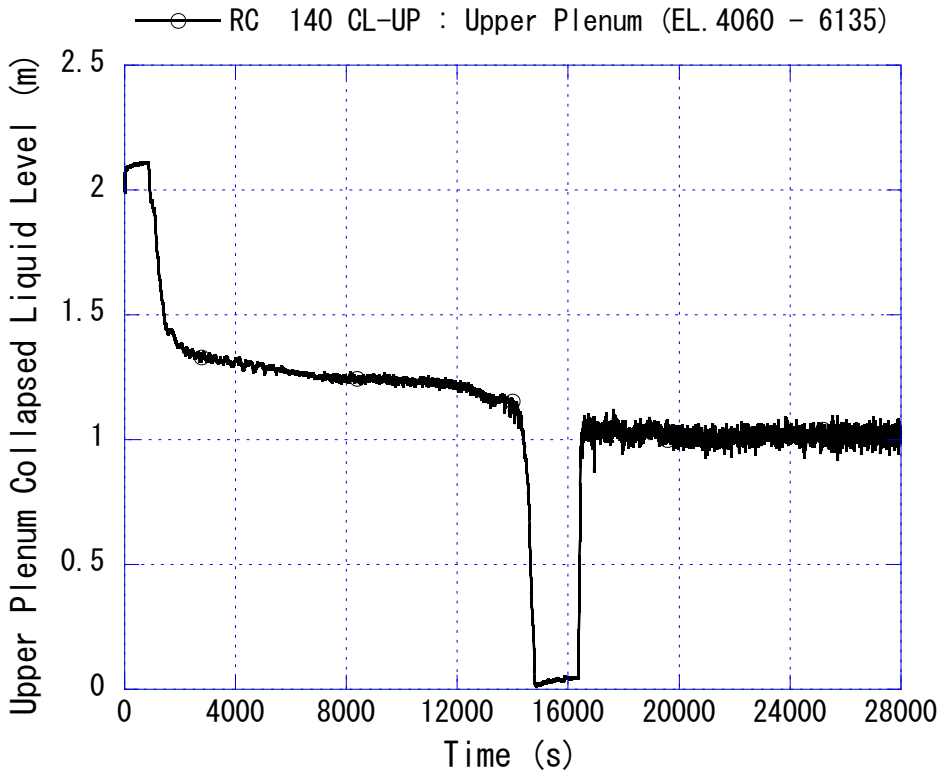

Fig. 4-17 Upper plenum collapsed liquid level

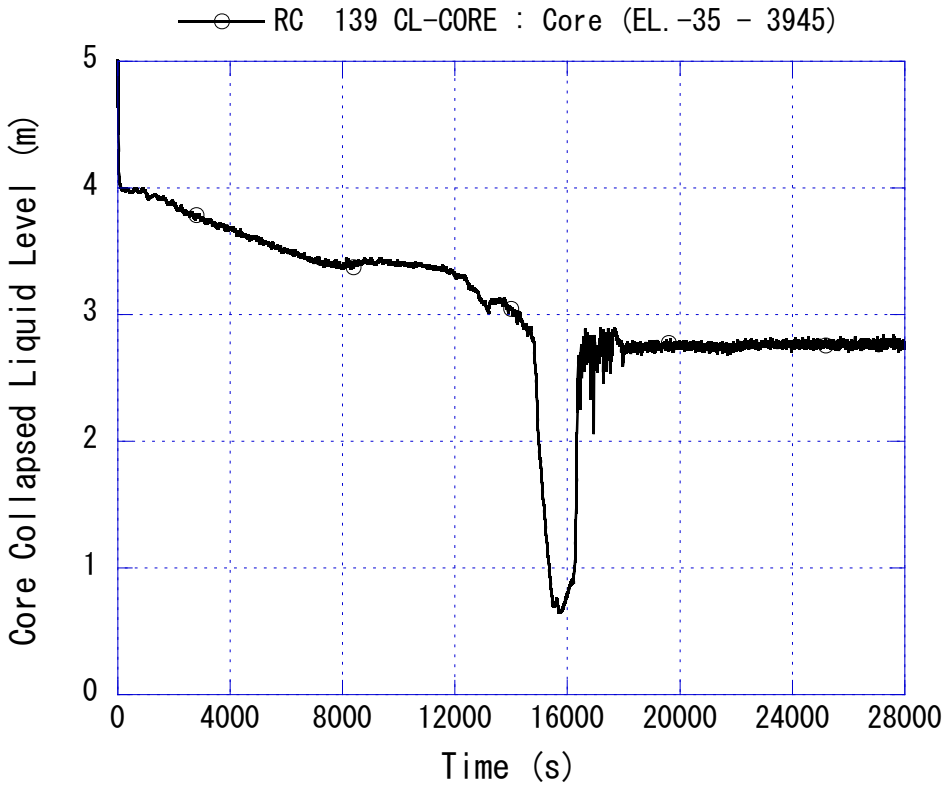

Fig. 4-18 Core collapsed liquid level (0 to 28000 s)

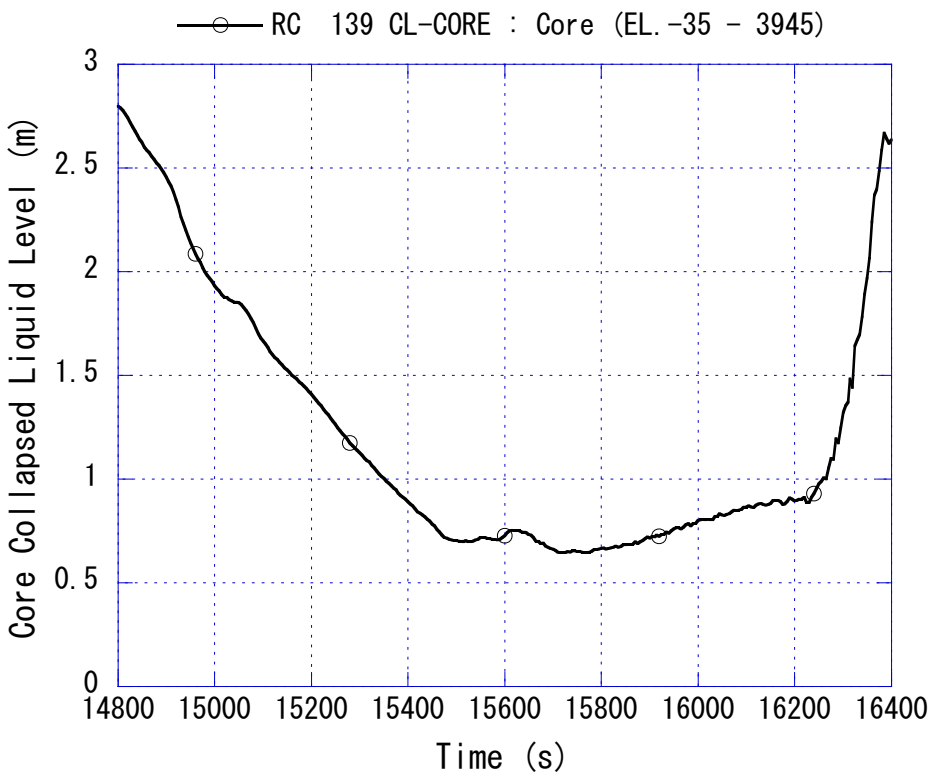

Fig. 4-19 Core collapsed liquid level (14800 to 16400 s)

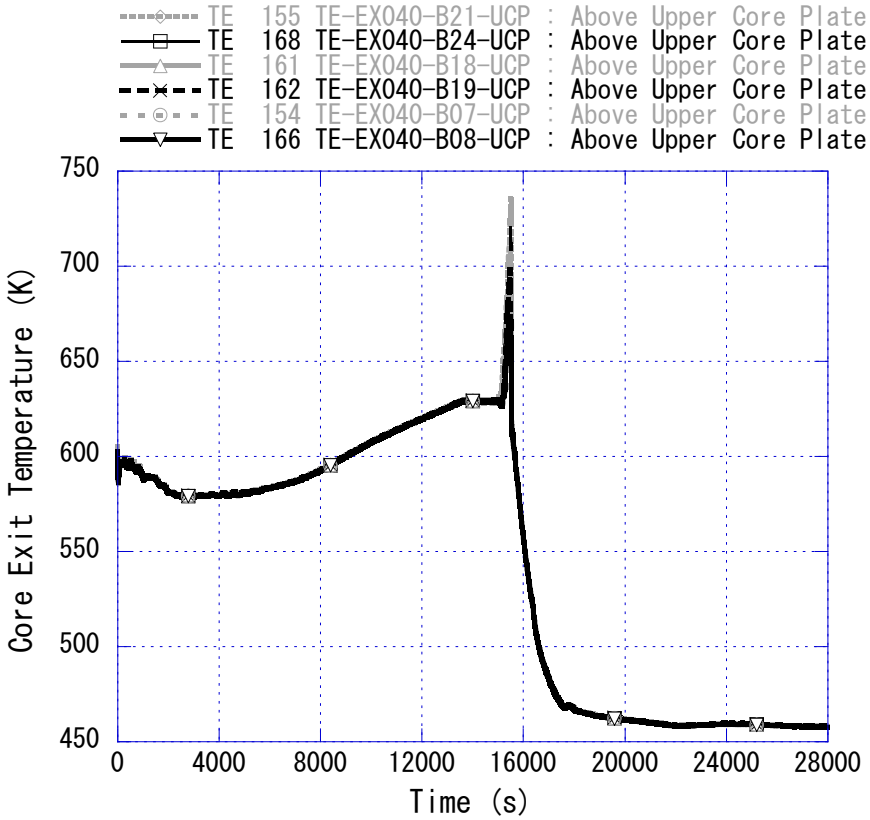

Fig. 4-20 Typical core exit temperatures (0 to 28000 s)

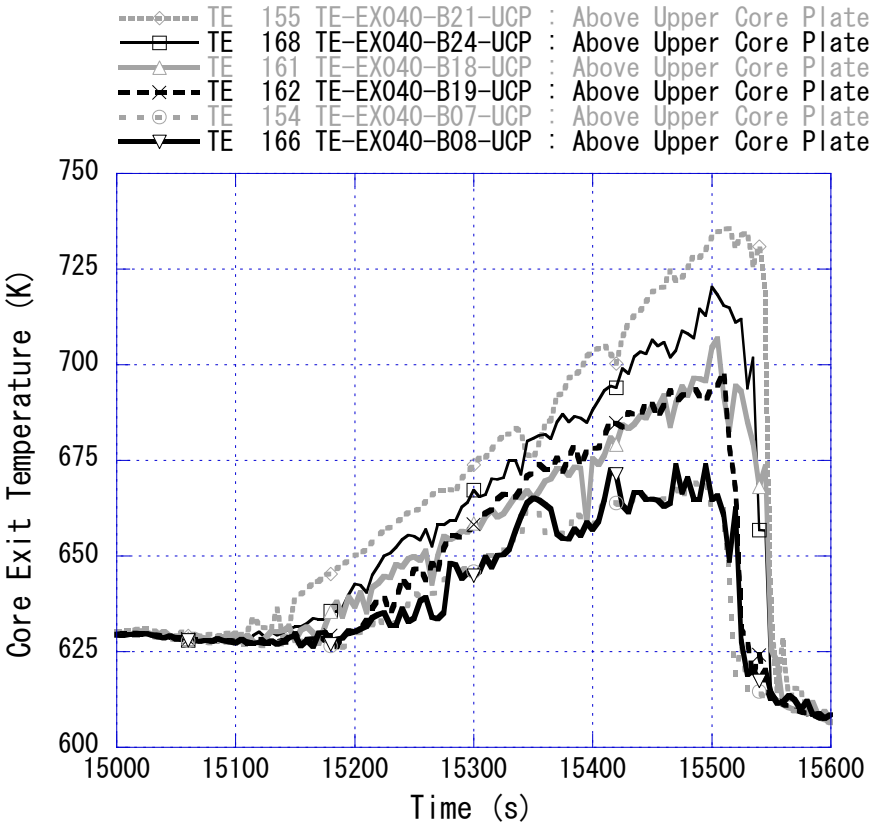

Fig. 4-21 Typical core exit temperatures (15000 to 15600 s)

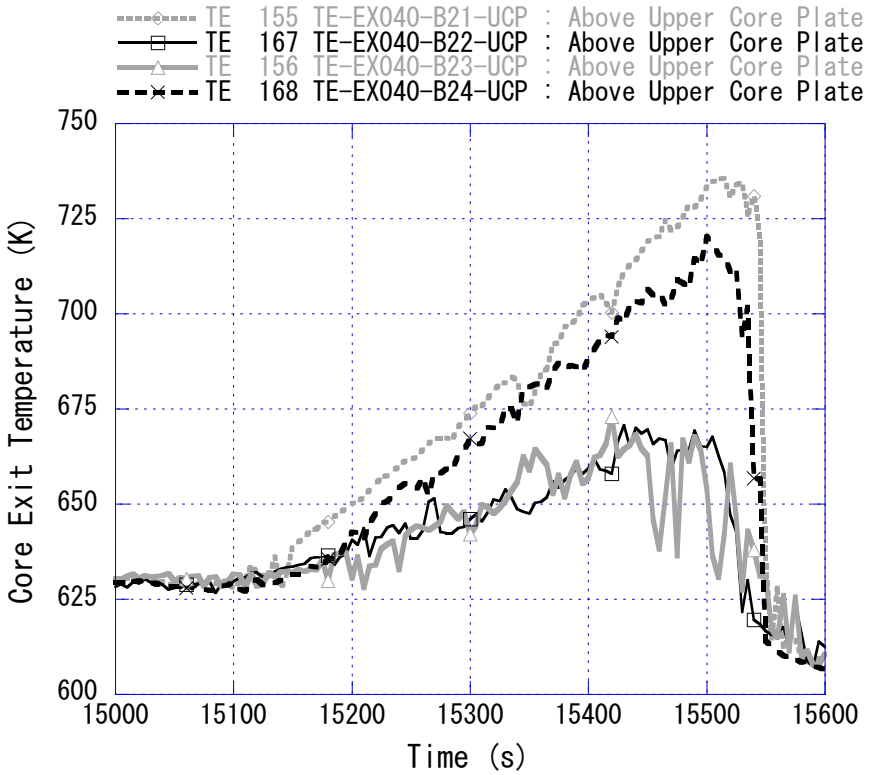

Fig. 4-22 Core exit temperatures at center of UCP (15000 to 15600 s)

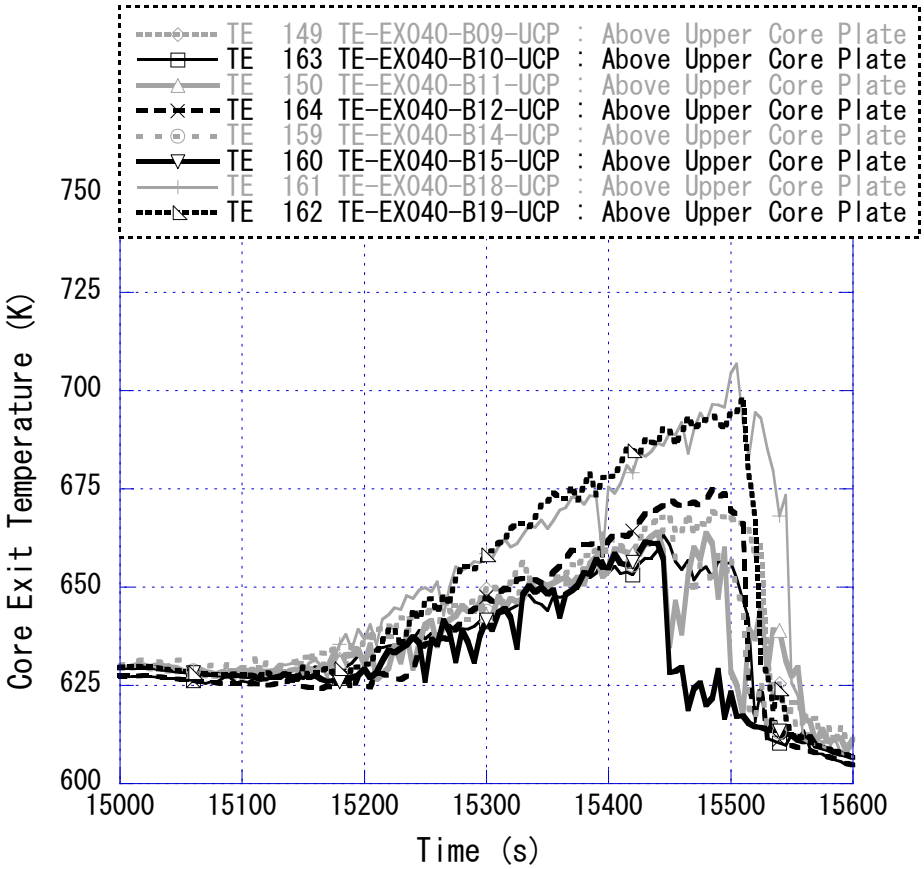

Fig. 4-23 Core exit temperatures at peripheral region of UCP (15000 to 15600 s)

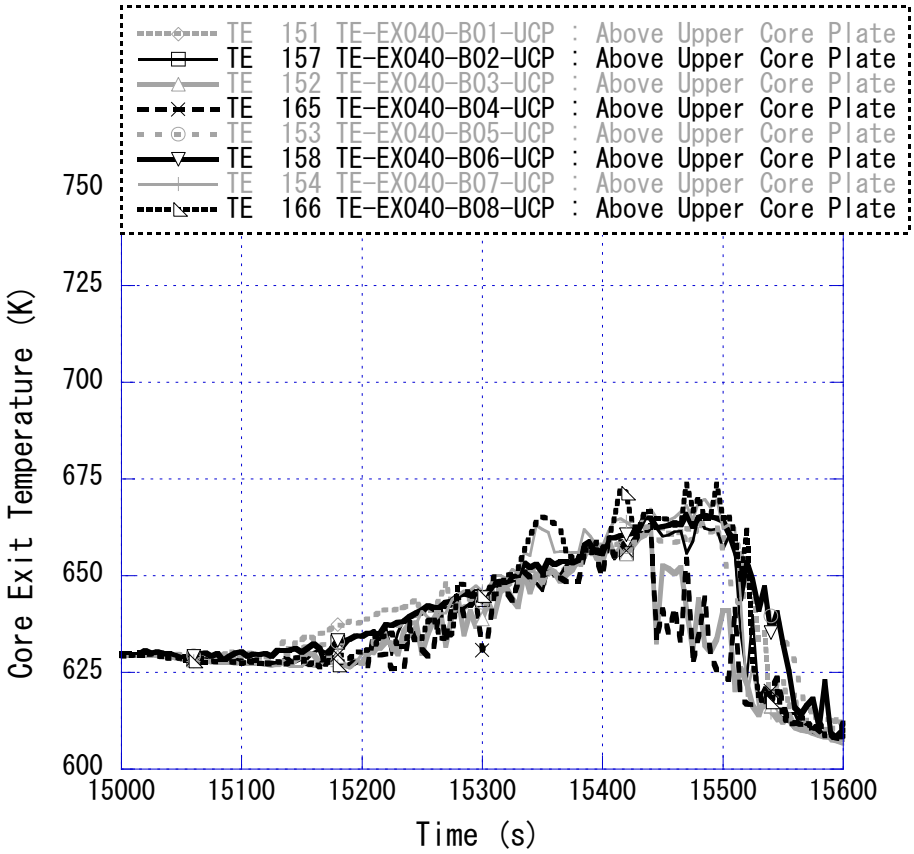

Fig. 4-24 Core exit temperatures at outer region of UCP (15000 to 15600 s)

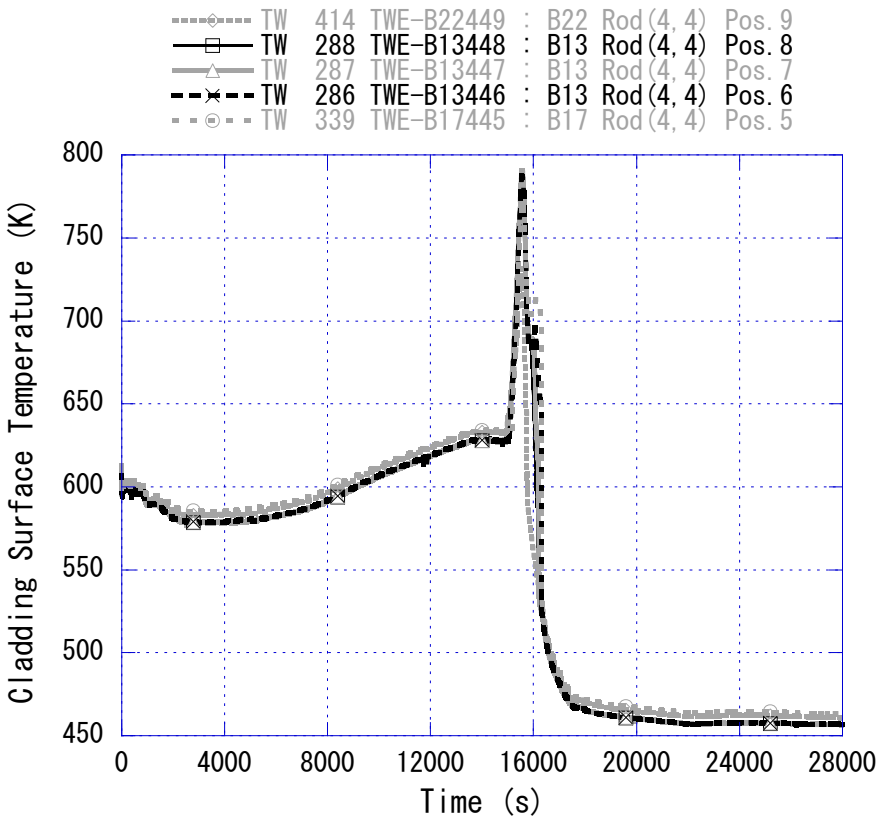

Fig. 4-25 Typical cladding surface temperatures at Positions 9-5 (0 to 28000 s)

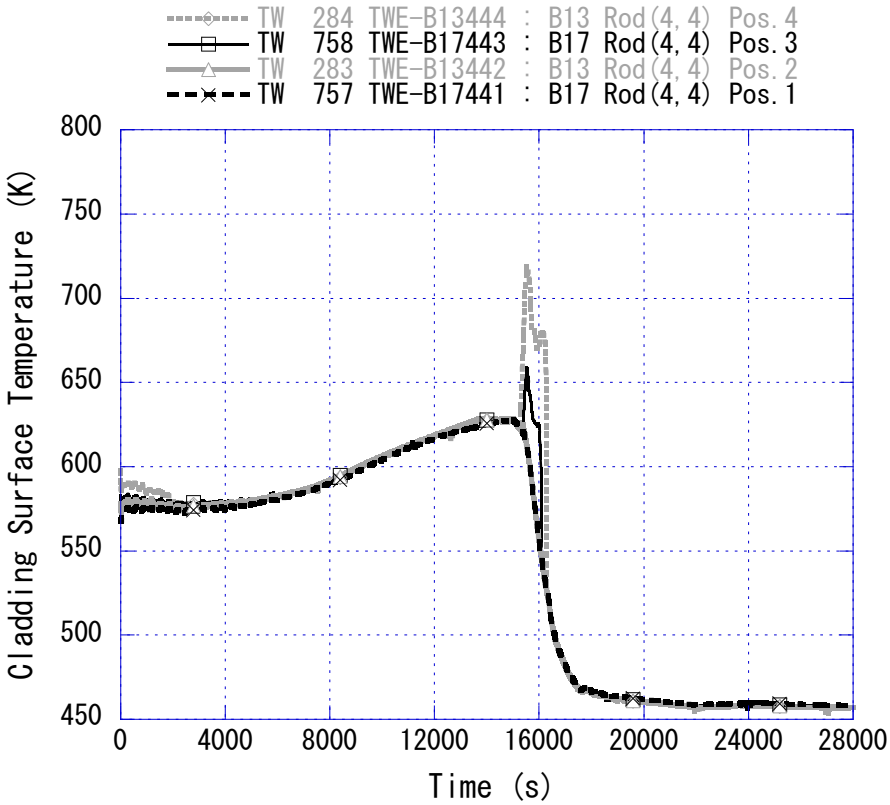

Fig. 4-26 Typical cladding surface temperatures at Positions 4-1 (0 to 28000 s)

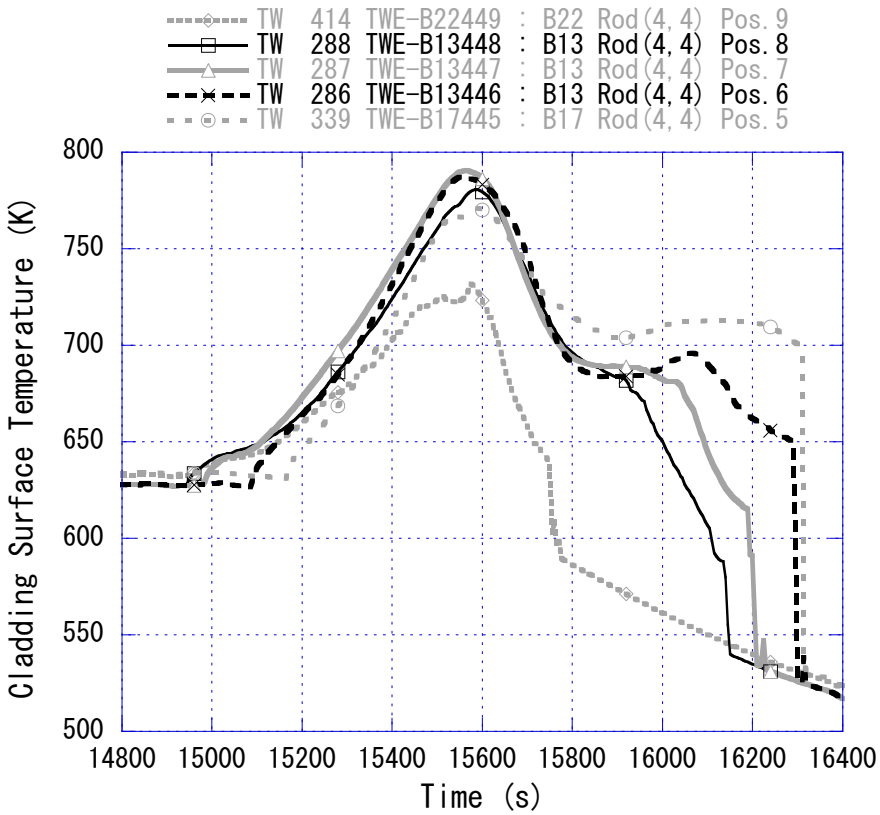

Fig. 4-27 Typical cladding surface temperatures at Positions 9-5 (14800 to 16400 s)

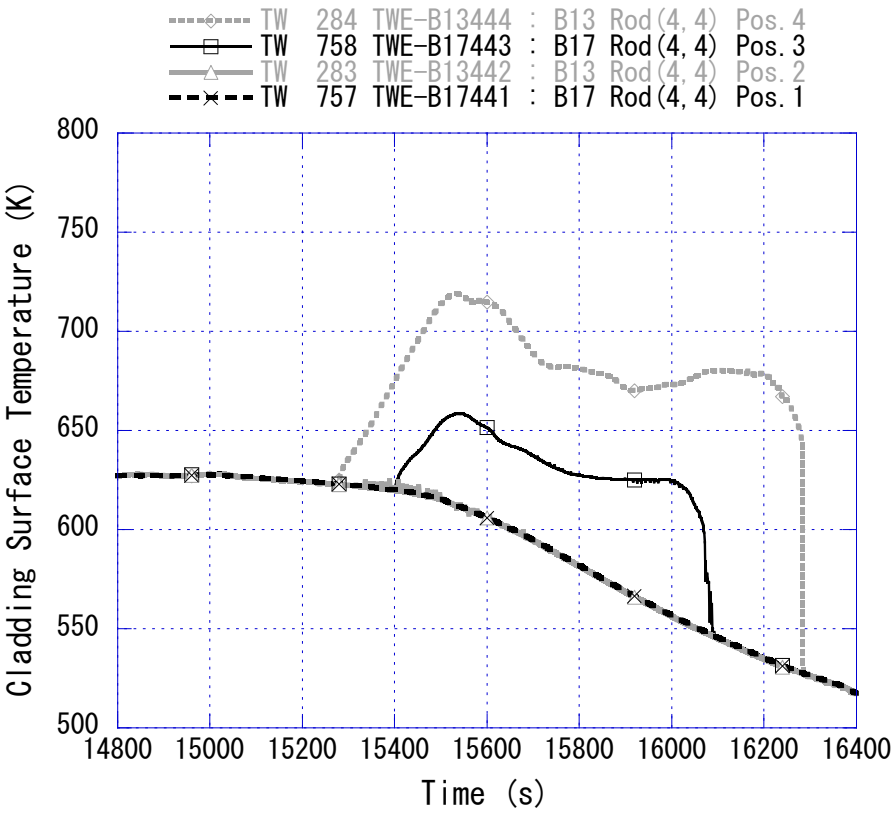

Fig. 4-28 Typical cladding surface temperatures at Positions 4-1 (14800 to 16400 s)

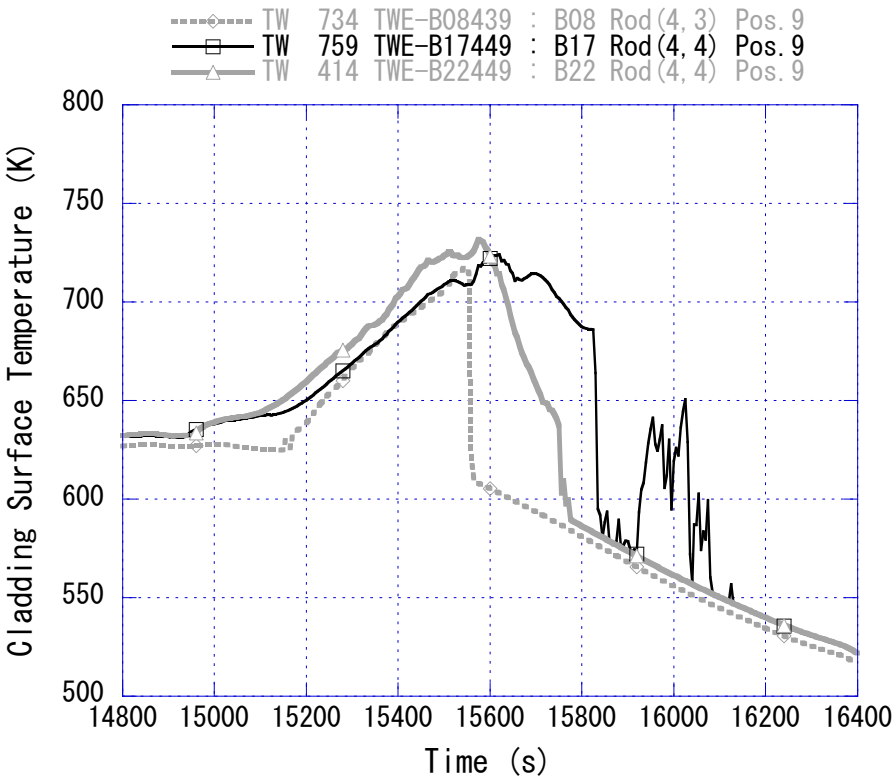

Fig. 4-29 Cladding surface temperatures at Position 9 (14800 to 16400 s)

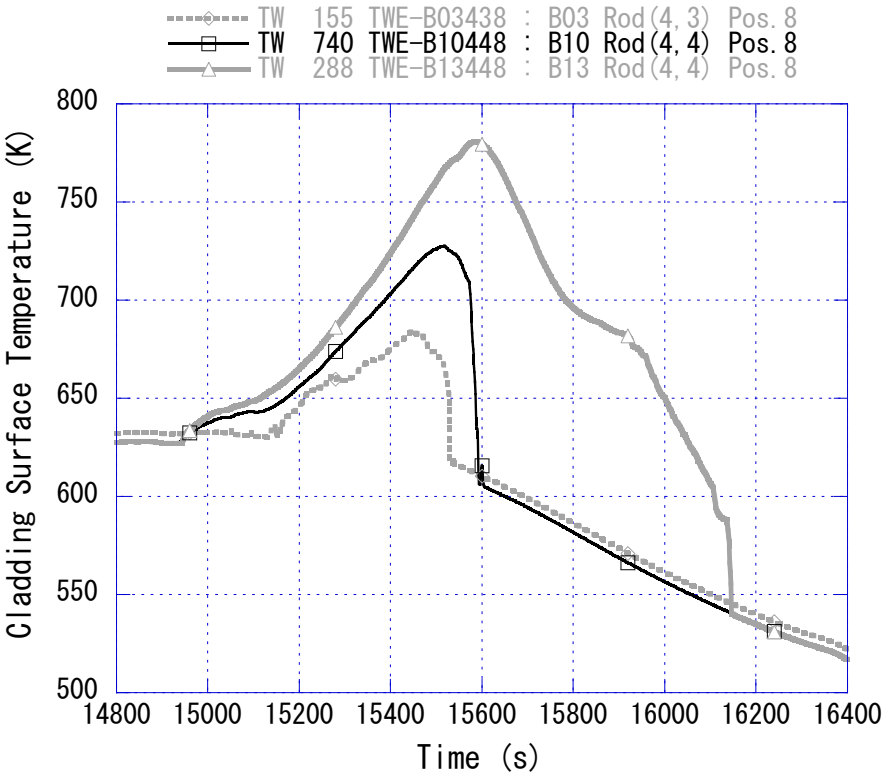

Fig. 4-30 Cladding surface temperatures at Position 8 (14800 to 16400 s)

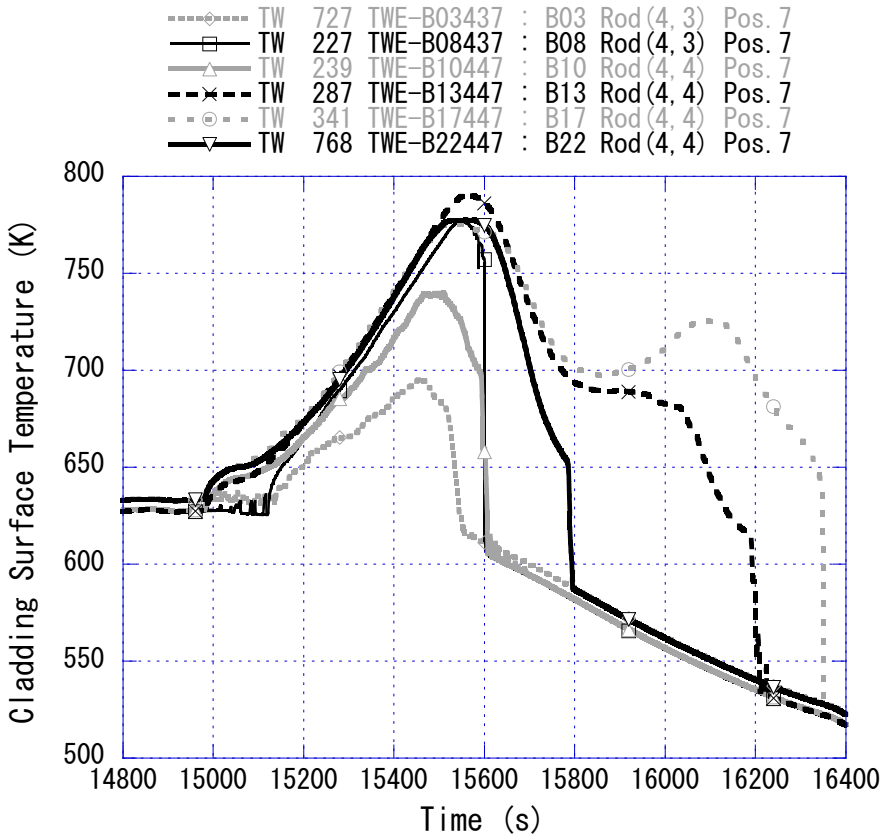

Fig. 4-31 Cladding surface temperatures at Position 7 (14800 to 16400 s)

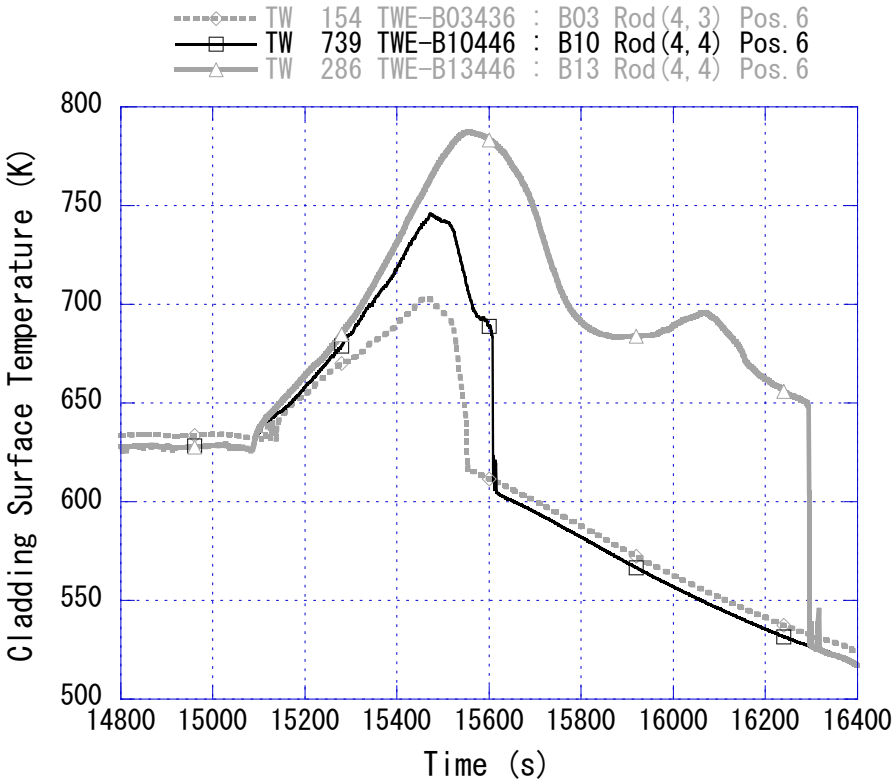

Fig. 4-32 Cladding surface temperatures at Position 6 (14800 to 16400 s)

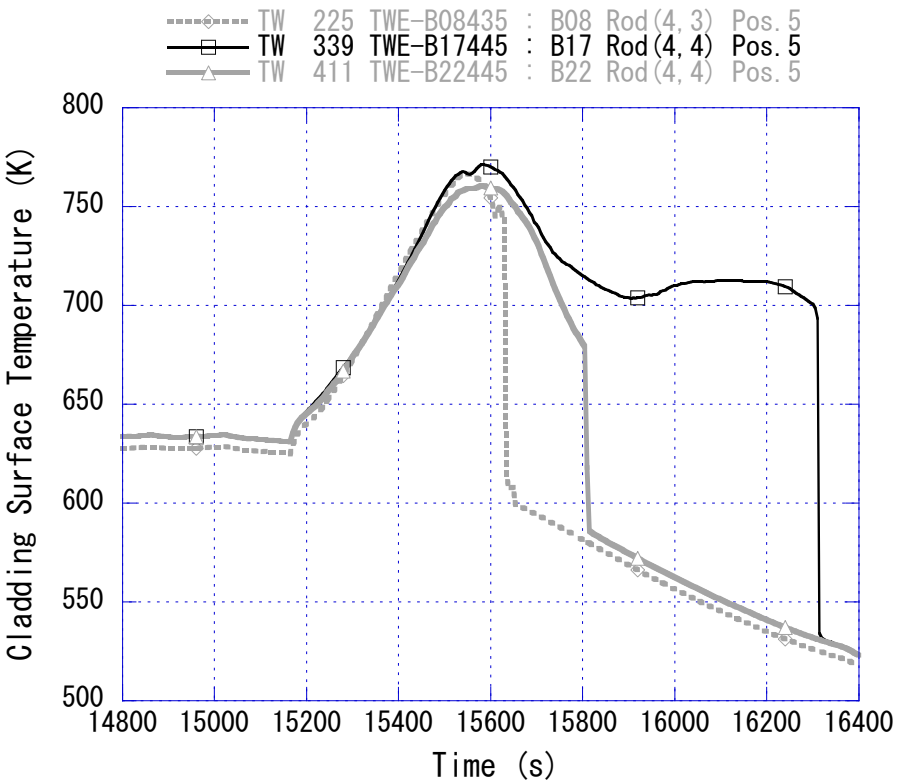

Fig. 4-33 Cladding surface temperatures at Position 5 (14800 to 16400 s)

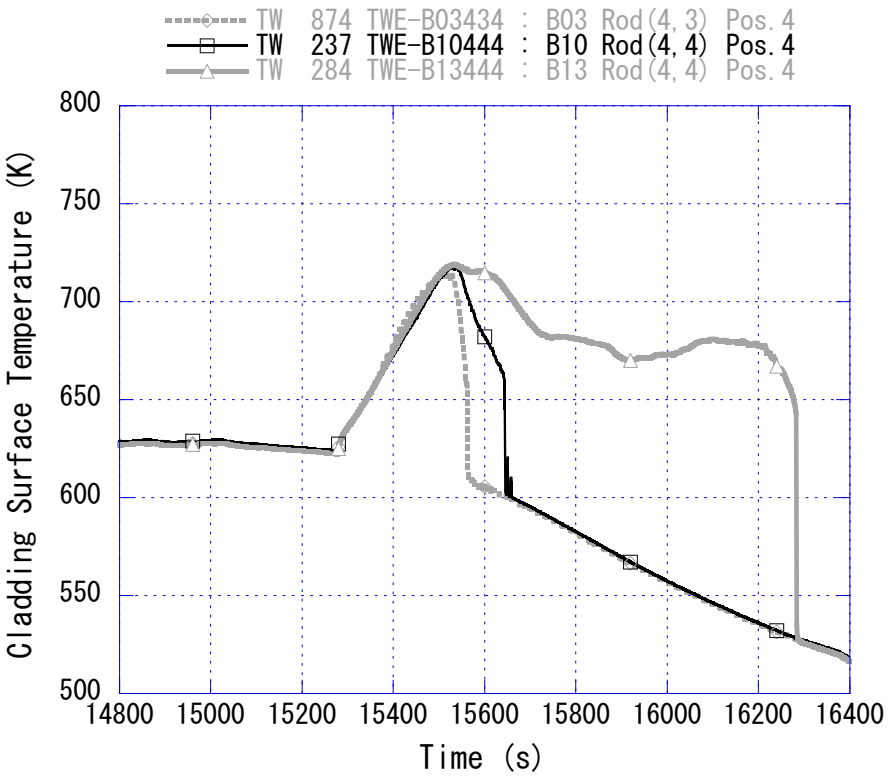

Fig. 4-34 Cladding surface temperatures at Position 4 (14800 to 16400 s)

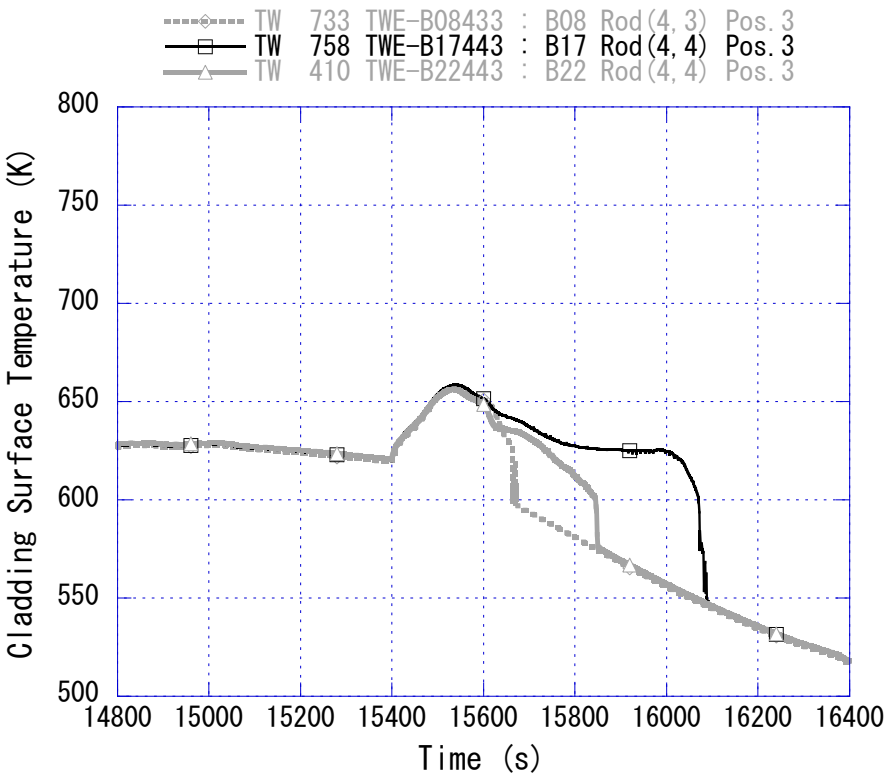

Fig. 4-35 Cladding surface temperatures at Position 3 (14800 to 16400 s)

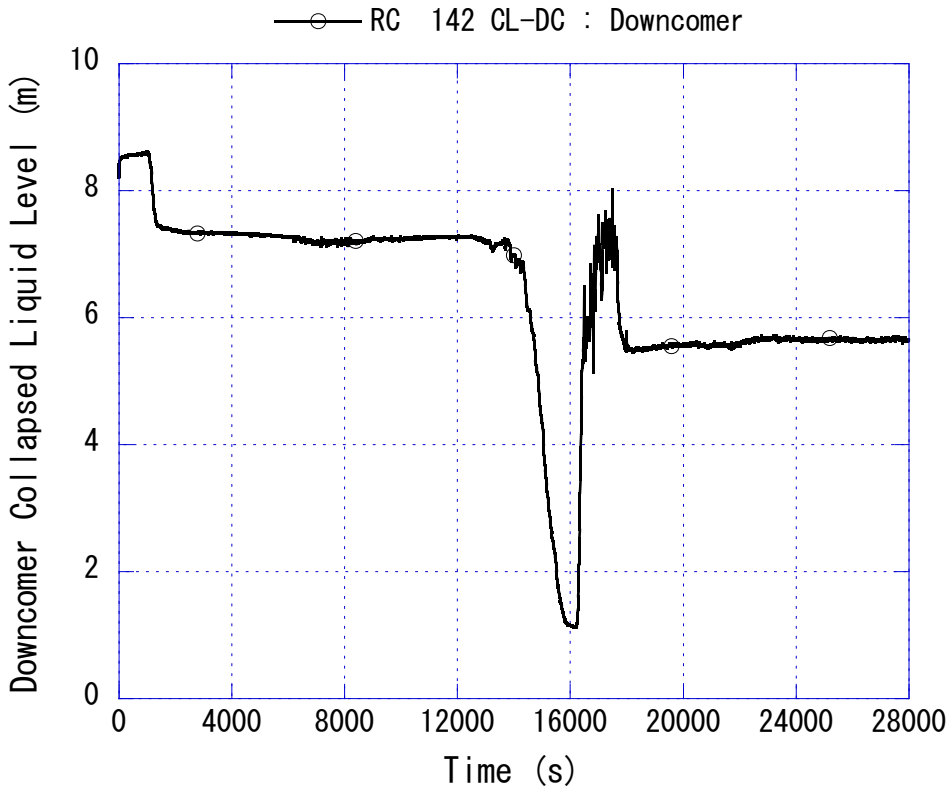

Fig. 4-36 Downcomer collapsed liquid level

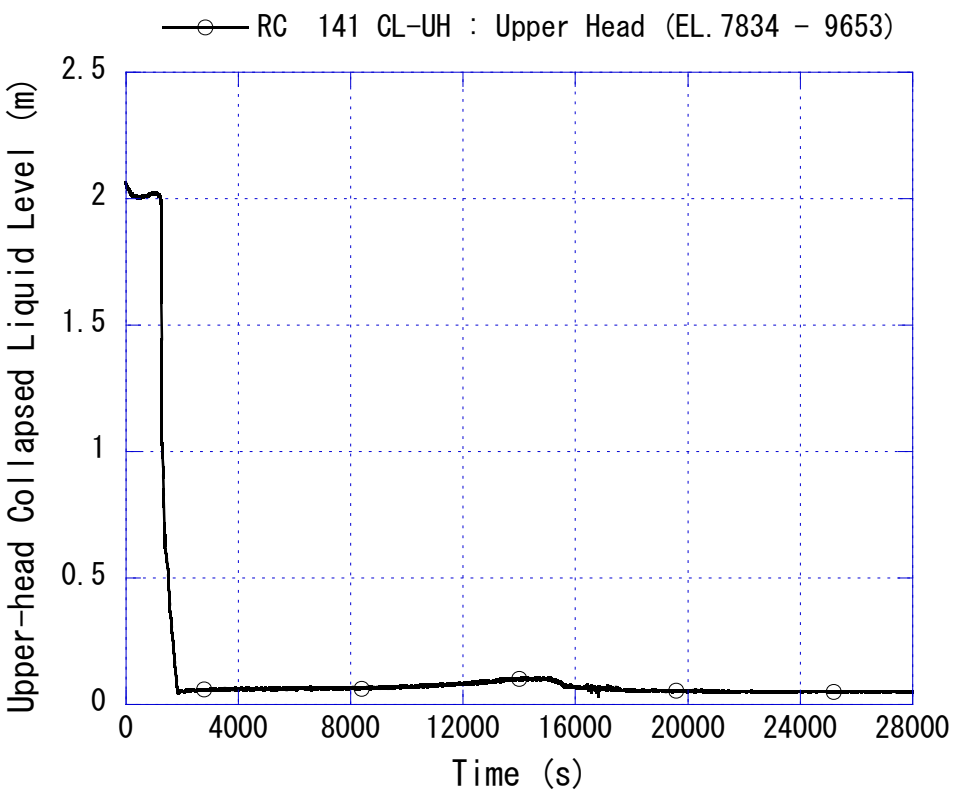

Fig. 4-37 Upper-head collapsed liquid level

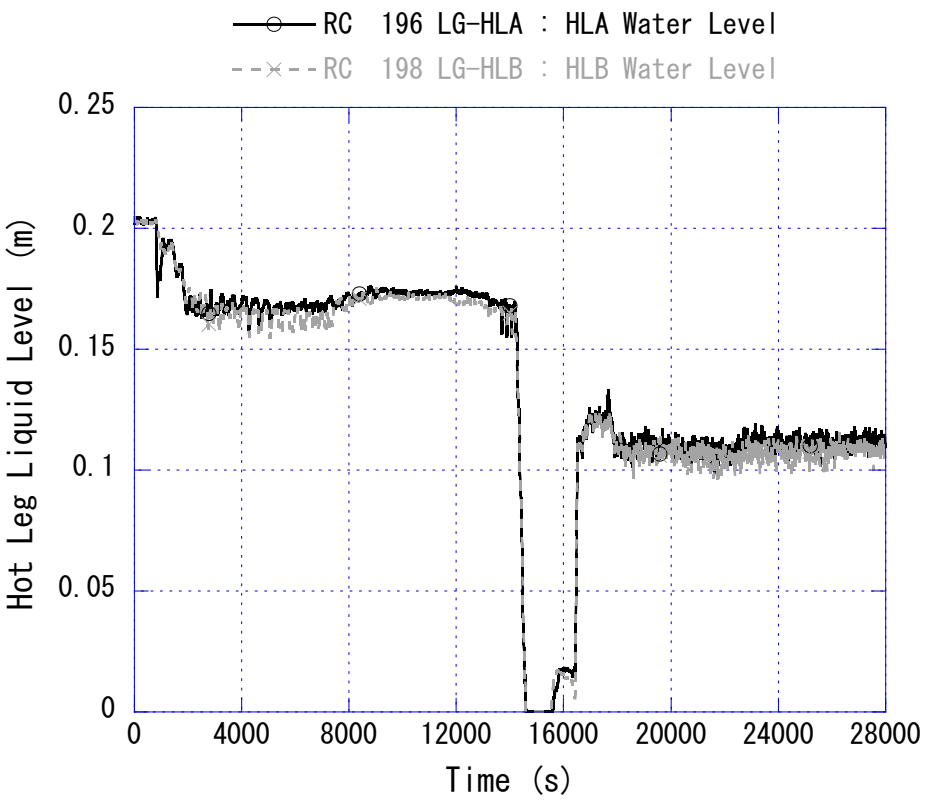

Fig. 4-38 Hot leg liquid level

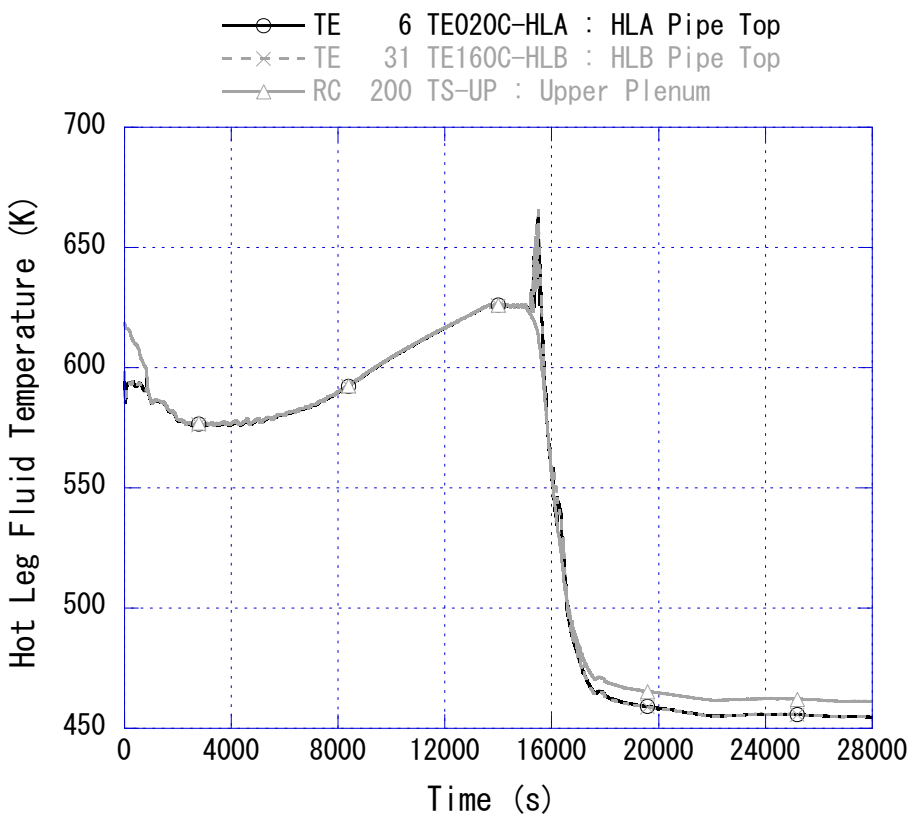

Fig. 4-39 Hot leg fluid temperature

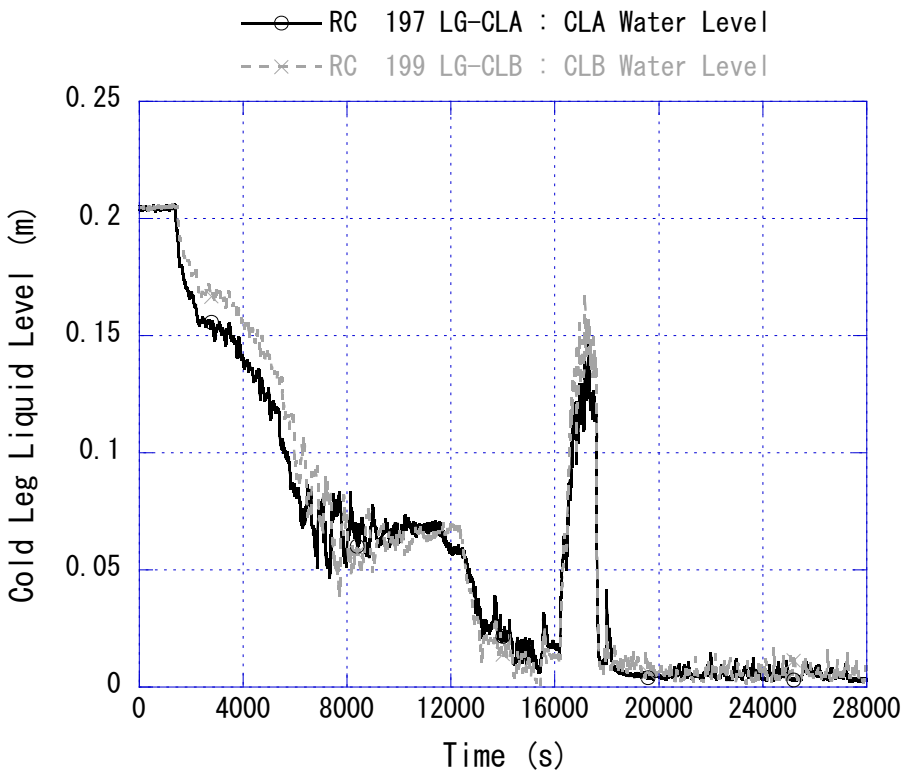

Fig. 4-40 Cold leg liquid level

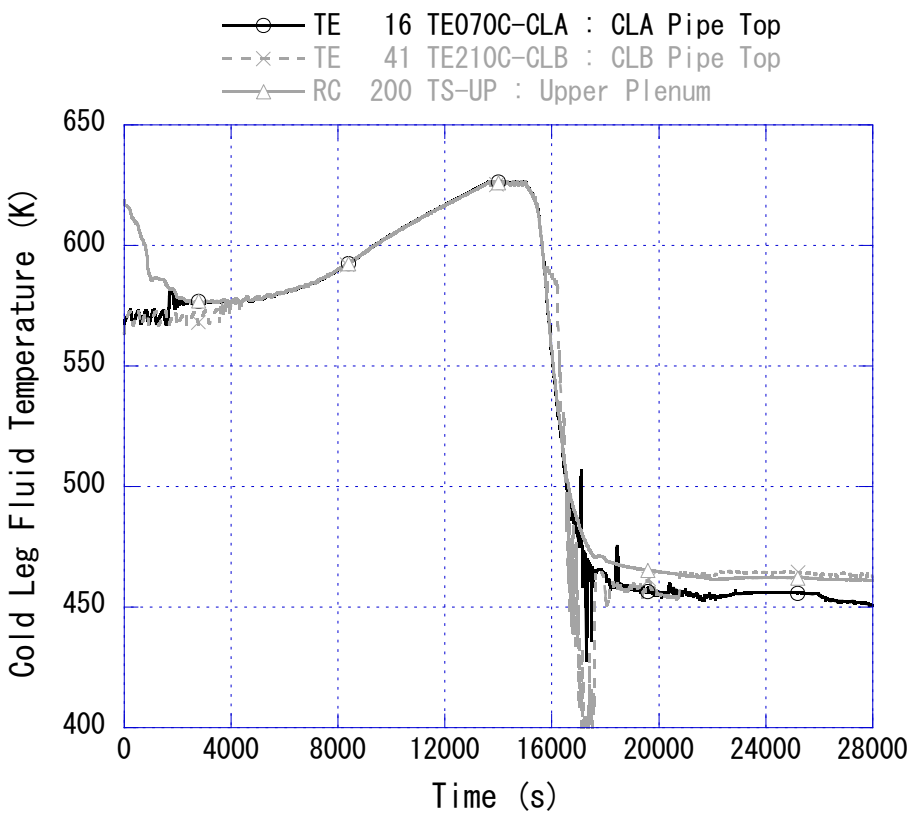

Fig. 4-41 Cold leg fluid temperature

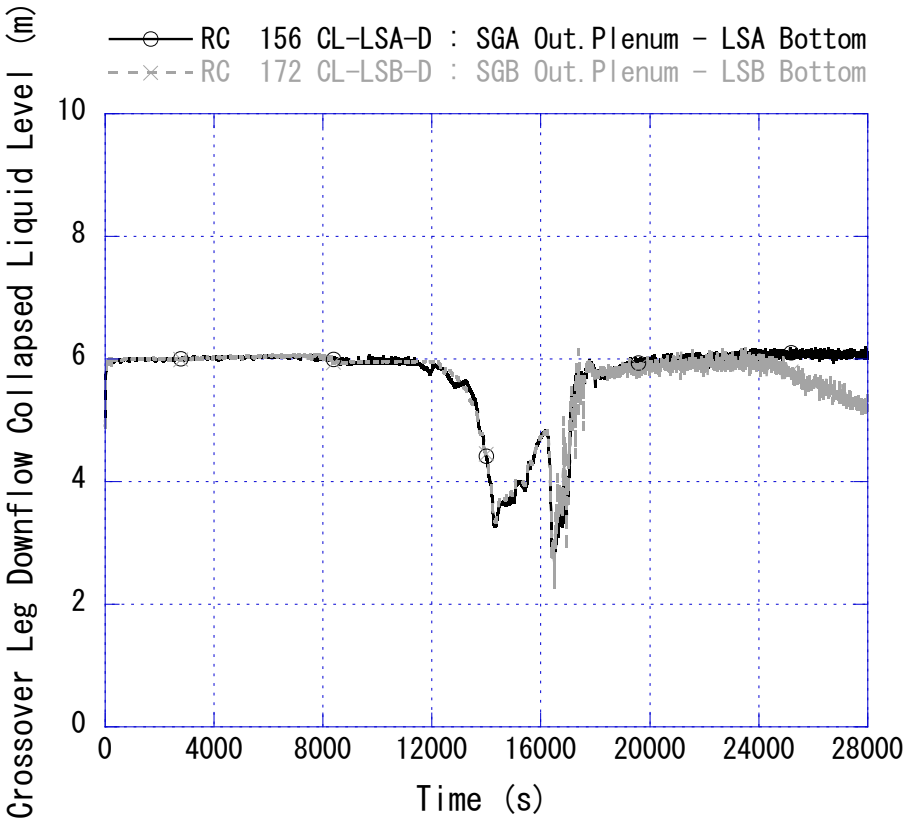

Fig. 4-42 Crossover leg downflow-side collapsed liquid level

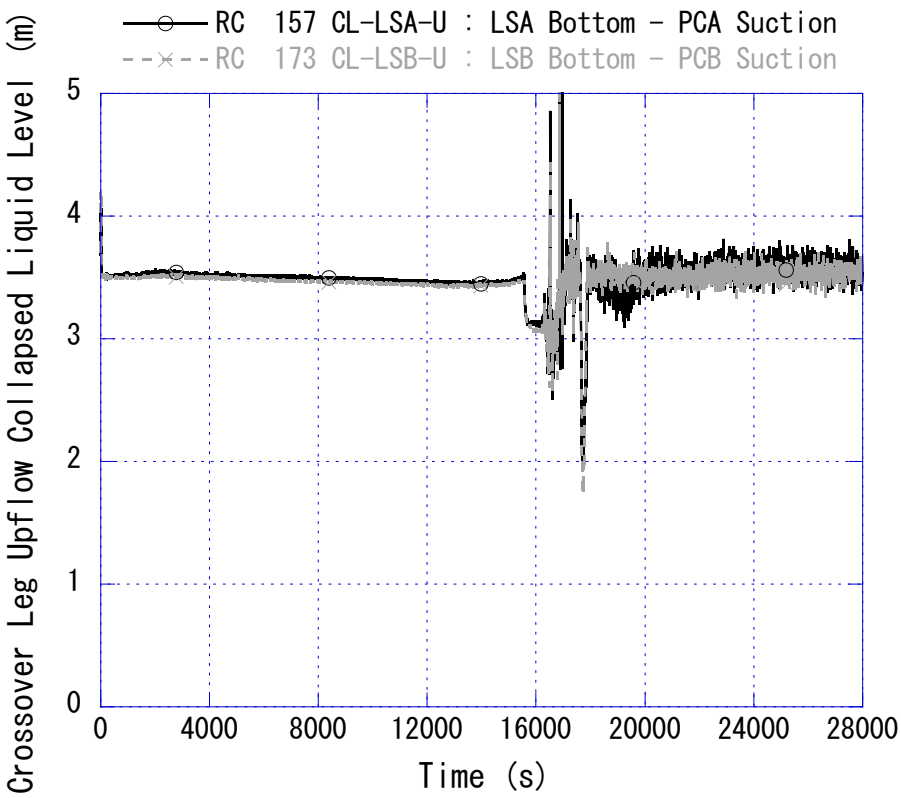

Fig. 4-43 Crossover leg upflow-side collapsed liquid level

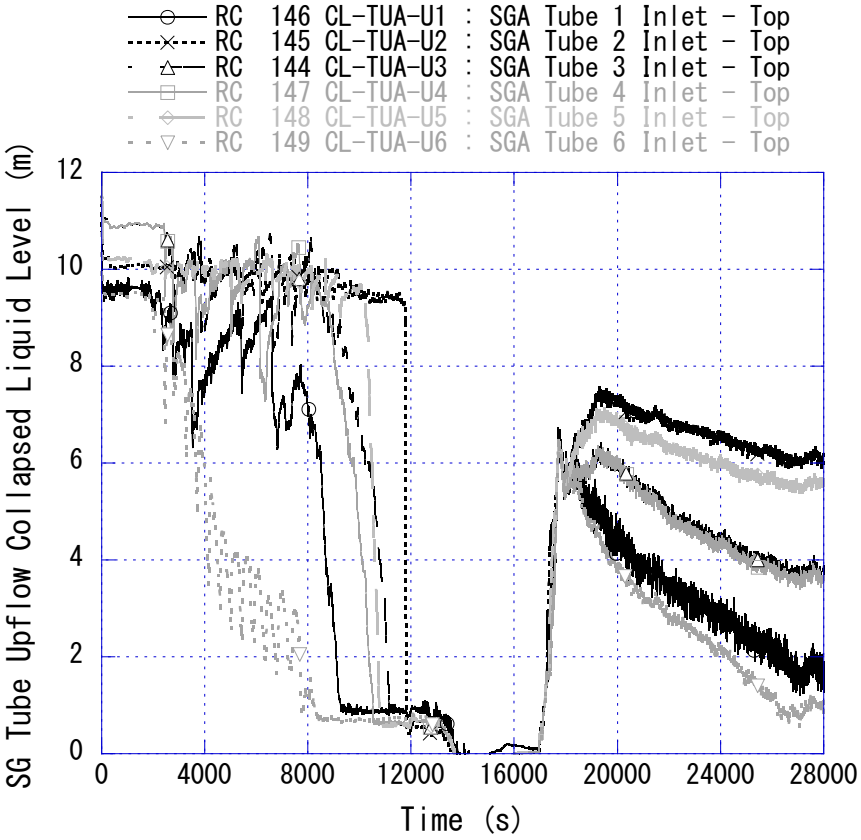

Fig. 4-44 SG U-tube upflow-side collapsed liquid level in loop with pressurizer

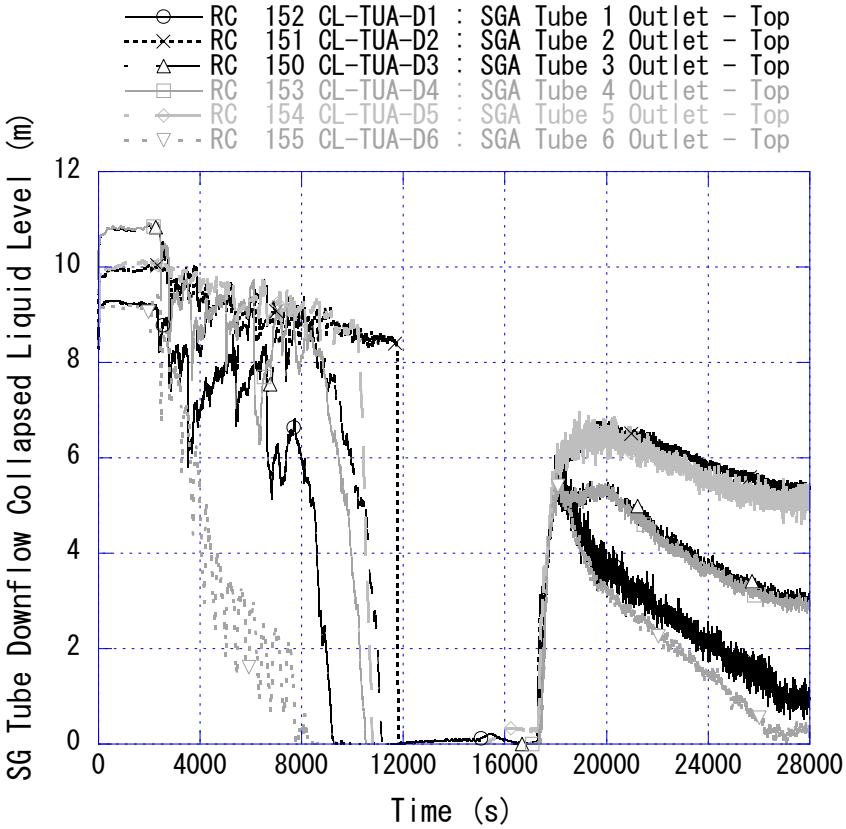

Fig. 4-45 SG U-tube downflow-side collapsed liquid level in loop with pressurizer

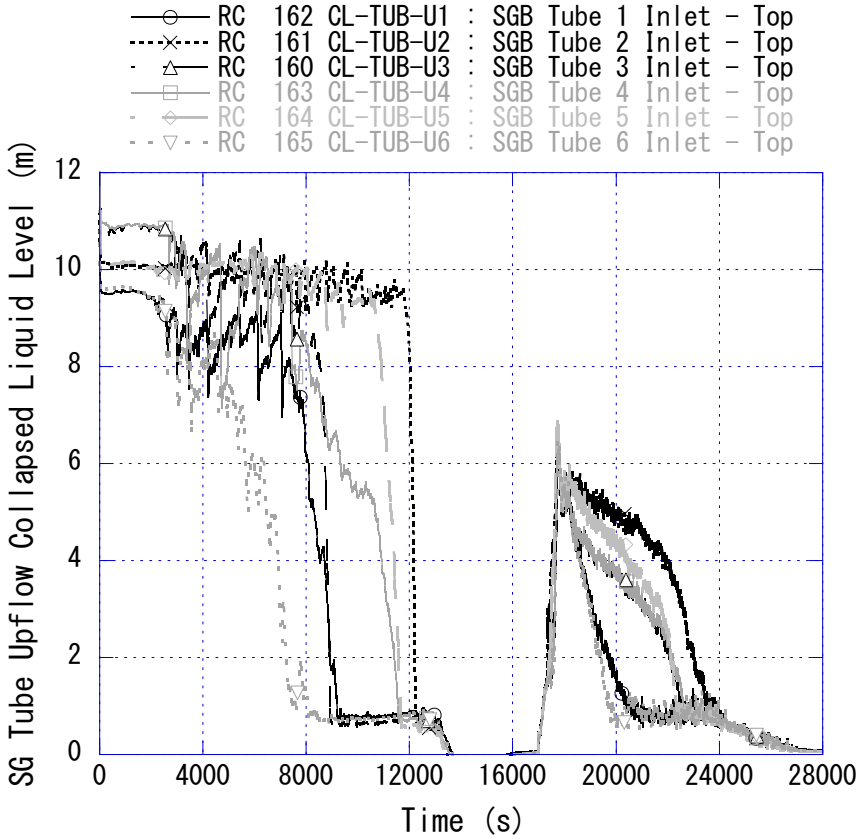

Fig. 4-46 SG U-tube upflow-side collapsed liquid level in loop without pressurizer

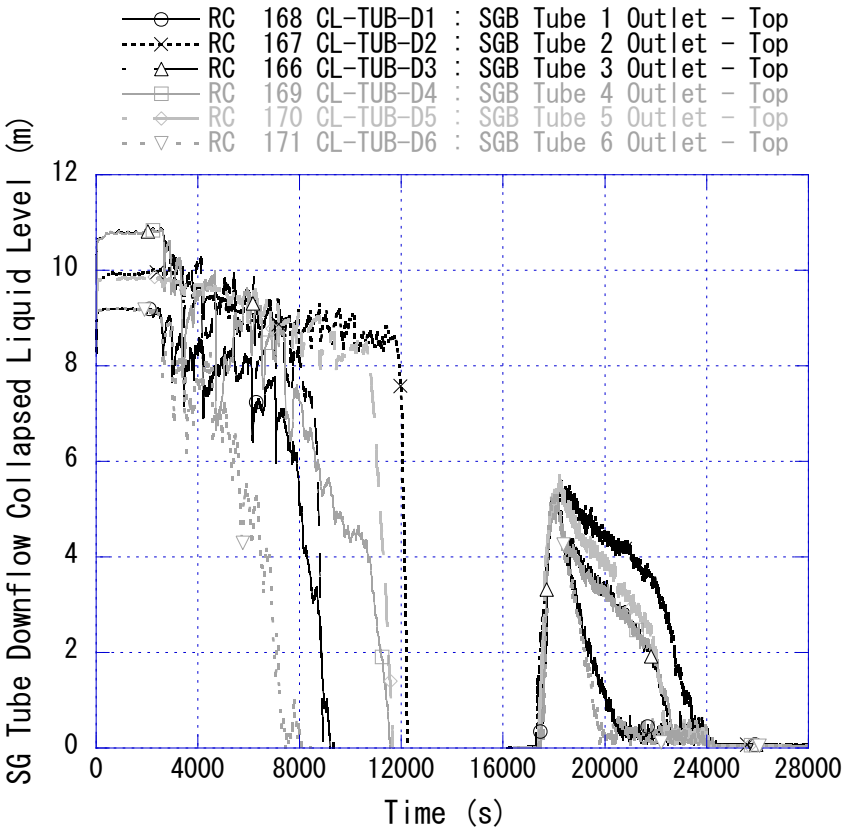

Fig. 4-47 SG U-tube downflow-side collapsed liquid level in loop without pressurizer

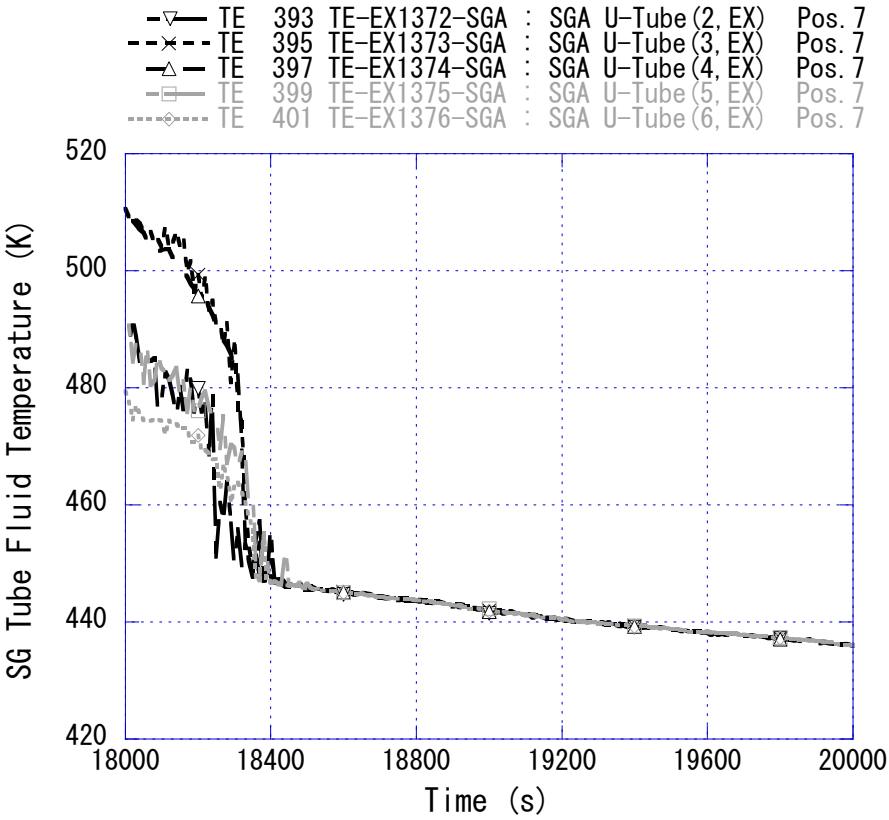

Fig. 4-48 SG U-tube downflow-side fluid temperature in loop with pressurizer

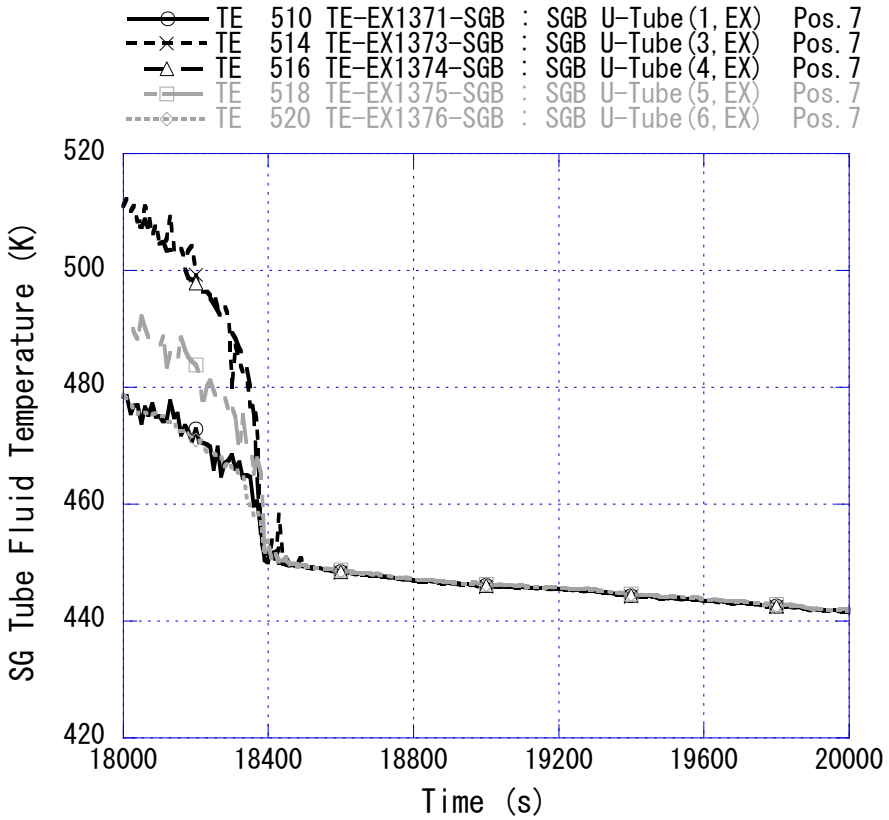

Fig. 4-49 SG U-tube downflow-side fluid temperature in loop without pressurizer

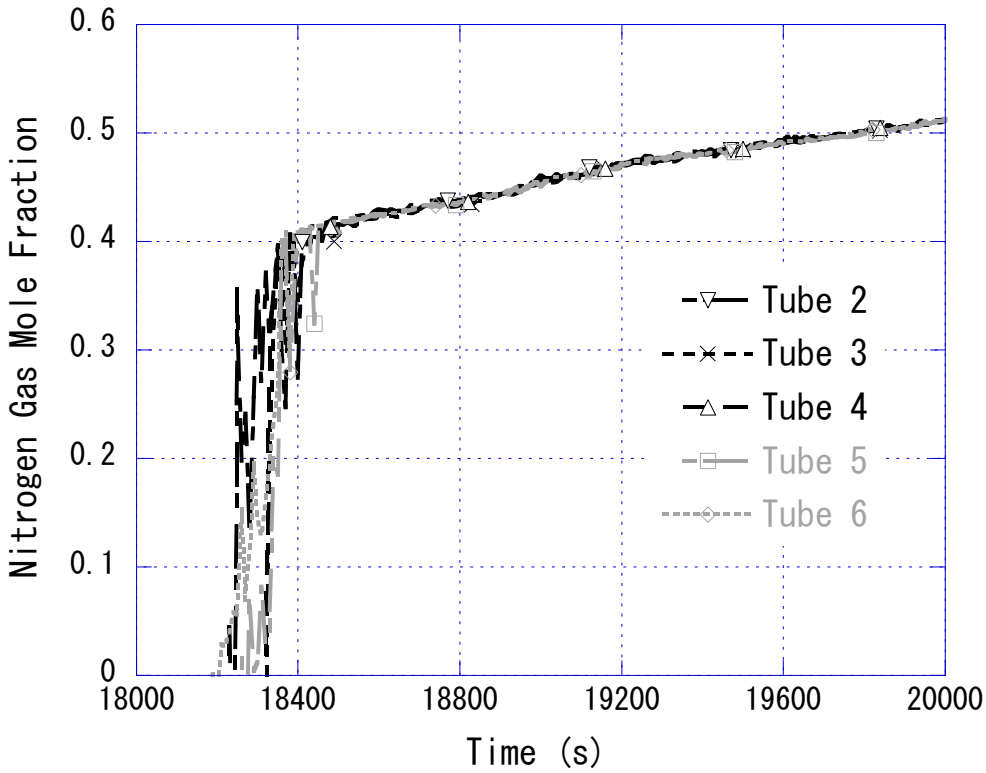

Fig. 4-50 Nitrogen gas mole fraction of SG U-tube in loop with pressurizer

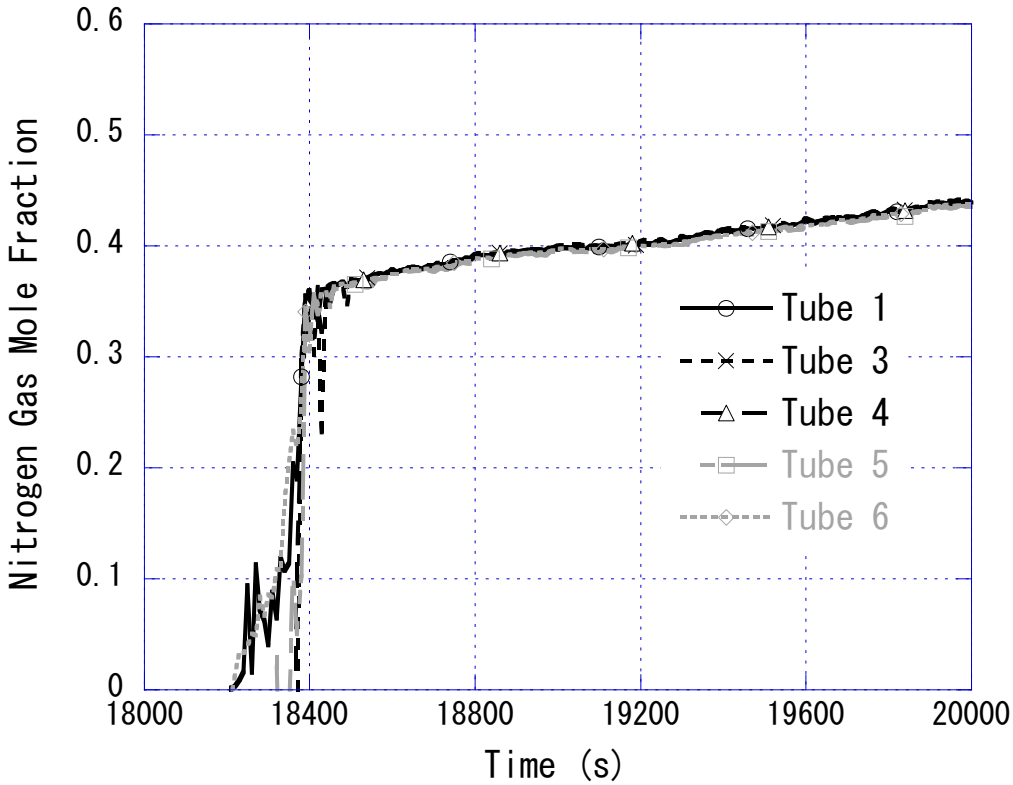

Fig. 4-51 Nitrogen gas mole fraction of SG U-tube in loop without pressurizer

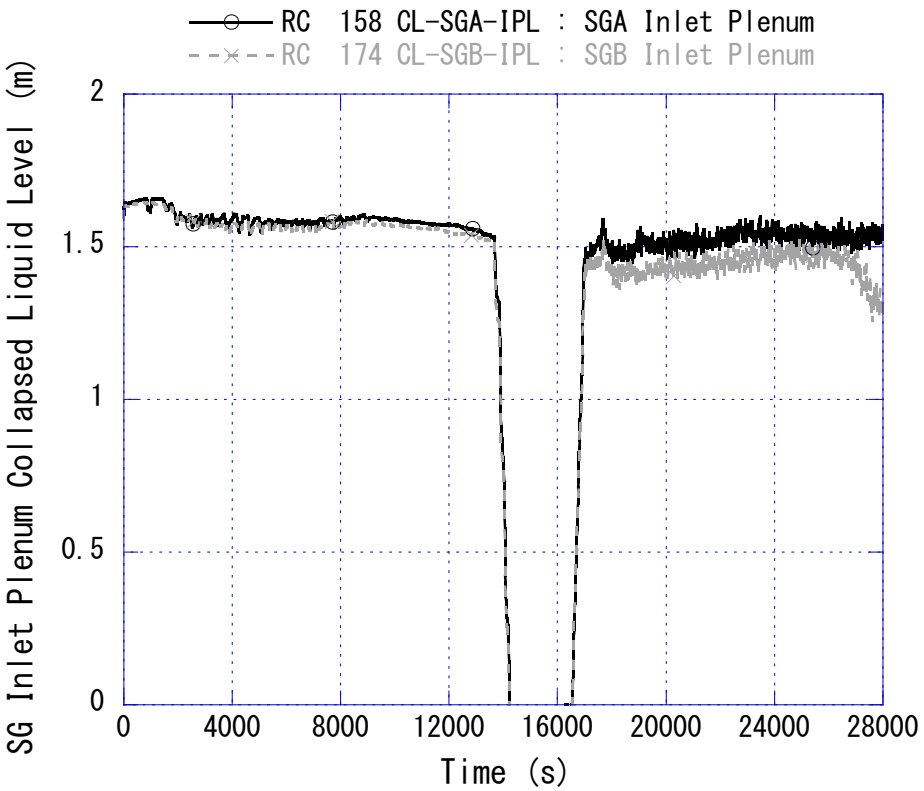

Fig. 4-52 SG inlet plenum collapsed liquid level

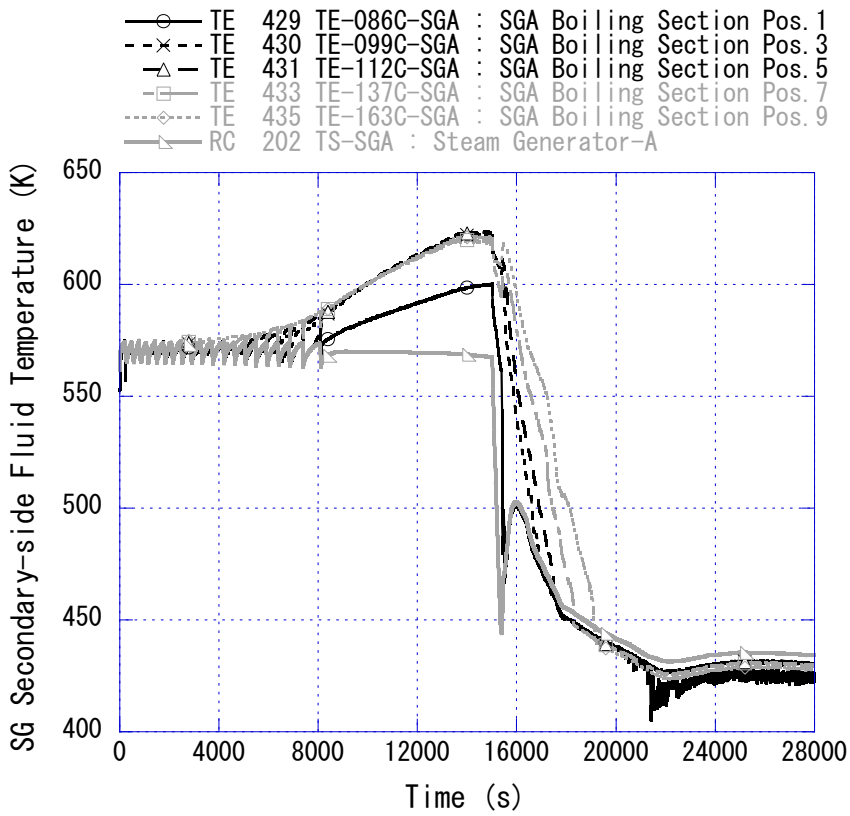

Fig. 4-53 SG secondary-side fluid temperature in loop with pressurizer

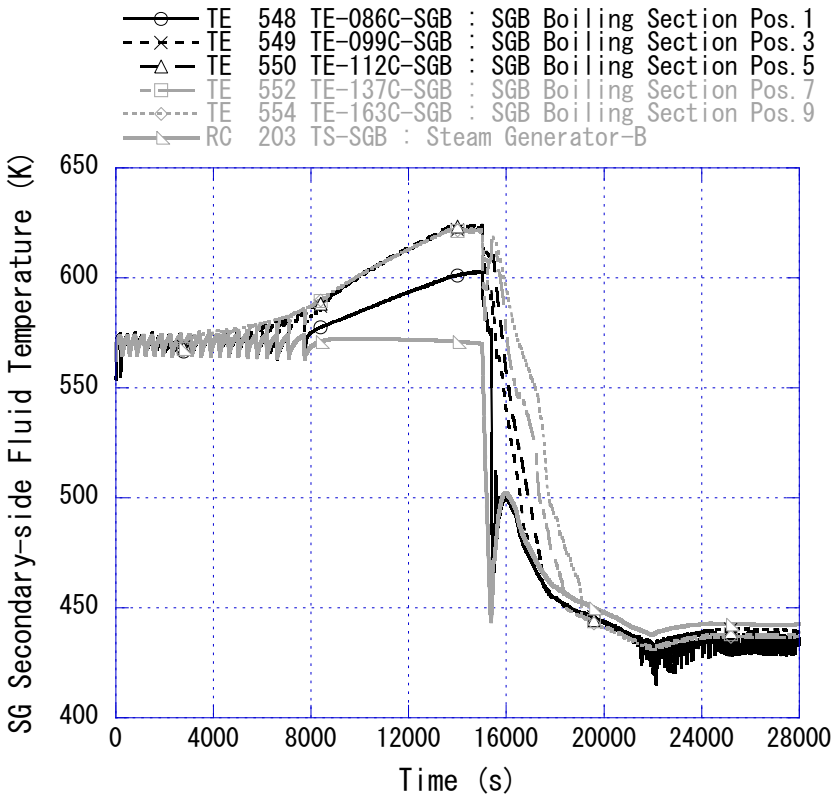

Fig. 4-54 SG secondary-side fluid temperature in loop without pressurizer

5. Summary

A ROSA/LSTF experiment named TR-LF-15 was carried out on June 11, 2014. This test simulated AM actions during a PWR SBO (TMLB' scenario) transient with pump seal LOCA. A feature of this scenario is loss of auxiliary feedwater functions. A 0.1% cold leg break was considered to simulate the pump seal LOCA. The test assumptions were made such as total failure of both high pressure injection system and low pressure injection system of ECCS. Also, non-condensable gas (nitrogen gas) ingress to the primary system from ACC tanks of ECCS was presumed. When the cladding surface temperature rise of 10 K was confirmed during core uncovery, SG secondary-side depressurization was undertaken as the first AM action. This SG secondary-side depressurization was taken by fully opening the safety valves in both SGs. Primary depressurization was started by completely opening the safety valve of PZR as the second AM action with some delay after the first AM action initiation. When the SG secondary-side pressure decreased to 1.0 MPa through the first AM action, water was injected into the secondary-side of both SGs via feedwater lines utilizing low-head pumps as the third AM action. Major consequences are summarized as follows;

(1) The primary pressure once became close to the SG secondary-side pressure following the break. When the SG secondary-side collapsed liquid level lowered to a certain low liquid level, the primary pressure turned to increase. This was owing to degradation in the heat removal from the SG secondary-side system.

(2) The SG secondary-side liquid level became lost, and then the PZR safety valve periodically opened which induced loss of primary coolant. Core uncovery thus occurred by core boil-off at high pressure. The SG secondary-side and primary pressures significantly reduced just after the first and second AM actions, respectively.

(3) The PZR liquid level once lost, and then recovered along with the primary pressure rise. An abrupt decline began in the PZR liquid level through the primary depressurization, and thus the PZR became voided again.

(4) A drop in the primary pressure was accelerated soon after the third AM action onset. This was due to the heat removal resumption from the SG secondary-side system arisen from the liquid level recovery in the SG secondary-side. The core was entirely quenched owing to the liquid level recovery in the core following coolant injection from the ACC system into both cold legs.

(5) The primary depressurization rate declined due to the nitrogen gas accumulation in the SG U-tubes after the termination of the ACC system. Non-uniform flow behaviors were observed in the SG U-tubes with nitrogen gas influx.

(6) The experiment was ended when confirming that the primary depressurization worsened on account of deterioration in the condensation heat transfer in the SG U-tubes.

Acknowledgement

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Appendix A Available Experimental Data List

Table A-1 shows the list of available experimental data qualified as “Good” for LSTF TR-LF-15 (Run ID designated to be LFF). This table contains Sequential No., Function ID., Tag Name, measurement location, range, unit, and uncertainty. The alphabetical prefix of the Function ID. and Tag Name is explained as follows;

(1) TE, fluid temperature,

(2) DT, differential temperature,

(3) TW, heater rod and structure temperature,

(4) FE, flow rate measured with conventional (differential pressure) flow meters,

(5) PE, pressure,

(6) MI, miscellaneous instrumented-signal (power, pump rotation speed, etc.),

(7) LE, liquid level,

(8) DP, differential pressure,

(9) DE, fluid density measured with gamma-ray densitometer,

(10) RC, two-phase flow data calculated with DE and others.

Table A-1 List of available experimental data for LSTF TR-LF-15

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1	TE 1	TE010A-HLA	HLA Vessel-Side CPT	270	720	K	2.75	0.61
2	TE 2	TE010B-HLA	HLA Vessel-Side CPT	270	720	K	2.75	0.61
3	TE 3	TE010C-HLA	HLA Vessel-Side CPT	270	720	K	2.75	0.61
4	TE 4	TE010D-HLA	HLA Vessel-Side CPT	270	720	K	2.75	0.61
5	TE 5	TE010E-HLA	HLA Vessel-Side CPT	270	720	K	2.75	0.61
6	TE 6	TE020C-HLA	HLA Pipe Top	270	720	K	2.75	0.61
7	TE 7	TE020D-HLA	HLA Pipe Bottom	270	720	K	2.75	0.61
8	TE 8	TE030C-HLA	HLA Pipe Top	270	720	K	2.75	0.61
9	TE 15	TE050C-LSA	LSA Upflow Leg	270	720	K	2.75	0.61
10	TE 16	TE070C-CLA	CLA Pipe Top	270	720	K	2.75	0.61
11	TE 17	TE070D-CLA	CLA Pipe Bottom	270	720	K	2.75	0.61
12	TE 18	TE080C-CLA	CLA Pipe Top	270	720	K	2.75	0.61
13	TE 20	TE090A-CLA	CLA Vessel-Side CPT	270	720	K	2.75	0.61
14	TE 21	TE090B-CLA	CLA Vessel-Side CPT	270	720	K	2.75	0.61
15	TE 22	TE090C-CLA	CLA Vessel-Side CPT	270	720	K	2.75	0.61
16	TE 23	TE090D-CLA	CLA Vessel-Side CPT	270	720	K	2.75	0.61
17	TE 24	TE090E-CLA	CLA Vessel-Side CPT	270	720	K	2.75	0.61
18	TE 25	TE100-HLA	HLA-CLA Average	270	720	K	2.75	0.61
19	TE 26	TE150A-HLB	HLB Vessel-Side CPT	270	720	K	2.75	0.61
20	TE 27	TE150B-HLB	HLB Vessel-Side CPT	270	720	K	2.75	0.61
21	TE 28	TE150C-HLB	HLB Vessel-Side CPT	270	720	K	2.75	0.61
22	TE 30	TE150E-HLB	HLB Vessel-Side CPT	270	720	K	2.75	0.61
23	TE 31	TE160C-HLB	HLB Pipe Top	270	720	K	2.75	0.61
24	TE 32	TE160D-HLB	HLB Pipe Bottom	270	720	K	2.75	0.61
25	TE 33	TE170C-HLB	HLB Pipe Top	270	720	K	2.75	0.61
26	TE 35	TE180A-HLB	HLB SG-Side CPT	270	720	K	2.75	0.61
27	TE 36	TE180B-HLB	HLB SG-Side CPT	270	720	K	2.75	0.61
28	TE 37	TE180C-HLB	HLB SG-Side CPT	270	720	K	2.75	0.61
29	TE 40	TE190C-LSB	LSB Upflow Leg	270	720	K	2.75	0.61
30	TE 41	TE210C-CLB	CLB Pipe Top	270	720	K	2.75	0.61
31	TE 42	TE210D-CLB	CLB Pipe Bottom	270	720	K	2.75	0.61
32	TE 43	TE220C-CLB	CLB Pipe Top	270	720	K	2.75	0.61
33	TE 45	TE230A-CLB	CLB Vessel-Side CPT	270	720	K	2.75	0.61
34	TE 46	TE230B-CLB	CLB Vessel-Side CPT	270	720	K	2.75	0.61
35	TE 50	TE240-HLB	HLB-CLB Average	270	720	K	2.75	0.61
36	TE 51	TE270C-PR	PZR Spray Line	270	720	K	2.75	0.61
37	TE 52	TE280C-PR	PZR Surge Line	270	720	K	2.75	0.61
38	TE 55	TE430-SGA	SGA Feedwater Line	270	670	K	2.63	0.66
39	TE 56	TE440-SGA	SGA Main Steam Line	270	670	K	2.63	0.66
40	TE 57	TE450-SGA	SGA Relief Valve Line	270	670	K	2.63	0.66
41	TE 58	TE460-SGA	SGA Safety Valve Line	270	670	K	2.63	0.66
42	TE 59	TE470-SGB	SGB Feedwater Line	270	670	K	2.63	0.66
43	TE 60	TE480-SGB	SGB Main Steam Line	270	670	K	2.63	0.66
44	TE 61	TE490-SGB	SGB Relief Valve Line	270	670	K	2.63	0.66
45	TE 62	TE500-SGB	SGB Safety Valve Line	270	670	K	2.63	0.66
46	TE 63	TE510-SH	MSL Steam Header	270	670	K	2.63	0.66
47	TE 64	TE520-JC	JC Hot Water	270	670	K	2.63	0.66
48	TE 65	TE530-JC	PF Suction Line	270	670	K	2.63	0.66
49	TE 66	TE540-JC	JC Spray Water	270	670	K	2.63	0.66
50	TE 67	TE550-JC	JC Steam Vent Line	270	670	K	2.63	0.66
51	TE 68	TE431-SGA	SGA Downcomer A	270	670	K	2.63	0.66
52	TE 69	TE432-SGA	SGA Downcomer B	270	670	K	2.63	0.66
53	TE 70	TE433-SGA	SGA Downcomer C	270	670	K	2.63	0.66
54	TE 71	TE434-SGA	SGA Downcomer D	270	670	K	2.63	0.66
55	TE 72	TE471-SGB	SGB Downcomer A	270	670	K	2.63	0.66
56	TE 73	TE472-SGB	SGB Downcomer B	270	670	K	2.63	0.66
57	TE 74	TE473-SGB	SGB Downcomer C	270	670	K	2.63	0.66
58	TE 75	TE474-SGB	SGB Downcomer D	270	670	K	2.63	0.66
59	TE 76	TE560C-BU	Break Upstream	270	720	K	2.63	0.66
60	TE 77	TE560D-BU	Break Upstream	270	720	K	2.63	0.66
61	TE 78	TE570C-BU	RSV Spool Piece, Outlet Side	270	720	K	2.63	0.66
62	TE 79	TE570D-BU	RSV Spool Piece, Outlet Side	270	720	K	2.63	0.66
63	TE 80	TE580C-BU	Break Orif. Upstream Top	270	720	K	2.63	0.66
64	TE 81	TE580D-BU	Break Orif. Upstream Bottom	270	720	K	2.63	0.66
65	TE 82	TE590C-BU	Break Orif. Downstream Top	270	720	K	2.63	0.66
66	TE 83	TE590D-BU	Break Orif. Downstream Bottom	270	720	K	2.63	0.66
67	TE 84	TE600-ST	ST Inlet Line	270	470	K	2.30	1.15
68	TE 85	TE610-ST	ST Top Region	270	470	K	2.30	1.15
69	TE 86	TE620-ST	ST Middle Region	270	470	K	2.30	1.15
70	TE 87	TE630-ST	ST Bottom Region	270	470	K	2.30	1.15
71	TE 88	TE640-ST	ST Spray Line	270	470	K	2.30	1.15
72	TE 89	TE650-ACC	Acc-Cold Tank Bottom	270	470	K	2.30	1.15
73	TE 90	TE660-ACC	Acc-Cold Tank Top	270	470	K	2.30	1.15
74	TE 91	TE670-ACC	Acc-Cold Line to CLA	270	470	K	2.30	1.15
75	TE 92	TE680-ACC	Acc-Cold Line to CLB	270	470	K	2.30	1.15
76	TE 93	TE690-ACH	Acc-Hot Tank Bottom	270	570	K	2.42	0.81
77	TE 94	TE700-ACH	Acc-Hot Tank Top	270	570	K	2.42	0.81
78	TE 95	TE710-ACH	Acc-Hot Line to CLA	270	570	K	2.42	0.81
79	TE 96	TE720-ACH	Acc-Hot Line to CLB	270	570	K	2.42	0.81
80	TE 97	TE730-HLA	HLA ECCS Nozzle	270	670	K	2.63	0.66
81	TE 98	TE740-LSA	LSA ECCS Nozzle	270	670	K	2.63	0.66

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
82	TE 99	TE750-CLA	CLA ECCS Nozzle	270	670	K	2.63	0.66
83	TE 100	TE760-HLB	HKB ECCS Nozzle	270	670	K	2.63	0.66
84	TE 101	TE770-LSB	LSB ECCS Nozzle	270	670	K	2.63	0.66
85	TE 102	TE780-CLB	CLB ECCS Nozzle	270	670	K	2.63	0.66
86	TE 103	TE790-PV	PV Bottom ECCS Nozzle	270	670	K	2.63	0.66
87	TE 104	TE800-PV	PV Top ECCS Nozzle	270	670	K	2.63	0.66
88	TE 106	TE820-PL	RHR Inlet Region	270	670	K	2.63	0.66
89	TE 107	TE830-PL	RHR Outlet Region	270	670	K	2.63	0.66
90	TE 108	TE840-PL	RHR Injection Line	270	670	K	2.63	0.66
91	TE 112	TE880-RWST	RWST Lower Region	270	370	K	2.37	2.37
92	TE 113	TE890-RWST	RWST Middle Region	270	370	K	2.37	2.37
93	TE 115	TE-E066F-PV	Upper Head Bottom	270	970	K	3.49	0.50
94	TE 117	TE-E075F-PV	Upper Head Middle	270	970	K	3.49	0.50
95	TE 118	TE-W075F-PV	Upper Head Middle	270	970	K	3.49	0.50
96	TE 119	TE-E081F-PV	Upper Head Top	270	970	K	3.49	0.50
97	TE 120	TE-W081F-PV	Upper Head Top	270	970	K	3.49	0.50
98	TE 121	TE-E080H-PV	CR Guide Tube Top	270	970	K	3.49	0.50
99	TE 122	TE-W080H-PV	CR Guide Tube Top	270	970	K	3.49	0.50
100	TE 123	TE-E049F-PV	Upper Plenum Bottom	270	970	K	3.49	0.50
101	TE 125	TE-E055F-PV	Upper Plenum Middle	270	970	K	3.49	0.50
102	TE 126	TE-W055F-PV	Upper Plenum Middle	270	970	K	3.49	0.50
103	TE 127	TE-E060F-PV	Upper Plenum Top	270	970	K	3.49	0.50
104	TE 128	TE-W060F-PV	Upper Plenum Top	270	970	K	3.49	0.50
105	TE 129	TE-IN038-B09-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
106	TE 130	TE-IN038-B11-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
107	TE 131	TE-IN038-B01-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
108	TE 132	TE-IN038-B03-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
109	TE 133	TE-IN038-B05-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
110	TE 134	TE-IN038-B07-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
111	TE 135	TE-IN038-B21-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
112	TE 136	TE-IN038-B23-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
113	TE 137	TE-IN038-B02-UCP	Below Upper core Plate	270	970	K	3.49	0.50
114	TE 138	TE-IN038-B06-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
115	TE 139	TE-IN038-B14-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
116	TE 140	TE-IN038-B15-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
117	TE 141	TE-IN038-B18-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
118	TE 142	TE-IN038-B19-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
119	TE 143	TE-IN038-B10-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
120	TE 144	TE-IN038-B12-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
121	TE 145	TE-IN038-B04-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
122	TE 146	TE-IN038-B08-UCP	Below Upper Core Plate	270	970	K	3.49	0.50
123	TE 149	TE-EX040-B09-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
124	TE 150	TE-EX040-B11-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
125	TE 151	TE-EX040-B01-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
126	TE 152	TE-EX040-B03-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
127	TE 153	TE-EX040-B05-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
128	TE 154	TE-EX040-B07-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
129	TE 156	TE-EX040-B23-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
130	TE 157	TE-EX040-B02-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
131	TE 158	TE-EX040-B06-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
132	TE 159	TE-EX040-B14-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
133	TE 160	TE-EX040-B15-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
134	TE 161	TE-EX040-B18-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
135	TE 162	TE-EX040-B19-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
136	TE 163	TE-EX040-B10-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
137	TE 164	TE-EX040-B12-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
138	TE 165	TE-EX040-B04-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
139	TE 166	TE-EX040-B08-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
140	TE 167	TE-EX040-B22-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
141	TE 168	TE-EX040-B24-UCP	Above Upper Core Plate	270	970	K	3.49	0.50
142	TE 169	TE-IN-002B02-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
143	TE 171	TE-IN-002B06-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
144	TE 172	TE-IN-002B07-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
145	TE 174	TE-IN-002B11-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
146	TE 177	TE-IN-002B18-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
147	TE 178	TE-IN-002B20-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
148	TE 179	TE-IN-002B21-LCPP	Below Lower Core Plate	270	720	K	2.75	0.61
149	TE 184	TE-EX-000B07-LCPP	Above Lower Core Plate	270	720	K	2.75	0.61
150	TE 186	TE-EX-000B11-LCPP	Above Lower Core Plate	270	720	K	2.75	0.61
151	TE 189	TE-EX-000B18-LCPP	Above Lower Core Plate	270	720	K	2.75	0.61
152	TE 190	TE-EX-000B20-LCPP	Above Lower Core Plate	270	720	K	2.75	0.61
153	TE 191	TE-EX-000B21-LCPP	Above Lower Core Plate	270	720	K	2.75	0.61
154	TE 193	TE-N000C-DC	Downcomer EL.0.0m,North	270	720	K	2.75	0.61
155	TE 194	TE-S000C-DC	Downcomer EL.0.0m,South	270	720	K	2.75	0.61
156	TE 196	TE-W000C-DC	Downcomer EL.0.0m,West	270	720	K	2.75	0.61
157	TE 197	TE-N018C-DC	Downcomer EL.1.8m,North	270	720	K	2.75	0.61
158	TE 199	TE-E018C-DC	Downcomer EL.1.8m,East	270	720	K	2.75	0.61
159	TE 200	TE-W018C-DC	Downcomer EL.1.8m,West	270	720	K	2.75	0.61
160	TE 201	TE-N036C-DC	Downcomer EL.3.6m,North	270	720	K	2.75	0.61
161	TE 202	TE-S036C-DC	Downcomer EL.3.6m,South	270	720	K	2.75	0.61
162	TE 203	TE-E036C-DC	Downcomer EL.3.6m,East	270	720	K	2.75	0.61
163	TE 204	TE-W036C-DC	Downcomer EL.3.6m,West	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
164	TE 206	TE-S060C-DC	Downcomer EL.6.0m,South	270	720	K	2.75	0.61
165	TE 208	TE-W060C-DC	Downcomer EL.6.0m,West	270	720	K	2.75	0.61
166	TE 209	TE-N055C-DC	Downcomer EL.5.5m,North	270	720	K	2.75	0.61
167	TE 210	TE-S055C-DC	Downcomer EL.5.5m,South	270	720	K	2.75	0.61
168	TE 211	TE-C-021-LP	Lower Plenum EL.-2.1m,C	270	720	K	2.75	0.61
169	TE 212	TE-C-018-LP	Lower Plenum EL.-1.8m,C	270	720	K	2.75	0.61
170	TE 213	TE-C-015-LP	Lower Plenum EL.-1.5m,C	270	720	K	3.73	0.83
171	TE 216	TE-C-006-LP	Lower Plenum EL.-0.6m,C	270	720	K	2.75	0.61
172	TE 217	TE-C-005-LP	Lower Plenum EL.-0.5m,C	270	720	K	2.75	0.61
173	TE 218	TE-C-003-LP	Lower Plenum EL.-0.3m,C	270	720	K	2.75	0.61
174	TE 220	TE-B18622	B18 Rod(6,2) Pos.2,Fluid	270	970	K	3.49	0.50
175	TE 221	TE-B18623	B18 Rod(6,2) Pos.3,Fluid	270	970	K	3.49	0.50
176	TE 222	TE-B18624	B18 Rod(6,2) Pos.4,Fluid	270	970	K	3.49	0.50
177	TE 223	TE-B18625	B18 Rod(6,2) Pos.5,Fluid	270	970	K	3.49	0.50
178	TE 226	TE-B18628	B18 Rod(6,2) Pos.8,Fluid	270	970	K	3.49	0.50
179	TE 227	TE-B18629	B18 Rod(6,2) Pos.9,Fluid	270	970	K	3.49	0.50
180	TE 256	TE-B09663	B09 Rod(6,6) Pos.3,Fluid	270	970	K	3.69	0.53
181	TE 257	TE-B09665	B09 Rod(6,6) Pos.5,Fluid	270	970	K	3.69	0.53
182	TE 258	TE-B09666	B09 Rod(6,6) Pos.6,Fluid	270	970	K	3.69	0.53
183	TE 260	TE-B09669	B09 Rod(6,6) Pos.9,Fluid	270	970	K	3.69	0.53
184	TE 277	TE-B14267	B14 Rod(2,6) Pos.7,Fluid	270	970	K	3.49	0.50
185	TE 278	TE-B14269	B14 Rod(2,6) Pos.9,Fluid	270	970	K	3.49	0.50
186	TE 279	TE-B15261	B15 Rod(2,6) Pos.1,Fluid	270	970	K	4.31	0.62
187	TE 280	TE-B15263	B15 Rod(2,6) Pos.3,Fluid	270	970	K	4.31	0.62
188	TE 281	TE-B15265	B15 Rod(2,6) Pos.5,Fluid	270	970	K	4.31	0.62
189	TE 282	TE-B15266	B15 Rod(2,6) Pos.6,Fluid	270	970	K	4.31	0.62
190	TE 283	TE-B15267	B15 Rod(2,6) Pos.7,Fluid	270	970	K	3.69	0.53
191	TE 284	TE-B15269	B15 Rod(2,6) Pos.9,Fluid	270	970	K	3.69	0.53
192	TE 291	TE-B15262	B15 Rod(2,6) Pos.2,Fluid	270	970	K	4.31	0.62
193	TE 292	TE-B15264	B15 Rod(2,6) Pos.4,Fluid	270	970	K	4.31	0.62
194	TE 293	TE-B15268	B15 Rod(2,6) Pos.8,Fluid	270	970	K	3.69	0.53
195	TE 294	TE-B23221	B23 Rod(2,2) Pos.1,Fluid	270	970	K	3.69	0.53
196	TE 295	TE-B23223	B23 Rod(2,2) Pos.3,Fluid	270	970	K	3.69	0.53
197	TE 296	TE-B23225	B23 Rod(2,2) Pos.5,Fluid	270	970	K	3.69	0.53
198	TE 297	TE-B23226	B23 Rod(2,2) Pos.6,Fluid	270	970	K	3.69	0.53
199	TE 298	TE-B23227	B23 Rod(2,2) Pos.7,Fluid	270	970	K	3.69	0.53
200	TE 299	TE-B23229	B23 Rod(2,2) Pos.9,Fluid	270	970	K	3.69	0.53
201	TE 300	TE-B20661	B20 Rod(6,6) Pos.1,Fluid	270	970	K	3.69	0.53
202	TE 301	TE-B20662	B20 Rod(6,6) Pos.2,Fluid	270	970	K	3.69	0.53
203	TE 302	TE-B20663	B20 Rod(6,6) Pos.3,Fluid	270	970	K	3.69	0.53
204	TE 303	TE-B20664	B20 Rod(6,6) Pos.4,Fluid	270	970	K	3.69	0.53
205	TE 305	TE-B20666	B20 Rod(6,6) Pos.6,Fluid	270	970	K	3.69	0.53
206	TE 306	TE-B20667	B20 Rod(6,6) Pos.7,Fluid	270	970	K	0.00	0.00
207	TE 307	TE-B20668	B20 Rod(6,6) Pos.8,Fluid	270	970	K	3.69	0.53
208	TE 308	TE-B20669	B20 Rod(6,6) Pos.9,Fluid	270	970	K	0.00	0.00
209	TE 309	TE-B22661	B22 Rod(6,6) Pos.1,Fluid	270	970	K	4.31	0.62
210	TE 310	TE-B22662	B22 Rod(6,6) Pos.2,Fluid	270	970	K	4.31	0.62
211	TE 311	TE-B22663	B22 Rod(6,6) Pos.3,Fluid	270	970	K	4.31	0.62
212	TE 312	TE-B22664	B22 Rod(6,6) Pos.4,Fluid	270	970	K	4.31	0.62
213	TE 313	TE-B22665	B22 Rod(6,6) Pos.5,Fluid	270	970	K	4.31	0.62
214	TE 314	TE-B22666	B22 Rod(6,6) Pos.6,Fluid	270	970	K	4.31	0.62
215	TE 315	TE-B22667	B22 Rod(6,6) Pos.7,Fluid	270	970	K	4.31	0.62
216	TE 316	TE-B22668	B22 Rod(6,6) Pos.8,Fluid	270	970	K	4.31	0.62
217	TE 317	TE-B22669	B22 Rod(6,6) Pos.9,Fluid	270	970	K	4.31	0.62
218	TE 318	TE-B24621	B24 Rod(6,2) Pos.1,Fluid	270	970	K	3.69	0.53
219	TE 319	TE-B24623	B24 Rod(6,2) Pos.3,Fluid	270	970	K	3.69	0.53
220	TE 320	TE-B24625	B24 Rod(6,2) Pos.5,Fluid	270	970	K	3.69	0.53
221	TE 321	TE-B24626	B24 Rod(6,2) Pos.6,Fluid	270	970	K	3.69	0.53
222	TE 322	TE-B24627	B24 Rod(6,2) Pos.7,Fluid	270	970	K	3.69	0.53
223	TE 323	TE-B24629	B24 Rod(6,2) Pos.9,Fluid	270	970	K	3.69	0.53
224	TE 324	TE-IN0641-SGA	SGA Inlet Plenum	270	720	K	2.75	0.61
225	TE 325	TE-IN0642-SGA	SGA Inlet Plenum	270	720	K	2.75	0.61
226	TE 326	TE-IN0643-SGA	SGA Inlet Plenum	270	720	K	2.75	0.61
227	TE 330	TE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	270	720	K	2.75	0.61
228	TE 331	TE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	270	720	K	2.75	0.61
229	TE 332	TE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	270	720	K	2.75	0.61
230	TE 333	TE-IN0864-SGA	SGA U-Tube(4,IN) Pos.1	270	720	K	2.75	0.61
231	TE 334	TE-IN0865-SGA	SGA U-Tube(5,IN) Pos.1	270	720	K	2.75	0.61
232	TE 335	TE-IN0866-SGA	SGA U-Tube(6,IN) Pos.1	270	720	K	2.75	0.61
233	TE 336	TE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	270	720	K	2.75	0.61
234	TE 337	TE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	270	720	K	2.75	0.61
235	TE 338	TE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	270	720	K	2.75	0.61
236	TE 339	TE-EX0864-SGA	SGA U-Tube(4,EX) Pos.1	270	720	K	2.75	0.61
237	TE 340	TE-EX0865-SGA	SGA U-Tube(5,EX) Pos.1	270	720	K	2.75	0.61
238	TE 341	TE-EX0866-SGA	SGA U-Tube(6,EX) Pos.1	270	720	K	2.75	0.61
239	TE 343	TE-IN0932-SGA	SGA U-Tube(2,IN) Pos.2	270	720	K	2.75	0.61
240	TE 344	TE-IN0933-SGA	SGA U-Tube(3,IN) Pos.2	270	720	K	2.75	0.61
241	TE 345	TE-IN0934-SGA	SGA U-Tube(4,IN) Pos.2	270	720	K	2.75	0.61
242	TE 346	TE-IN0935-SGA	SGA U-Tube(5,IN) Pos.2	270	720	K	2.75	0.61
243	TE 347	TE-IN0936-SGA	SGA U-Tube(6,IN) Pos.2	270	720	K	2.75	0.61
244	TE 348	TE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	270	720	K	2.75	0.61
245	TE 349	TE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
246	TE 350	TE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	270	720	K	2.75	0.61
247	TE 352	TE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	270	720	K	2.75	0.61
248	TE 353	TE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	270	720	K	2.75	0.61
249	TE 354	TE-IN0994-SGA	SGA U-Tube(4,IN) Pos.3	270	720	K	2.75	0.61
250	TE 355	TE-EX0994-SGA	SGA U-Tube(4,EX) Pos.3	270	720	K	2.75	0.61
251	TE 356	TE-IN0995-SGA	SGA U-Tube(5,IN) Pos.3	270	720	K	2.75	0.61
252	TE 358	TE-IN0996-SGA	SGA U-Tube(6,IN) Pos.3	270	720	K	2.75	0.61
253	TE 359	TE-EX0996-SGA	SGA U-Tube(6,EX) Pos.3	270	720	K	2.75	0.61
254	TE 360	TE-IN1051-SGA	SGA U-Tube(1,IN) Pos.4	270	720	K	2.75	0.61
255	TE 361	TE-IN1052-SGA	SGA U-Tube(2,IN) Pos.4	270	720	K	2.75	0.61
256	TE 362	TE-IN1053-SGA	SGA U-Tube(3,IN) Pos.4	270	720	K	2.75	0.61
257	TE 363	TE-IN1054-SGA	SGA U-Tube(4,IN) Pos.4	270	720	K	2.75	0.61
258	TE 364	TE-IN1055-SGA	SGA U-Tube(5,IN) Pos.4	270	720	K	2.75	0.61
259	TE 365	TE-IN1056-SGA	SGA U-Tube(6,IN) Pos.4	270	720	K	2.75	0.61
260	TE 366	TE-IN1121-SGA	SGA U-Tube(1,IN) Pos.5	270	720	K	2.75	0.61
261	TE 367	TE-EX1121-SGA	SGA U-Tube(1,EX) Pos.5	270	720	K	2.75	0.61
262	TE 368	TE-IN1122-SGA	SGA U-Tube(2,IN) Pos.5	270	720	K	2.75	0.61
263	TE 371	TE-EX1123-SGA	SGA U-Tube(3,EX) Pos.5	270	720	K	2.75	0.61
264	TE 372	TE-IN1124-SGA	SGA U-Tube(4,IN) Pos.5	270	720	K	2.75	0.61
265	TE 373	TE-EX1124-SGA	SGA U-Tube(4,EX) Pos.5	270	720	K	2.75	0.61
266	TE 374	TE-IN1125-SGA	SGA U-Tube(5,IN) Pos.5	270	720	K	2.75	0.61
267	TE 376	TE-IN1126-SGA	SGA U-Tube(6,IN) Pos.5	270	720	K	2.75	0.61
268	TE 377	TE-EX1126-SGA	SGA U-Tube(6,EX) Pos.5	270	720	K	2.75	0.61
269	TE 378	TE-IN1251-SGA	SGA U-Tube(1,IN) Pos.6	270	720	K	2.75	0.61
270	TE 379	TE-EX1251-SGA	SGA U-Tube(1,EX) Pos.6	270	720	K	2.75	0.61
271	TE 380	TE-IN1252-SGA	SGA U-Tube(2,IN) Pos.6	270	720	K	2.75	0.61
272	TE 381	TE-EX1252-SGA	SGA U-Tube(2,EX) Pos.6	270	720	K	2.75	0.61
273	TE 382	TE-IN1253-SGA	SGA U-Tube(3,IN) Pos.6	270	720	K	2.75	0.61
274	TE 383	TE-EX1253-SGA	SGA U-Tube(3,EX) Pos.6	270	720	K	2.75	0.61
275	TE 384	TE-IN1254-SGA	SGA U-Tube(4,IN) Pos.6	270	720	K	2.75	0.61
276	TE 385	TE-EX1254-SGA	SGA U-Tube(4,EX) Pos.6	270	720	K	2.75	0.61
277	TE 386	TE-IN1255-SGA	SGA U-Tube(5,IN) Pos.6	270	720	K	2.75	0.61
278	TE 387	TE-EX1255-SGA	SGA U-Tube(5,EX) Pos.6	270	720	K	2.75	0.61
279	TE 389	TE-EX1256-SGA	SGA U-Tube(6,EX) Pos.6	270	720	K	2.75	0.61
280	TE 390	TE-IN1371-SGA	SGA U-Tube(1,IN) Pos.7	270	720	K	2.75	0.61
281	TE 392	TE-IN1372-SGA	SGA U-Tube(2,IN) Pos.7	270	720	K	2.75	0.61
282	TE 393	TE-EX1372-SGA	SGA U-Tube(2,EX) Pos.7	270	720	K	2.75	0.61
283	TE 395	TE-EX1373-SGA	SGA U-Tube(3,EX) Pos.7	270	720	K	2.75	0.61
284	TE 396	TE-IN1374-SGA	SGA U-Tube(4,IN) Pos.7	270	720	K	2.75	0.61
285	TE 397	TE-EX1374-SGA	SGA U-Tube(4,EX) Pos.7	270	720	K	2.75	0.61
286	TE 399	TE-EX1375-SGA	SGA U-Tube(5,EX) Pos.7	270	720	K	2.75	0.61
287	TE 400	TE-IN1376-SGA	SGA U-Tube(6,IN) Pos.7	270	720	K	2.75	0.61
288	TE 401	TE-EX1376-SGA	SGA U-Tube(6,EX) Pos.7	270	720	K	2.75	0.61
289	TE 403	TE-EX1501-SGA	SGA U-Tube(1,EX) Pos.8	270	720	K	2.75	0.61
290	TE 404	TE-IN1502-SGA	SGA U-Tube(2,IN) Pos.8	270	720	K	2.75	0.61
291	TE 405	TE-EX1502-SGA	SGA U-Tube(2,EX) Pos.8	270	720	K	2.75	0.61
292	TE 407	TE-EX1503-SGA	SGA U-Tube(3,EX) Pos.8	270	720	K	2.75	0.61
293	TE 408	TE-IN1504-SGA	SGA U-Tube(4,IN) Pos.8	270	720	K	2.75	0.61
294	TE 410	TE-IN1505-SGA	SGA U-Tube(5,IN) Pos.8	270	720	K	2.75	0.61
295	TE 412	TE-IN1506-SGA	SGA U-Tube(6,IN) Pos.8	270	720	K	2.75	0.61
296	TE 413	TE-EX1506-SGA	SGA U-Tube(6,EX) Pos.8	270	720	K	2.75	0.61
297	TE 414	TE-IN1632-SGA	SGA U-Tube(2,IN) Pos.9	270	720	K	2.75	0.61
298	TE 415	TE-EX1632-SGA	SGA U-Tube(2,EX) Pos.9	270	720	K	2.75	0.61
299	TE 417	TE-EX1633-SGA	SGA U-Tube(3,EX) Pos.9	270	720	K	2.75	0.61
300	TE 419	TE-EX1634-SGA	SGA U-Tube(4,EX) Pos.9	270	720	K	2.75	0.61
301	TE 420	TE-IN1635-SGA	SGA U-Tube(5,IN) Pos.9	270	720	K	2.75	0.61
302	TE 421	TE-EX1635-SGA	SGA U-Tube(5,EX) Pos.9	270	720	K	2.75	0.61
303	TE 422	TE-IN1701-SGA	SGA U-Tube(1,IN) Pos.10	270	720	K	2.75	0.61
304	TE 426	TE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	270	720	K	2.75	0.61
305	TE 427	TE-IN1864-SGA	SGA U-Tube(4,IN) Pos.11	270	720	K	2.75	0.61
306	TE 429	TE-086C-SGA	SGA Boiling Section Pos.1	270	670	K	2.63	0.66
307	TE 430	TE-099C-SGA	SGA Boiling Section Pos.3	270	670	K	2.63	0.66
308	TE 431	TE-112C-SGA	SGA Boiling Section Pos.5	270	670	K	2.63	0.66
309	TE 432	TE-125C-SGA	SGA Boiling Section Pos.6	270	670	K	2.63	0.66
310	TE 433	TE-137C-SGA	SGA Boiling Section Pos.7	270	670	K	2.63	0.66
311	TE 434	TE-150C-SGA	SGA Boiling Section Pos.8	270	670	K	2.63	0.66
312	TE 435	TE-163C-SGA	SGA Boiling Section Pos.9	270	670	K	2.63	0.66
313	TE 436	TE-178C-SGA	SGA Boiling Section Pos.10	270	670	K	2.63	0.66
314	TE 437	TE-192F-SGA	SGA Boiling Section	270	670	K	2.63	0.66
315	TE 438	TE-208F-SGA	SGA Separator	270	670	K	2.63	0.66
316	TE 439	TE-192C-SGA	SGA Downcomer	270	670	K	2.63	0.66
317	TE 440	TE-208C-SGA	SGA Downcomer	270	670	K	2.63	0.66
318	TE 441	TE-223C-SGA	SGA Steam Dome	270	670	K	2.63	0.66
319	TE 442	TE-245C-SGA	SGA Steam Dome	270	670	K	2.63	0.66
320	TE 443	TE-IN0641-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
321	TE 444	TE-IN0642-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
322	TE 445	TE-IN0643-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
323	TE 449	TE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	270	720	K	2.75	0.61
324	TE 450	TE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	270	720	K	2.75	0.61
325	TE 452	TE-IN0864-SGB	SGB U-Tube(4,IN) Pos.1	270	720	K	2.75	0.61
326	TE 453	TE-IN0865-SGB	SGB U-Tube(5,IN) Pos.1	270	720	K	2.75	0.61
327	TE 454	TE-IN0866-SGB	SGB U-Tube(6,IN) Pos.1	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
328	TE 455	TE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	270	720	K	2.75	0.61
329	TE 456	TE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	270	720	K	2.75	0.61
330	TE 457	TE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	270	720	K	2.75	0.61
331	TE 458	TE-EX0864-SGB	SGB U-Tube(4,EX) Pos.1	270	720	K	2.75	0.61
332	TE 460	TE-EX0866-SGB	SGB U-Tube(6,EX) Pos.1	270	720	K	2.75	0.61
333	TE 461	TE-IN0931-SGB	SGB U-Tube(1,IN) Pos.2	270	720	K	2.75	0.61
334	TE 463	TE-IN0933-SGB	SGB U-Tube(3,IN) Pos.2	270	720	K	2.75	0.61
335	TE 464	TE-IN0934-SGB	SGB U-Tube(4,IN) Pos.2	270	720	K	2.75	0.61
336	TE 467	TE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	270	720	K	2.75	0.61
337	TE 468	TE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	270	720	K	2.75	0.61
338	TE 469	TE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	270	720	K	2.75	0.61
339	TE 470	TE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	270	720	K	2.75	0.61
340	TE 471	TE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	270	720	K	2.75	0.61
341	TE 472	TE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	270	720	K	2.75	0.61
342	TE 473	TE-IN0994-SGB	SGB U-Tube(4,IN) Pos.3	270	720	K	2.75	0.61
343	TE 474	TE-EX0994-SGB	SGB U-Tube(4,EX) Pos.3	270	720	K	2.75	0.61
344	TE 476	TE-EX0995-SGB	SGB U-Tube(5,EX) Pos.3	270	720	K	2.75	0.61
345	TE 477	TE-IN0996-SGB	SGB U-Tube(6,IN) Pos.3	270	720	K	2.75	0.61
346	TE 478	TE-EX0996-SGB	SGB U-Tube(6,EX) Pos.3	270	720	K	2.75	0.61
347	TE 479	TE-IN1051-SGB	SGB U-Tube(1,IN) Pos.4	270	720	K	2.75	0.61
348	TE 482	TE-IN1054-SGB	SGB U-Tube(4,IN) Pos.4	270	720	K	2.75	0.61
349	TE 486	TE-EX1121-SGB	SGB U-Tube(1,EX) Pos.5	270	720	K	2.75	0.61
350	TE 487	TE-IN1122-SGB	SGB U-Tube(2,IN) Pos.5	270	720	K	2.75	0.61
351	TE 488	TE-EX1122-SGB	SGB U-Tube(2,EX) Pos.5	270	720	K	2.75	0.61
352	TE 489	TE-IN1123-SGB	SGB U-Tube(3,IN) Pos.5	270	720	K	2.75	0.61
353	TE 490	TE-EX1123-SGB	SGB U-Tube(3,EX) Pos.5	270	720	K	2.75	0.61
354	TE 491	TE-IN1124-SGB	SGB U-Tube(4,IN) Pos.5	270	720	K	2.75	0.61
355	TE 492	TE-EX1124-SGB	SGB U-Tube(4,EX) Pos.5	270	720	K	2.75	0.61
356	TE 497	TE-IN1251-SGB	SGB U-Tube(1,IN) Pos.6	270	720	K	2.75	0.61
357	TE 498	TE-EX1251-SGB	SGB U-Tube(1,EX) Pos.6	270	720	K	2.75	0.61
358	TE 499	TE-IN1252-SGB	SGB U-Tube(2,IN) Pos.6	270	720	K	2.75	0.61
359	TE 502	TE-EX1253-SGB	SGB U-Tube(3,EX) Pos.6	270	720	K	2.75	0.61
360	TE 503	TE-IN1254-SGB	SGB U-Tube(4,IN) Pos.6	270	720	K	2.75	0.61
361	TE 504	TE-EX1254-SGB	SGB U-Tube(4,EX) Pos.6	270	720	K	2.75	0.61
362	TE 505	TE-IN1255-SGB	SGB U-Tube(5,IN) Pos.6	270	720	K	2.75	0.61
363	TE 506	TE-EX1255-SGB	SGB U-Tube(5,EX) Pos.6	270	720	K	2.75	0.61
364	TE 509	TE-IN1371-SGB	SGB U-Tube(1,IN) Pos.7	270	720	K	2.75	0.61
365	TE 510	TE-EX1371-SGB	SGB U-Tube(1,EX) Pos.7	270	720	K	2.75	0.61
366	TE 511	TE-IN1372-SGB	SGB U-Tube(2,IN) Pos.7	270	720	K	2.75	0.61
367	TE 514	TE-EX1373-SGB	SGB U-Tube(3,EX) Pos.7	270	720	K	2.75	0.61
368	TE 515	TE-IN1374-SGB	SGB U-Tube(4,IN) Pos.7	270	720	K	2.75	0.61
369	TE 516	TE-EX1374-SGB	SGB U-Tube(4,EX) Pos.7	270	720	K	2.75	0.61
370	TE 517	TE-IN1375-SGB	SGB U-Tube(5,IN) Pos.7	270	720	K	2.75	0.61
371	TE 518	TE-EX1375-SGB	SGB U-Tube(5,EX) Pos.7	270	720	K	2.75	0.61
372	TE 519	TE-IN1376-SGB	SGB U-Tube(6,IN) Pos.7	270	720	K	2.75	0.61
373	TE 520	TE-EX1376-SGB	SGB U-Tube(6,EX) Pos.7	270	720	K	2.75	0.61
374	TE 525	TE-IN1503-SGB	SGB U-Tube(3,IN) Pos.8	270	720	K	2.75	0.61
375	TE 526	TE-EX1503-SGB	SGB U-Tube(3,EX) Pos.8	270	720	K	2.75	0.61
376	TE 527	TE-IN1504-SGB	SGB U-Tube(4,IN) Pos.8	270	720	K	2.75	0.61
377	TE 528	TE-EX1504-SGB	SGB U-Tube(4,EX) Pos.8	270	720	K	2.75	0.61
378	TE 529	TE-IN1505-SGB	SGB U-Tube(5,IN) Pos.8	270	720	K	2.75	0.61
379	TE 530	TE-EX1505-SGB	SGB U-Tube(5,EX) Pos.8	270	720	K	2.75	0.61
380	TE 532	TE-EX1506-SGB	SGB U-Tube(6,EX) Pos.8	270	720	K	2.75	0.61
381	TE 533	TE-IN1632-SGB	SGB U-Tube(2,IN) Pos.9	270	720	K	2.75	0.61
382	TE 534	TE-EX1632-SGB	SGB U-Tube(2,EX) Pos.9	270	720	K	2.75	0.61
383	TE 535	TE-IN1633-SGB	SGB U-Tube(3,IN) Pos.9	270	720	K	2.75	0.61
384	TE 536	TE-EX1633-SGB	SGB U-Tube(3,EX) Pos.9	270	720	K	2.75	0.61
385	TE 537	TE-IN1634-SGB	SGB U-Tube(4,IN) Pos.9	270	720	K	2.75	0.61
386	TE 538	TE-EX1634-SGB	SGB U-Tube(4,EX) Pos.9	270	720	K	2.75	0.61
387	TE 539	TE-IN1635-SGB	SGB U-Tube(5,IN) Pos.9	270	720	K	2.75	0.61
388	TE 544	TE-IN1785-SGB	SGB U-Tube(5,IN) Pos.10	270	720	K	2.75	0.61
389	TE 546	TE-IN1864-SGB	SGB U-Tube(4,IN) Pos.11	270	720	K	2.75	0.61
390	TE 548	TE-086C-SGB	SGB Boiling Section Pos.1	270	670	K	2.63	0.66
391	TE 549	TE-099C-SGB	SGB Boiling Section Pos.3	270	670	K	2.63	0.66
392	TE 550	TE-112C-SGB	SGB Boiling Section Pos.5	270	670	K	2.63	0.66
393	TE 551	TE-125C-SGB	SGB Boiling Section Pos.6	270	670	K	2.63	0.66
394	TE 552	TE-137C-SGB	SGB Boiling Section Pos.7	270	670	K	2.63	0.66
395	TE 553	TE-150C-SGB	SGB Boiling Section Pos.8	270	670	K	2.63	0.66
396	TE 554	TE-163C-SGB	SGB Boiling Section Pos.9	270	670	K	2.63	0.66
397	TE 555	TE-178C-SGB	SGB Boiling Section Pos.10	270	670	K	2.63	0.66
398	TE 556	TE-192F-SGB	SGB Boiling Section	270	670	K	2.63	0.66
399	TE 557	TE-208F-SGB	SGB Separator	270	670	K	2.63	0.66
400	TE 558	TE-192C-SGB	SGB Downcomer	270	670	K	2.63	0.66
401	TE 559	TE-208C-SGB	SGB Downcomer	270	670	K	2.63	0.66
402	TE 560	TE-223C-SGB	SGB Steam Dome	270	670	K	2.63	0.66
403	TE 561	TE-245C-SGB	SGB Steam Dome	270	670	K	2.63	0.29
404	TE 595	TE724-ACH	Acc-Hot Line to CLB	270	570	K	2.42	0.81
405	TE 609	TE012C-HLA	HLA Spool Piece Top	270	720	K	2.75	0.61
406	TE 610	TE012D-HLA	HLA Spool Piece Bottom	270	720	K	2.75	0.61
407	TE 615	TE052-LSA	LSA Spool Piece	270	720	K	2.75	0.61
408	TE 619	TE072C-CLA	CLA Spool Piece Top	270	720	K	2.75	0.61
409	TE 620	TE072D-CLA	CLA Spool Piece Bottom	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
410	TE 624	TE152C-HLB	HLB Spool Piece Top	270	720	K	2.75	0.61
411	TE 625	TE152D-HLB	HLB Spool Piece Bottom	270	720	K	2.75	0.61
412	TE 630	TE192-LSB	LSB Spool Piece	270	720	K	2.75	0.61
413	TE 634	TE212C-CLB	CLB Spool Piece Top	270	720	K	2.75	0.61
414	TE 635	TE212D-CLB	CLB Spool Piece Bottom	270	720	K	2.75	0.61
415	TE 644	TE571C-BU	RSV Spool Piece, Inlet Side	270	720	K	2.75	0.61
416	TE 645	TE571D-BU	RSV Spool Piece, Inlet Side	270	720	K	2.75	0.61
417	TE 651	TE591C-BU	Break Spool Piece	270	720	K	2.75	0.61
418	TE 652	TE591D-BU	Break Spool Piece	270	720	K	2.75	0.61
419	TE 662	TE-N-006-DC	PV Downcomer DTT North	270	720	K	2.75	0.61
420	TE 663	TE-S-006-DC	PV Downcomer DTT South	270	720	K	2.75	0.61
421	TE 664	TE-E-006-DC	PV Downcomer DTT East	270	720	K	2.75	0.61
422	TE 665	TE-W-006-DC	PV Downcomer DTT West	270	720	K	2.75	0.61
423	TE 707	TE-121E-UHDP	PLR-UH-9 Oil Outlet	270	720	K	2.75	0.61
424	TE 709	TE-121B-UHDP	PLR-UH-9 EL. 7.6m	270	720	K	2.75	0.61
425	TE 710	TE-121C-UHDP	PLR-UH-9 EL. 8.2m	270	720	K	2.75	0.61
426	TE 711	TE-E071C-DC	Downcomer EL.7.1m,East	270	720	K	2.75	0.61
427	TE 712	TE-W071C-DC	Downcomer EL.7.1m,West	270	720	K	2.75	0.61
428	TE 713	TE-E067C-DC	Downcomer EL.6.7m,East	270	720	K	2.75	0.61
429	TE 715	TE-951-CS	Oil Inlet-Main	270	720	K	2.75	0.61
430	TE 716	TE-952-CS	Oil Outlet-Main	270	720	K	2.75	0.61
431	TE 718	TE-B05221	B05 Rod(2,2) Pos.1,Fluid	270	970	K	3.69	0.53
432	TE 719	TE-B05223	B05 Rod(2,2) Pos.3,Fluid	270	970	K	3.69	0.53
433	TE 720	TE-B05225	B05 Rod(2,2) Pos.5,Fluid	270	970	K	3.69	0.53
434	TE 721	TE-B05226	B05 Rod(2,2) Pos.6,Fluid	270	970	K	3.69	0.53
435	TE 723	TE-B05229	B05 Rod(2,2) Pos.9,Fluid	270	970	K	3.69	0.53
436	TE 724	TE-B07221	B07 Rod(2,2) Pos.1,Fluid	270	1470	K	5.31	0.44
437	TE 725	TE-B07223	B07 Rod(2,2) Pos.3,Fluid	270	1470	K	5.31	0.44
438	TE 726	TE-B07225	B07 Rod(2,2) Pos.5,Fluid	270	1470	K	5.31	0.44
439	TE 727	TE-B07226	B07 Rod(2,2) Pos.6,Fluid	270	1470	K	5.31	0.44
440	TE 728	TE-B07227	B07 Rod(2,2) Pos.7,Fluid	270	1470	K	5.31	0.44
441	TE 729	TE-B07229	B07 Rod(2,2) Pos.9,Fluid	270	1470	K	5.31	0.44
442	TE 730	TE-EX0650-SGA	SGA Outlet Plenum	270	720	K	2.75	0.61
443	TE 731	TE-EX0680-SGA	SGA Outlet Plenum	270	720	K	2.75	0.61
444	TE 732	TE-EX0720-SGA	SGA Outlet Plenum	270	720	K	2.75	0.61
445	TE 733	TE-EX0650-SGB	SGB Outlet Plenum	270	720	K	2.75	0.61
446	TE 734	TE-EX0680-SGB	SGB Outlet Plenum	270	720	K	2.75	0.61
447	TE 735	TE-EX0720-SGB	SGB Outlet Plenum	270	720	K	2.75	0.61
448	TE 739	TE275C-PR	PZR Spray Inlet Nozzle	270	720	K	2.75	0.61
449	TE 752	TE293-ACH	Acc-Hot Top Gas Line	270	720	K	2.75	0.61
450	TE 780	TE687X-ACH	Acc-Hot Tank Fluid DL.6570	270	720	K	2.75	0.61
451	TE 854	TE-NP053F-PV	PV UP North Peri. EL.5299	270	630	K	3.05	0.85
452	TE 855	TE-NP055F-PV	PV UP North Peri. EL.5503	270	630	K	3.05	0.85
453	TE 856	TE-NP057F-PV	PV UP North Peri. EL.5706	270	630	K	3.05	0.85
454	TE 857	TE-NP059F-PV	PV UP North Peri. EL.5938	270	630	K	3.05	0.85
455	TE 858	TE-EP047F-PV	PV UP East Peri. EL.4672	270	630	K	3.05	0.85
456	TE 859	TE-EP053F-PV	PV UP East Peri. EL.5299	270	630	K	3.05	0.85
457	TE 860	TE-EP055F-PV	PV UP East Peri. EL.5503	270	630	K	3.05	0.85
458	TE 861	TE-EP057F-PV	PV UP East Peri. EL.5706	270	630	K	3.05	0.85
459	TE 862	TE-EP059F-PV	PV UP East Peri. EL.5938	270	630	K	3.05	0.85
460	TE 863	TE-SP047F-PV	PV UP South Peri. EL.4672	270	630	K	3.05	0.85
461	TE 864	TE-SP053F-PV	PV UP South Peri. EL.5299	270	630	k	3.05	0.85
462	TE 865	TE-SP055F-PV	PV UP South Peri. EL.5503	270	630	K	3.05	0.85
463	TE 866	TE-SP057F-PV	PV UP South Peri. EL.5706	270	630	K	3.05	0.85
464	TE 867	TE-SP059F-PV	PV UP South Peri. EL.5938	270	630	K	3.05	0.85
465	TE 868	TE-WP047F-PV	PV UP West Peri. EL.4672	270	630	K	3.05	0.85
466	TE 869	TE-WP053F-PV	PV UP West Peri. EL.5299	270	630	K	3.05	0.85
467	TE 870	TE-WP055F-PV	PV UP West Peri. EL.5503	270	630	K	3.05	0.85
468	TE 871	TE-WP057F-PV	PV UP West Peri. EL.5706	270	630	K	3.05	0.85
469	TE 872	TE-WP059F-PV	PV UP West Peri. EL.5938	270	630	K	3.05	0.85
470	TE 873	TE-EM053F-PV	PV UP East Middle EL.5299	270	630	K	3.05	0.85
471	TE 874	TE-EM057F-PV	PV UP East Middle EL.5706	270	630	K	3.05	0.85
472	TE 875	TE-WM053F-PV	PV UP West Middle EL.5299	270	630	K	3.05	0.85
473	TE 876	TE-WM057F-PV	PV UP West Middle EL.5706	270	630	K	3.05	0.85
474	TE 877	TE-WC047F-PV	PV UP West Center EL.4672	270	630	K	3.05	0.85
475	TE 878	TE-WC053F-PV	PV UP West Center EL.5299	270	630	K	3.05	0.85
476	TE 879	TE-WC055F-PV	PV UP West Center EL.5503	270	630	K	3.05	0.85
477	TE 880	TE-WC057F-PV	PV UP West Center EL.5706	270	630	K	3.05	0.85
478	TE 881	TE-WC059F-PV	PV UP West Center EL.5938	270	630	K	3.05	0.85
479	TE 882	TE-EC047F-PV	PV UP East Center EL.4672	270	630	K	3.05	0.85
480	TE 883	TE-EC053F-PV	PV UP East Center EL.5299	270	630	K	3.05	0.85
481	TE 884	TE-EC055F-PV	PV UP East Center EL.5503	270	630	K	3.05	0.85
482	TE 885	TE-EC057F-PV	PV UP East Center EL.5706	270	630	K	3.05	0.85
483	TE 886	TE-EC059F-PV	PV UP East Center EL.5938	270	630	K	3.05	0.85
484	TE 887	TE-EN037C-DC	DC East-North EL.3662	270	630	K	3.05	0.85
485	TE 888	TE-E037C-DC	DC East EL.3662	270	630	K	3.05	0.85
486	TE 891	TE-W037C-DC	DC West EL.3662	270	630	K	3.05	0.85
487	TE 893	TE-EN040C-DC	DC East-North EL.4037	270	630	K	3.05	0.85
488	TE 894	TE-E040C-DC	DC East EL.4037	270	630	K	3.05	0.85
489	TE 895	TE-ES040C-DC	DC East-South EL.4037	270	630	K	3.05	0.85
490	TE 896	TE-WN040C-DC	DC West-North EL.4037	270	630	K	3.05	0.85
491	TE 897	TE-W040C-DC	DC West EL.4037	270	630	K	3.05	0.85

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
492	TE 898	TE-WS040C-DC	DC West-South EL.4037	270	630	K	3.05	0.85
493	TE 899	TE-W042C-DC	DC West EL.4210	270	630	K	3.05	0.85
494	TE 900	TE-E042C-DC	DC East EL.4210	270	630	K	3.05	0.85
495	TE 901	TE-SW045C-DC	DC South-West EL.4497	270	630	K	3.05	0.85
496	TE 902	TE-NE045C-DC	DC North-East EL.4497	270	630	K	3.05	0.85
497	TE 903	TE-N045C-DC	DC North EL.4497	270	630	K	3.05	0.85
498	TE 904	TE-NW045C-DC	DC North-West EL.4497	270	630	K	3.05	0.85
499	TE 905	TE-S045C-DC	DC South EL.4497	270	630	K	3.05	0.85
500	TE 906	TE-SE045C-DC	DC South-East EL.4497	270	630	K	3.05	0.85
501	TE 907	TE-NE051C-DC	DC North-East EL.5074	270	630	K	3.05	0.85
502	TE 908	TE-N051C-DC	DC North EL.5074	270	630	K	3.05	0.85
503	TE 909	TE-NW051C-DC	DC North-West EL.5074	270	630	K	3.05	0.85
504	TE 910	TE-SW051C-DC	DC South-West EL.5074	270	630	K	3.05	0.85
505	TE 911	TE-S051C-DC	DC South EL.5074	270	630	K	3.05	0.85
506	TE 912	TE-SE051C-DC	DC South-East EL.5074	270	630	K	3.05	0.85
507	TE 913	TE-N054C-DC	DC North EL.5363	270	630	K	3.05	0.85
508	TE 914	TE-S054C-DC	DC South EL.5363	270	630	K	3.05	0.85
509	TE 921	HTE-C046-PV	Heated TC, EL.4597	270	1270	K	4.55	0.46
510	TE 925	TE-C056-PV	HTC Fluid, EL.5606	270	1270	K	4.55	0.46
511	TE 926	HTE-C056-PV	Heated TC, EL.5606	270	1270	K	4.55	0.46
512	TE 958	TE194A-PR	PZR DL.2025	270	720	K	2.75	0.61
513	TE 960	TE194C-PR	PZR DL.5995	270	720	K	2.75	0.61
514	TE 961	TE194D-PR	PZR DL.7965	270	720	K	2.75	0.61
515	TE 962	TE194E-PR	PZR DL.9795	270	720	K	2.75	0.61
516	TE 963	TE194F-PR	PZR DL.11321	270	720	K	2.75	0.61
517	TE 964	TE-PR2	PZR HT	270	1470	K	5.31	0.44
518	TE 1089	TE910-CWT	Cooling Water Tank	270	370	K	2.37	2.37
519	TE 1092	TE960-AIR	Atmospheric Temperature	170	370	K	2.30	1.15
520	TE 1093	TE961-AIR	Room Temperature	170	370	K	2.30	1.15
521	TE 1094	TC030D-HLA	HLA Fluid at Pipe Bottom	273	673	K	2.63	0.66
522	TE 1095	TC170D-HLB	HLB Fluid at Pipe Bottom	273	673	K	2.63	0.66
523	TE 1096	TC080D-CLA	CLA Fluid at Pipe Bottom	273	673	K	2.63	0.66
524	TE 1097	TC220D-CLB	CLB Fluid at Pipe Bottom	273	673	K	2.63	0.66
525	TE 1098	TC194B-PR	PZR Fluid	273	673	K	2.63	0.66
526	TE 1099	TC223D-SGA	SGA Steam Dome	273	673	K	2.63	0.66
527	TE 1100	TC223D-SGB	SGB Steam Dome	273	673	K	2.63	0.66
528	TE 1101	TC-E000C-DC	Downcomer EL.0.0m,East	273	673	K	2.63	0.66
529	TE 1102	TC-E060C-DC	Downcomer EL.6.0m,East	273	673	K	2.63	0.66
530	TE 1123	TE687A-ACH	Acc-Hot Tank Fluid DL.10	270	720	K	2.75	0.61
531	TE 1124	TE687B-ACH	Acc-Hot Tank Fluid DL.475	270	720	K	2.75	0.61
532	TE 1125	TE687C-ACH	Acc-Hot Tank Fluid DL.940	270	720	K	2.75	0.61
533	TE 1126	TE687D-ACH	Acc-Hot Tank Fluid DL.1405	270	720	K	2.75	0.61
534	TE 1127	TE687E-ACH	Acc-Hot Tank Fluid DL.1870	270	720	K	2.75	0.61
535	TE 1128	TE687F-ACH	Acc-Hot Tank Fluid DL.2335	270	720	K	2.75	0.61
536	TE 1129	TE687G-ACH	Acc-Hot Tank Fluid DL.2800	270	720	K	2.75	0.61
537	TE 1130	TE687H-ACH	Acc-Hot Tank Fluid DL.3265	270	720	K	2.75	0.61
538	TE 1131	TE687I-ACH	Acc-Hot Tank Fluid DL.3275	270	720	K	2.75	0.61
539	TE 1132	TE687J-ACH	Acc-Hot Tank Fluid DL.3285	270	720	K	2.75	0.61
540	TE 1133	TE687K-ACH	Acc-Hot Tank Fluid DL.3295	270	720	K	2.75	0.61
541	TE 1134	TE687L-ACH	Acc-Hot Tank Fluid DL.3305	270	720	K	2.75	0.61
542	TE 1135	TE687M-ACH	Acc-Hot Tank Fluid DL.3315	270	720	K	2.75	0.61
543	TE 1136	TE687N-ACH	Acc-Hot Tank Fluid DL.3325	270	720	K	2.75	0.61
544	TE 1137	TE687O-ACH	Acc-Hot Tank Fluid DL.3335	270	720	K	2.75	0.61
545	TE 1138	TE687P-ACH	Acc-Hot Tank Fluid DL.3345	270	720	K	2.75	0.61
546	TE 1139	TE687Q-ACH	Acc-Hot Tank Fluid DL.3355	270	720	K	2.75	0.61
547	TE 1140	TE687R-ACH	Acc-Hot Tank Fluid DL.3820	270	720	K	2.75	0.61
548	TE 1141	TE687S-ACH	Acc-Hot Tank Fluid DL.4285	270	720	K	2.75	0.61
549	TE 1142	TE687T-ACH	Acc-Hot Tank Fluid DL.4750	270	720	K	2.75	0.61
550	TE 1143	TE687U-ACH	Acc-Hot Tank Fluid DL.5215	270	720	K	2.75	0.61
551	TE 1144	TE687V-ACH	Acc-Hot Tank Fluid DL.5680	270	720	K	2.75	0.61
552	TE 1145	TE687W-ACH	Acc-Hot Tank Fluid DL.6145	270	720	K	2.75	0.61
553	TE 1151	TE075A-CLA	CLA TC Rake	270	720	K	2.75	0.61
554	TE 1152	TE075B-CLA	CLA TC Rake	270	720	K	2.75	0.61
555	TE 1153	TE075C-CLA	CLA TC Rake	270	720	K	2.75	0.61
556	TE 1154	TE075D-CLA	CLA TC Rake	270	720	K	2.75	0.61
557	TE 1155	TE075E-CLA	CLA TC Rake	270	720	K	2.75	0.61
558	TE 1156	TE215A-CLB	CLB TC Rake	270	720	K	2.75	0.61
559	TE 1157	TE215B-CLB	CLB TC Rake	270	720	K	2.75	0.61
560	TE 1158	TE215C-CLB	CLB TC Rake	270	720	K	2.75	0.61
561	TE 1159	TE215D-CLB	CLB TC Rake	270	720	K	2.75	0.61
562	TE 1160	TE215E-CLB	CLB TC Rake	270	720	K	2.75	0.61
563	TE 1165	TE970-DIS	Dis. Gas Sampling	270	470	K	2.30	1.15
564	TE 1166	TE-H10-GAS	Air Injection Line No.1	270	370	K	2.37	2.37
565	TE 1167	TE-H20-GAS	Air Injection Line No.2	270	370	K	2.37	2.37
566	TE 1168	TE-E030C-DC	DC East EL.3000	270	720	K	2.37	0.53
567	TE 1169	TE-S030C-DC	DC South EL.3000	270	720	K	2.37	0.53
568	TE 1170	TE-W030C-DC	DC West EL.3000	270	720	K	2.37	0.53
569	TE 1171	TE-N030C-DC	DC North EL.3000	270	720	K	2.37	0.53
570	TE 1172	TE-S037C-DC	DC South EL.3662	270	720	K	2.37	0.53
571	TE 1173	TE-N037C-DC	DC North EL.3662	270	720	K	2.37	0.53
572	TE 1174	TE-1A1-CLA	CLA Below ECCS A1	270	720	K	2.75	0.61
573	TE 1175	TE-1A2-CLA	CLA Below ECCS A2	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
574	TE 1176	TE-1A3-CLA	CLA Below ECCS A3	270	720	K	2.75	0.61
575	TE 1177	TE-2A1-CLA	CLA SP SG-Side A1	270	720	K	2.75	0.61
576	TE 1178	TE-2A2-CLA	CLA SP SG-Side A2	270	720	K	2.75	0.61
577	TE 1179	TE-2A3-CLA	CLA SP SG-Side A3	270	720	K	2.75	0.61
578	TE 1180	TE-2A4-CLA	CLA SP SG-Side A4	270	720	K	2.75	0.61
579	TE 1181	TE-2A5-CLA	CLA SP SG-Side A5	270	720	K	2.75	0.61
580	TE 1182	TE-2A6-CLA	CLA SP SG-Side A6	270	720	K	2.75	0.61
581	TE 1183	TE-2A7-CLA	CLA SP SG-Side A7	270	720	K	2.75	0.61
582	TE 1184	TE-2B1-CLA	CLA SP SG-Side B1	270	720	K	2.75	0.61
583	TE 1185	TE-2B2-CLA	CLA SP SG-Side B2	270	720	K	2.75	0.61
584	TE 1186	TE-2B3-CLA	CLA SP SG-Side B3	270	720	K	2.75	0.61
585	TE 1187	TE-2B4-CLA	CLA SP SG-Side B4	270	720	K	2.75	0.61
586	TE 1188	TE-2B5-CLA	CLA SP SG-Side B5	270	720	K	2.75	0.61
587	TE 1189	TE-2B6-CLA	CLA SP SG-Side B6	270	720	K	2.75	0.61
588	TE 1190	TE-2B7-CLA	CLA SP SG-Side B7	270	720	K	2.75	0.61
589	TE 1191	TE-2C1-CLA	CLA SP SG-Side C1	270	720	K	2.75	0.61
590	TE 1192	TE-2C2-CLA	CLA SP SG-Side C2	270	720	K	2.75	0.61
591	TE 1193	TE-2C3-CLA	CLA SP SG-Side C3	270	720	K	2.75	0.61
592	TE 1194	TE-2C4-CLA	CLA SP SG-Side C4	270	720	K	2.75	0.61
593	TE 1195	TE-2C5-CLA	CLA SP SG-Side C5	270	720	K	2.75	0.61
594	TE 1196	TE-2C6-CLA	CLA SP SG-Side C6	270	720	K	2.75	0.61
595	TE 1197	TE-2C7-CLA	CLA SP SG-Side C7	270	720	K	2.75	0.61
596	TE 1198	TE-3A1-CLA	CLA SP Vessel-Side A1	270	720	K	2.75	0.61
597	TE 1199	TE-3A2-CLA	CLA SP Vessel-Side A2	270	720	K	2.75	0.61
598	TE 1200	TE-3A3-CLA	CLA SP Vessel-Side A3	270	720	K	2.75	0.61
599	TE 1201	TE-3A4-CLA	CLA SP Vessel-Side A4	270	720	K	2.75	0.61
600	TE 1202	TE-3A5-CLA	CLA SP Vessel-Side A5	270	720	K	2.75	0.61
601	TE 1203	TE-3A6-CLA	CLA SP Vessel-Side A6	270	720	K	2.75	0.61
602	TE 1204	TE-3A7-CLA	CLA SP Vessel-Side A7	270	720	K	2.75	0.61
603	TE 1205	TE-3B1-CLA	CLA SP Vessel-Side B1	270	720	K	2.75	0.61
604	TE 1206	TE-3B2-CLA	CLA SP Vessel-Side B2	270	720	K	2.75	0.61
605	TE 1207	TE-3B3-CLA	CLA SP Vessel-Side B3	270	720	K	2.75	0.61
606	TE 1208	TE-3B4-CLA	CLA SP Vessel-Side B4	270	720	K	2.75	0.61
607	TE 1209	TE-3B5-CLA	CLA SP Vessel-Side B5	270	720	K	2.75	0.61
608	TE 1210	TE-3B6-CLA	CLA SP Vessel-Side B6	270	720	K	2.75	0.61
609	TE 1211	TE-3B7-CLA	CLA SP Vessel-Side B7	270	720	K	2.75	0.61
610	TE 1212	TE-3C1-CLA	CLA SP Vessel-Side C1	270	720	K	2.75	0.61
611	TE 1213	TE-3C2-CLA	CLA SP Vessel-Side C2	270	720	K	2.75	0.61
612	TE 1214	TE-3C3-CLA	CLA SP Vessel-Side C3	270	720	K	2.75	0.61
613	TE 1215	TE-3C4-CLA	CLA SP Vessel-Side C4	270	720	K	2.75	0.61
614	TE 1216	TE-3C5-CLA	CLA SP Vessel-Side C5	270	720	K	2.75	0.61
615	TE 1217	TE-3C6-CLA	CLA SP Vessel-Side C6	270	720	K	2.75	0.61
616	TE 1218	TE-3C7-CLA	CLA SP Vessel-Side C7	270	720	K	2.75	0.61
617	TE 1219	TE-4A11-CLA	CLA Downcomer A11	270	720	K	2.75	0.61
618	TE 1220	TE-4A12-CLA	CLA Downcomer A12	270	720	K	2.75	0.61
619	TE 1221	TE-4A13-CLA	CLA Downcomer A13	270	720	K	2.75	0.61
620	TE 1222	TE-4A21-CLA	CLA Downcomer A21	270	720	K	2.75	0.61
621	TE 1223	TE-4A22-CLA	CLA Downcomer A22	270	720	K	2.75	0.61
622	TE 1224	TE-4A23-CLA	CLA Downcomer A23	270	720	K	2.75	0.61
623	TE 1225	TE-4B11-CLA	CLA Downcomer B11	270	720	K	2.75	0.61
624	TE 1226	TE-4B12-CLA	CLA Downcomer B12	270	720	K	2.75	0.61
625	TE 1227	TE-4B13-CLA	CLA Downcomer B13	270	720	K	2.75	0.61
626	TE 1228	TE-4B21-CLA	CLA Downcomer B21	270	720	K	2.75	0.61
627	TE 1229	TE-4B22-CLA	CLA Downcomer B22	270	720	K	2.75	0.61
628	TE 1230	TE-4B23-CLA	CLA Downcomer B23	270	720	K	2.75	0.61
629	TE 1231	TE-4C11-CLA	CLA Downcomer C11	270	720	K	2.75	0.61
630	TE 1232	TE-4C12-CLA	CLA Downcomer C12	270	720	K	2.75	0.61
631	TE 1233	TE-4C13-CLA	CLA Downcomer C13	270	720	K	2.75	0.61
632	TE 1234	TE-4C21-CLA	CLA Downcomer C21	270	720	K	2.75	0.61
633	TE 1235	TE-4C22-CLA	CLA Downcomer C22	270	720	K	2.75	0.61
634	TE 1236	TE-4C23-CLA	CLA Downcomer C23	270	720	K	2.75	0.61
635	TE 1237	TE-1A1-CLB	CLB Elbow A1	270	720	K	2.75	0.61
636	TE 1238	TE-1A2-CLB	CLB Elbow A2	270	720	K	2.75	0.61
637	TE 1239	TE-1A3-CLB	CLB Elbow A3	270	720	K	2.75	0.61
638	TE 1240	TE-1A4-CLB	CLB Elbow A4	270	720	K	2.75	0.61
639	TE 1241	TE-1A5-CLB	CLB Elbow A5	270	720	K	2.75	0.61
640	TE 1242	TE-1A6-CLB	CLB Elbow A6	270	720	K	2.75	0.61
641	TE 1243	TE-1A7-CLB	CLB Elbow A7	270	720	K	2.75	0.61
642	TE 1244	TE-1B1-CLB	CLB Elbow B1	270	720	K	2.75	0.61
643	TE 1245	TE-1B2-CLB	CLB Elbow B2	270	720	K	2.75	0.61
644	TE 1246	TE-1B3-CLB	CLB Elbow B3	270	720	K	2.75	0.61
645	TE 1247	TE-1B4-CLB	CLB Elbow B4	270	720	K	2.75	0.61
646	TE 1248	TE-1B5-CLB	CLB Elbow B5	270	720	K	2.75	0.61
647	TE 1249	TE-1B6-CLB	CLB Elbow B6	270	720	K	2.75	0.61
648	TE 1250	TE-1B7-CLB	CLB Elbow B7	270	720	K	2.75	0.61
649	TE 1251	TE-1C1-CLB	CLB Elbow C1	270	720	K	2.75	0.61
650	TE 1252	TE-1C2-CLB	CLB Elbow C2	270	720	K	2.75	0.61
651	TE 1253	TE-1C3-CLB	CLB Elbow C3	270	720	K	2.75	0.61
652	TE 1254	TE-1C4-CLB	CLB Elbow C4	270	720	K	2.75	0.61
653	TE 1255	TE-1C5-CLB	CLB Elbow C5	270	720	K	2.75	0.61
654	TE 1256	TE-1C6-CLB	CLB Elbow C6	270	720	K	2.75	0.61
655	TE 1257	TE-1C7-CLB	CLB Elbow C7	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
656	TE 1258	TE-2A1-CLB	CLB SP SG-Side A1	270	720	K	2.75	0.61
657	TE 1259	TE-2A2-CLB	CLB SP SG-Side A2	270	720	K	2.75	0.61
658	TE 1260	TE-2A3-CLB	CLB SP SG-Side A3	270	720	K	2.75	0.61
659	TE 1261	TE-2A4-CLB	CLB SP SG-Side A4	270	720	K	2.75	0.61
660	TE 1262	TE-2A5-CLB	CLB SP SG-Side A5	270	720	K	2.75	0.61
661	TE 1263	TE-2A6-CLB	CLB SP SG-Side A6	270	720	K	2.75	0.61
662	TE 1264	TE-2A7-CLB	CLB SP SG-Side A7	270	720	K	2.75	0.61
663	TE 1265	TE-2B1-CLB	CLB SP SG-Side B1	270	720	K	2.75	0.61
664	TE 1266	TE-2B2-CLB	CLB SP SG-Side B2	270	720	K	2.75	0.61
665	TE 1267	TE-2B3-CLB	CLB SP SG-Side B3	270	720	K	2.75	0.61
666	TE 1268	TE-2B4-CLB	CLB SP SG-Side B4	270	720	K	2.75	0.61
667	TE 1269	TE-2B5-CLB	CLB SP SG-Side B5	270	720	K	2.75	0.61
668	TE 1270	TE-2B6-CLB	CLB SP SG-Side B6	270	720	K	2.75	0.61
669	TE 1271	TE-2B7-CLB	CLB SP SG-Side B7	270	720	K	2.75	0.61
670	TE 1272	TE-2C1-CLB	CLB SP SG-Side C1	270	720	K	2.75	0.61
671	TE 1273	TE-2C2-CLB	CLB SP SG-Side C2	270	720	K	2.75	0.61
672	TE 1274	TE-2C3-CLB	CLB SP SG-Side C3	270	720	K	2.75	0.61
673	TE 1275	TE-2C4-CLB	CLB SP SG-Side C4	270	720	K	2.75	0.61
674	TE 1276	TE-2C5-CLB	CLB SP SG-Side C5	270	720	K	2.75	0.61
675	TE 1277	TE-2C6-CLB	CLB SP SG-Side C6	270	720	K	2.75	0.61
676	TE 1278	TE-2C7-CLB	CLB SP SG-Side C7	270	720	K	2.75	0.61
677	TE 1279	TE-3A1-CLB	CLB SP Vessel-Side A1	270	720	K	2.75	0.61
678	TE 1280	TE-3A2-CLB	CLB SP Vessel-Side A2	270	720	K	2.75	0.61
679	TE 1281	TE-3A3-CLB	CLB SP Vessel-Side A3	270	720	K	2.75	0.61
680	TE 1282	TE-3A4-CLB	CLB SP Vessel-Side A4	270	720	K	2.75	0.61
681	TE 1283	TE-3A5-CLB	CLB SP Vessel-Side A5	270	720	K	2.75	0.61
682	TE 1284	TE-3A6-CLB	CLB SP Vessel-Side A6	270	720	K	2.75	0.61
683	TE 1285	TE-3A7-CLB	CLB SP Vessel-Side A7	270	720	K	2.75	0.61
684	TE 1286	TE-3B1-CLB	CLB SP Vessel-Side B1	270	720	K	2.75	0.61
685	TE 1287	TE-3B2-CLB	CLB SP Vessel-Side B2	270	720	K	2.75	0.61
686	TE 1288	TE-3B3-CLB	CLB SP Vessel-Side B3	270	720	K	2.75	0.61
687	TE 1289	TE-3B4-CLB	CLB SP Vessel-Side B4	270	720	K	2.75	0.61
688	TE 1290	TE-3B5-CLB	CLB SP Vessel-Side B5	270	720	K	2.75	0.61
689	TE 1291	TE-3B6-CLB	CLB SP Vessel-Side B6	270	720	K	2.75	0.61
690	TE 1292	TE-3B7-CLB	CLB SP Vessel-Side B7	270	720	K	2.75	0.61
691	TE 1293	TE-3C1-CLB	CLB SP Vessel-Side C1	270	720	K	2.75	0.61
692	TE 1294	TE-3C2-CLB	CLB SP Vessel-Side C2	270	720	K	2.75	0.61
693	TE 1295	TE-3C3-CLB	CLB SP Vessel-Side C3	270	720	K	2.75	0.61
694	TE 1296	TE-3C4-CLB	CLB SP Vessel-Side C4	270	720	K	2.75	0.61
695	TE 1297	TE-3C5-CLB	CLB SP Vessel-Side C5	270	720	K	2.75	0.61
696	TE 1298	TE-3C6-CLB	CLB SP Vessel-Side C6	270	720	K	2.75	0.61
697	TE 1299	TE-3C7-CLB	CLB SP Vessel-Side C7	270	720	K	2.75	0.61
698	TE 1300	TE-4A11-CLB	CLB Downcomer A11	270	720	K	2.75	0.61
699	TE 1301	TE-4A12-CLB	CLB Downcomer A12	270	720	K	2.75	0.61
700	TE 1302	TE-4A13-CLB	CLB Downcomer A13	270	720	K	2.75	0.61
701	TE 1303	TE-4A21-CLB	CLB Downcomer A21	270	720	K	2.75	0.61
702	TE 1304	TE-4A22-CLB	CLB Downcomer A22	270	720	K	2.75	0.61
703	TE 1305	TE-4A23-CLB	CLB Downcomer A23	270	720	K	2.75	0.61
704	TE 1306	TE-4B11-CLB	CLB Downcomer B11	270	720	K	2.75	0.61
705	TE 1307	TE-4B12-CLB	CLB Downcomer B12	270	720	K	2.75	0.61
706	TE 1308	TE-4B13-CLB	CLB Downcomer B13	270	720	K	2.75	0.61
707	TE 1309	TE-4B21-CLB	CLB Downcomer B21	270	720	K	2.75	0.61
708	TE 1310	TE-4B22-CLB	CLB Downcomer B22	270	720	K	2.75	0.61
709	TE 1311	TE-4B23-CLB	CLB Downcomer B23	270	720	K	2.75	0.61
710	TE 1312	TE-4C11-CLB	CLB Downcomer C11	270	720	K	2.75	0.61
711	TE 1313	TE-4C12-CLB	CLB Downcomer C12	270	720	K	2.75	0.61
712	TE 1314	TE-4C13-CLB	CLB Downcomer C13	270	720	K	2.75	0.61
713	TE 1315	TE-4C21-CLB	CLB Downcomer C21	270	720	K	2.75	0.61
714	TE 1316	TE-4C22-CLB	CLB Downcomer C22	270	720	K	2.75	0.61
715	TE 1317	TE-4C23-CLB	CLB Downcomer C23	270	720	K	2.75	0.61
716	TE 1321	TE-1A1-HLA	HLA SP TC Rakes A1	270	720	K	2.75	0.61
717	TE 1322	TE-1A2-HLA	HLA SP TC Rakes A2	270	720	K	2.75	0.61
718	TE 1323	TE-1A3-HLA	HLA SP TC Rakes A3	270	720	K	2.75	0.61
719	TE 1324	TE-1A4-HLA	HLA SP TC Rakes A4	270	720	K	2.75	0.61
720	TE 1325	TE-1A5-HLA	HLA SP TC Rakes A5	270	720	K	2.75	0.61
721	TE 1326	TE-1A6-HLA	HLA SP TC Rakes A6	270	720	K	2.75	0.61
722	TE 1327	TE-1A7-HLA	HLA SP TC Rakes A7	270	720	K	2.75	0.61
723	TE 1328	TE-1B1-HLA	HLA SP TC Rakes B1	270	720	K	2.75	0.61
724	TE 1329	TE-1B2-HLA	HLA SP TC Rakes B2	270	720	K	2.75	0.61
725	TE 1330	TE-1B3-HLA	HLA SP TC Rakes B3	270	720	K	2.75	0.61
726	TE 1331	TE-1B4-HLA	HLA SP TC Rakes B4	270	720	K	2.75	0.61
727	TE 1332	TE-1B5-HLA	HLA SP TC Rakes B5	270	720	K	2.75	0.61
728	TE 1333	TE-1B6-HLA	HLA SP TC Rakes B6	270	720	K	2.75	0.61
729	TE 1334	TE-1B7-HLA	HLA SP TC Rakes B7	270	720	K	2.75	0.61
730	TE 1335	TE-1C1-HLA	HLA SP TC Rakes C1	270	720	K	2.75	0.61
731	TE 1336	TE-1C2-HLA	HLA SP TC Rakes C2	270	720	K	2.75	0.61
732	TE 1337	TE-1C3-HLA	HLA SP TC Rakes C3	270	720	K	2.75	0.61
733	TE 1338	TE-1C4-HLA	HLA SP TC Rakes C4	270	720	K	2.75	0.61
734	TE 1339	TE-1C5-HLA	HLA SP TC Rakes C5	270	720	K	2.75	0.61
735	TE 1340	TE-1C6-HLA	HLA SP TC Rakes C6	270	720	K	2.75	0.61
736	TE 1341	TE-1C7-HLA	HLA SP TC Rakes C7	270	720	K	2.75	0.61
737	TE 1363	TE-1A1-HLB	HLB SP TC Rakes A1	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
738	TE 1364	TE-1A2-HLB	HLB SP TC Rakes A2	270	720	K	2.75	0.61
739	TE 1365	TE-1A3-HLB	HLB SP TC Rakes A3	270	720	K	2.75	0.61
740	TE 1366	TE-1A4-HLB	HLB SP TC Rakes A4	270	720	K	2.75	0.61
741	TE 1367	TE-1A5-HLB	HLB SP TC Rakes A5	270	720	K	2.75	0.61
742	TE 1368	TE-1A6-HLB	HLB SP TC Rakes A6	270	720	K	2.75	0.61
743	TE 1369	TE-1A7-HLB	HLB SP TC Rakes A7	270	720	K	2.75	0.61
744	TE 1370	TE-1B1-HLB	HLB SP TC Rakes B1	270	720	K	2.75	0.61
745	TE 1371	TE-1B2-HLB	HLB SP TC Rakes B2	270	720	K	2.75	0.61
746	TE 1372	TE-1B3-HLB	HLB SP TC Rakes B3	270	720	K	2.75	0.61
747	TE 1373	TE-1B4-HLB	HLB SP TC Rakes B4	270	720	K	2.75	0.61
748	TE 1374	TE-1B5-HLB	HLB SP TC Rakes B5	270	720	K	2.75	0.61
749	TE 1375	TE-1B6-HLB	HLB SP TC Rakes B6	270	720	K	2.75	0.61
750	TE 1376	TE-1B7-HLB	HLB SP TC Rakes B7	270	720	K	2.75	0.61
751	TE 1377	TE-1C1-HLB	HLB SP TC Rakes C1	270	720	K	2.75	0.61
752	TE 1378	TE-1C2-HLB	HLB SP TC Rakes C2	270	720	K	2.75	0.61
753	TE 1379	TE-1C3-HLB	HLB SP TC Rakes C3	270	720	K	2.75	0.61
754	TE 1380	TE-1C4-HLB	HLB SP TC Rakes C4	270	720	K	2.75	0.61
755	TE 1381	TE-1C5-HLB	HLB SP TC Rakes C5	270	720	K	2.75	0.61
756	TE 1382	TE-1C6-HLB	HLB SP TC Rakes C6	270	720	K	2.75	0.61
757	TE 1383	TE-1C7-HLB	HLB SP TC Rakes C7	270	720	K	2.75	0.61
758	DT 1	DTE020A-HLA	HLA Wall I/O	-150	150	K	2.90	0.97
759	DT 2	DTE020B-HLA	HLA Wall-Fluid	-150	150	K	2.90	0.97
760	DT 3	DTE030A-HLA	HLA Wall I/O	-150	150	K	2.90	0.97
761	DT 4	DTE030B-HLA	HLA Wall-Fluid	-150	150	K	2.90	0.97
762	DT 5	DTE050A-LSA	LSA Wall I/O	-150	150	K	2.90	0.97
763	DT 6	DTE050B-LSA	LSA Wall-Fluid	-150	150	K	2.90	0.97
764	DT 7	DTE060A-PCA	PCA Wall I/O	-150	150	K	2.90	0.97
765	DT 8	DTE070A-CLA	CLA Wall I/O	-150	150	K	2.90	0.97
766	DT 9	DTE070B-CLA	CLA Wall-Fluid	-150	150	K	2.90	0.97
767	DT 10	DTE080A-CLA	CLA Wall I/O	-150	150	K	2.90	0.97
768	DT 11	DTE080B-CLA	CLA Wall-Fluid	-150	150	K	2.90	0.97
769	DT 12	DTE100-HLA	HLA-CLA	-150	150	K	2.90	0.97
770	DT 13	DTE160A-HLB	HLB Wall I/O	-150	150	K	2.90	0.97
771	DT 14	DTE160B-HLB	HLB Wall-Fluid	-150	150	K	2.90	0.97
772	DT 15	DTE170A-HLB	HLB Wall I/O	-150	150	K	2.90	0.97
773	DT 16	DTE170B-HLB	HLB Wall-Fluid	-150	150	K	2.90	0.97
774	DT 17	DTE190A-LSB	LSB Wall I/O	-150	150	K	2.90	0.97
775	DT 18	DTE190B-LSB	LSB Wall-Fluid	-150	150	K	2.90	0.97
776	DT 19	DTE200A-PCB	PCB Wall I/O	-150	150	K	2.90	0.97
777	DT 20	DTE210A-CLB	CLB Wall I/O	-150	150	K	2.90	0.97
778	DT 21	DTE210B-CLB	CLB Wall-Fluid	-150	150	K	2.90	0.97
779	DT 22	DTE220A-CLB	CLB Wall I/O	-150	150	K	2.90	0.97
780	DT 23	DTE220B-CLB	CLB Wall-Fluid	-150	150	K	2.90	0.97
781	DT 24	DTE240-HLB	HLB-CLB	-150	150	K	2.90	0.97
782	DT 25	DTE270A-PR	PZR Spray Line Wall-Fluid	-150	150	K	2.90	0.97
783	DT 26	DTE280A-PR	PZR Surge Line Wall-Fluid	-150	150	K	2.90	0.97
784	DT 27	DTE-E-015A-PV	PV Wall I/O-E at L. Plenum	-150	150	K	2.90	0.97
785	DT 28	DTE-W-015A-PV	PV Wall I/O-W at L. Plenum	-150	150	K	2.90	0.97
786	DT 29	DTE-N000A-PV	PV Wall I/O-N at DC Bottom	-150	150	K	2.90	0.97
787	DT 30	DTE-S000A-PV	PV Wall I/O-S at DC Bottom	-150	150	K	2.90	0.97
788	DT 31	DTE-E000A-PV	PV Wall I/O-E at DC Bottom	-150	150	K	2.90	0.97
789	DT 32	DTE-W000A-PV	PV Wall I/O-W at DC Bottom	-150	150	K	2.90	0.97
790	DT 33	DTE-N018A-PV	PV Wall I/O-N at DC Middle	-150	150	K	2.90	0.97
791	DT 34	DTE-S018A-PV	PV Wall I/O-S at DC Middle	-150	150	K	2.90	0.97
792	DT 35	DTE-E018A-PV	PV Wall I/O-E at DC Middle	-150	150	K	2.90	0.97
793	DT 36	DTE-W018A-PV	PV Wall I/O-W at DC Middle	-150	150	K	2.90	0.97
794	DT 37	DTE-N036A-PV	PV Wall I/O-N at Upper DC	-150	150	K	2.90	0.97
795	DT 38	DTE-S036A-PV	PV Wall I/O-S at Upper DC	-150	150	K	2.90	0.97
796	DT 39	DTE-E036A-PV	PV Wall I/O-E at Upper DC	-150	150	K	2.90	0.97
797	DT 40	DTE-W036A-PV	PV Wall I/O-W at Upper DC	-150	150	K	2.90	0.97
798	DT 41	DTE-N060A-PV	PV Wall I/O-N at DC Top	-150	150	K	2.90	0.97
799	DT 42	DTE-S060A-PV	PV Wall I/O-S at DC Top	-150	150	K	2.90	0.97
800	DT 43	DTE-E060A-PV	PV Wall I/O-E at DC Top	-150	150	K	2.90	0.97
801	DT 44	DTE-W060A-PV	PV Wall I/O-W at DC Top	-150	150	K	2.90	0.97
802	DT 45	DTE-E080A-PV	PV Wall I/O-E at DC Head	-150	150	K	2.90	0.97
803	DT 46	DTE-W080A-PV	PV Wall I/O-W at DC Head	-150	150	K	2.90	0.97
804	DT 47	DTE-N000B-PV	PV/DC Fluid at DC Bottom	-150	150	K	2.90	0.97
805	DT 48	DTE-S000B-PV	PV/DC Fluid at DC Bottom	-150	150	K	2.90	0.97
806	DT 50	DTE-W000B-PV	PV/DC Fluid at DC Bottom	-150	150	K	2.90	0.97
807	DT 51	DTE-N018B-PV	PV/DC Fluid at DC Middle	-150	150	K	2.90	0.97
808	DT 53	DTE-E018B-PV	PV/DC Fluid at DC Middle	-150	150	K	2.90	0.97
809	DT 54	DTE-W018B-PV	PV/DC Fluid at DC Middle	-150	150	K	2.90	0.97
810	DT 55	DTE-N036B-PV	PV/DC Fluid at Upper DC	-150	150	K	2.90	0.97
811	DT 56	DTE-S036B-PV	PV/DC Fluid at Upper DC	-150	150	K	2.90	0.97
812	DT 57	DTE-E036B-PV	PV/DC Fluid at Upper DC	-150	150	K	2.90	0.97
813	DT 58	DTE-W036B-PV	PV/DC Fluid at Upper DC	-150	150	K	2.90	0.97
814	DT 60	DTE-S060B-PV	PV/DC Fluid at DC Top	-150	150	K	2.90	0.97
815	DT 62	DTE-W060B-PV	PV/DC Fluid at DC Top	-150	150	K	2.90	0.97
816	DT 64	DTE-S000C-PV	CB/DC Fluid at DC Bottom	-150	150	K	2.90	0.97
817	DT 66	DTE-W000C-PV	CB/DC Fluid at DC Bottom	-150	150	K	2.90	0.97
818	DT 67	DTE-N018C-PV	CB/DC Fluid at DC Middle	-150	150	K	2.90	0.97

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
819	DT 69	DTE-E018C-PV	CB/DC Fluid at DC Middle	-150	150	K	2.90	0.97
820	DT 70	DTE-W018C-PV	CB/DC Fluid at DC Middle	-150	150	K	2.90	0.97
821	DT 71	DTE-N036C-PV	CB/DC Fluid at Upper DC	-150	150	K	2.90	0.97
822	DT 72	DTE-S036C-PV	CB/DC Fluid at Upper DC	-150	150	K	2.90	0.97
823	DT 73	DTE-E036C-PV	CB/DC Fluid at Upper DC	-150	150	K	2.90	0.97
824	DT 74	DTE-W036C-PV	CB/DC Fluid at Upper DC	-150	150	K	2.90	0.97
825	DT 76	DTE-S060C-PV	CB/DC Fluid at DC Top	-150	150	K	2.90	0.97
826	DT 78	DTE-W060C-PV	CB/DC Fluid at DC Top	-150	150	K	2.90	0.97
827	DT 80	DTE-S000E-PV	CB Wall I/O at DC Bottom	-150	150	K	2.90	0.97
828	DT 81	DTE-E000E-PV	CB Wall I/O at DC Bottom	-150	150	K	2.90	0.97
829	DT 82	DTE-W000E-PV	CB Wall I/O at DC Bottom	-150	150	K	2.90	0.97
830	DT 87	DTE-N018E-PV	CB Wall I/O at DC Middle	-150	150	K	2.90	0.97
831	DT 88	DTE-S018E-PV	CB Wall I/O at DC Middle	-150	150	K	2.90	0.97
832	DT 89	DTE-E018E-PV	CB Wall I/O at DC Middle	-150	150	K	2.90	0.97
833	DT 90	DTE-W018E-PV	CB Wall I/O at DC Middle	-150	150	K	2.90	0.97
834	DT 95	DTE-N036E-PV	CB Wall I/O at Upper DC	-150	150	K	2.90	0.97
835	DT 96	DTE-S036E-PV	CB Wall I/O at Upper DC	-150	150	K	2.90	0.97
836	DT 97	DTE-E036E-PV	CB Wall I/O at Upper DC	-150	150	K	2.90	0.97
837	DT 101	DTE-E049E-PV	CB Wall I/O below Nozzle	-150	150	K	2.90	0.97
838	DT 103	DTE-N060E-PV	CB Wall I/O at DC Top	-150	150	K	2.90	0.97
839	DT 104	DTE-S060E-PV	CB Wall I/O at DC Top	-150	150	K	2.90	0.97
840	DT 105	DTE-E060E-PV	CB Wall I/O at DC Top	-150	150	K	2.90	0.97
841	DT 106	DTE-W060E-PV	CB Wall I/O at DC Top	-150	150	K	2.90	0.97
842	DT 107	DTE-040-B09-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
843	DT 108	DTE-040-B11-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
844	DT 109	DTE-040-B01-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
845	DT 110	DTE-040-B03-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
846	DT 111	DTE-040-B05-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
847	DT 112	DTE-040-B07-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
848	DT 113	DTE-040-B21-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
849	DT 114	DTE-040-B23-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
850	DT 115	DTE-040-B02-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
851	DT 116	DTE-040-B15-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
852	DT 117	DTE-040-B06-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
853	DT 118	DTE-040-B14-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
854	DT 119	DTE-040-B18-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
855	DT 120	DTE-040-B19-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
856	DT 121	DTE-040-B10-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
857	DT 122	DTE-040-B12-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
858	DT 123	DTE-040-B04-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
859	DT 124	DTE-040-B08-UCP	Fluid DT across UCP	-150	150	K	2.90	0.97
860	DT 130	DTE-000-B07-LCP	In/Out Fluid across LCP	-150	150	K	1.67	0.56
861	DT 132	DTE-000-B11-LCP	In/Out Fluid across LCP	-150	150	K	1.67	0.56
862	DT 135	DTE-000-B18-LCP	In/Out Fluid across LCP	-150	150	K	1.67	0.56
863	DT 136	DTE-000-B20-LCP	In/Out Fluid across LCP	-150	150	K	1.67	0.56
864	DT 137	DTE-000-B21-LCP	In/Out Fluid across LCP	-150	150	K	1.67	0.56
865	DT 139	DTE-086A-SGA	SGA Wall I/O Pos.1	-40	40	K	2.07	2.58
866	DT 140	DTE-137A-SGA	SGA Wall I/O Pos.7	-40	40	K	2.07	2.58
867	DT 141	DTE-178A-SGA	SGA Wall I/O Pos.10	-40	40	K	2.07	2.58
868	DT 142	DTE-223A-SGA	SGA Steam Dome Wall I/O	-40	40	K	2.07	2.58
869	DT 143	DTE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	-100	100	K	2.42	1.21
870	DT 144	DTE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	-100	100	K	2.42	1.21
871	DT 145	DTE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	-100	100	K	2.42	1.21
872	DT 146	DTE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	-100	100	K	2.42	1.21
873	DT 147	DTE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	-100	100	K	2.42	1.21
874	DT 148	DTE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	-100	100	K	2.42	1.21
875	DT 149	DTE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	-100	100	K	2.42	1.21
876	DT 150	DTE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	-100	100	K	2.42	1.21
877	DT 151	DTE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	-100	100	K	2.42	1.21
878	DT 153	DTE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	-100	100	K	2.42	1.21
879	DT 154	DTE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	-100	100	K	2.42	1.21
880	DT 155	DTE-IN1121-SGA	SGA U-Tube(1,IN) Pos.5	-100	100	K	2.42	1.21
881	DT 156	DTE-EX1121-SGA	SGA U-Tube(1,EX) Pos.5	-100	100	K	2.42	1.21
882	DT 157	DTE-IN1122-SGA	SGA U-Tube(2,IN) Pos.5	-100	100	K	2.42	1.21
883	DT 158	DTE-EX1122-SGA	SGA U-Tube(2,EX) Pos.5	-100	100	K	2.42	1.21
884	DT 160	DTE-EX1123-SGA	SGA U-Tube(3,EX) Pos.5	-100	100	K	2.42	1.21
885	DT 161	DTE-IN1371-SGA	SGA U-Tube(1,IN) Pos.7	-100	100	K	2.42	1.21
886	DT 162	DTE-EX1371-SGA	SGA U-Tube(1,EX) Pos.7	-100	100	K	2.42	1.21
887	DT 163	DTE-IN1372-SGA	SGA U-Tube(2,IN) Pos.7	-100	100	K	2.42	1.21
888	DT 164	DTE-EX1372-SGA	SGA U-Tube(2,EX) Pos.7	-100	100	K	2.42	1.21
889	DT 166	DTE-EX1373-SGA	SGA U-Tube(3,EX) Pos.7	-100	100	K	2.42	1.21
890	DT 167	DTE-IN1632-SGA	SGA U-Tube(2,IN) Pos.9	-100	100	K	2.42	1.21
891	DT 168	DTE-EX1632-SGA	SGA U-Tube(2,EX) Pos.9	-100	100	K	2.42	1.21
892	DT 169	DTE-IN1633-SGA	SGA U-Tube(3,IN) Pos.9	-100	100	K	2.42	1.21
893	DT 170	DTE-EX1633-SGA	SGA U-Tube(3,EX) Pos.9	-100	100	K	2.42	1.21
894	DT 171	DTE-IN1701-SGA	SGA U-Tube(1,IN) Pos.10	-100	100	K	2.42	1.21
895	DT 172	DTE-IN1782-SGA	SGA U-Tube(2,IN) Pos.10	-100	100	K	2.42	1.21
896	DT 173	DTE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	-100	100	K	2.42	1.21
897	DT 174	DTE-086A-SGB	SGB Wall I/O Pos.1	-40	40	K	2.07	2.58
898	DT 175	DTE-137A-SGB	SGB Wall I/O Pos.7	-40	40	K	2.07	2.58
899	DT 176	DTE-178A-SGB	SGB Wall I/O Pos.10	-40	40	K	2.07	2.58
900	DT 177	DTE-223A-SGB	SGB Steam Dome Wall I/O	-40	40	K	2.07	2.58

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
901	DT 178	DTE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	-100	100	K	2.42	1.21
902	DT 179	DTE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	-100	100	K	2.42	1.21
903	DT 180	DTE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	-100	100	K	2.42	1.21
904	DT 181	DTE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	-100	100	K	2.42	1.21
905	DT 182	DTE-IN0863-SGB	SGB U-Tube(3,IN) Pos.1	-100	100	K	2.42	1.21
906	DT 183	DTE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	-100	100	K	2.42	1.21
907	DT 184	DTE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	-100	100	K	2.42	1.21
908	DT 185	DTE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	-100	100	K	2.42	1.21
909	DT 186	DTE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	-100	100	K	2.42	1.21
910	DT 187	DTE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	-100	100	K	2.42	1.21
911	DT 188	DTE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	-100	100	K	2.42	1.21
912	DT 189	DTE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	-100	100	K	2.42	1.21
913	DT 191	DTE-EX1121-SGB	SGB U-Tube(1,EX) Pos.5	-100	100	K	2.42	1.21
914	DT 192	DTE-IN1122-SGB	SGB U-Tube(2,IN) Pos.5	-100	100	K	2.42	1.21
915	DT 193	DTE-EX1122-SGB	SGB U-Tube(2,EX) Pos.5	-100	100	K	2.42	1.21
916	DT 194	DTE-IN1123-SGB	SGB U-Tube(3,IN) Pos.5	-100	100	K	2.42	1.21
917	DT 195	DTE-EX1123-SGB	SGB U-Tube(3,EX) Pos.5	-100	100	K	2.42	1.21
918	DT 196	DTE-IN1371-SGB	SGB U-Tube(1,IN) Pos.7	-100	100	K	2.42	1.21
919	DT 197	DTE-EX1371-SGB	SGB U-Tube(1,EX) Pos.7	-100	100	K	2.42	1.21
920	DT 198	DTE-IN1372-SGB	SGB U-Tube(2,IN) Pos.7	-100	100	K	2.42	1.21
921	DT 199	DTE-EX1372-SGB	SGB U-Tube(2,EX) Pos.7	-100	100	K	2.42	1.21
922	DT 201	DTE-EX1373-SGB	SGB U-Tube(3,EX) Pos.7	-100	100	K	2.42	1.21
923	DT 202	DTE-IN1632-SGB	SGB U-Tube(2,IN) Pos.9	-100	100	K	2.42	1.21
924	DT 203	DTE-EX1632-SGB	SGB U-Tube(2,EX) Pos.9	-100	100	K	2.42	1.21
925	DT 204	DTE-IN1633-SGB	SGB U-Tube(3,IN) Pos.9	-100	100	K	2.42	1.21
926	DT 205	DTE-EX1633-SGB	SGB U-Tube(3,EX) Pos.9	-100	100	K	2.42	1.21
927	DT 206	DTE-IN1701-SGB	SGB U-Tube(1,IN) Pos.10	-100	100	K	2.42	1.21
928	DT 208	DTE-IN1863-SGB	SGB U-Tube(3,IN) Pos.11	-100	100	K	2.42	1.21
929	DT 215	DTE-C046-PV	HTC Differential Temp	-150	150	K	2.90	0.97
930	DT 217	DTE-C056-PV	HTC Differential Temp	-150	150	K	2.90	0.97
931	TW 1	TWE020B-HLA	HLA Inner Surface	270	720	K	2.75	0.61
932	TW 2	TWE030B-HLA	HLA Inner Surface	270	720	K	2.75	0.61
933	TW 3	TWE050B-LSA	LSA Inner Surface	270	720	K	2.75	0.61
934	TW 4	TWE060B-PCA	PCA Inner Surface	270	720	K	2.75	0.61
935	TW 5	TWE070B-CLA	CLA Inner Surface	270	720	K	2.75	0.61
936	TW 6	TWE080B-CLA	CLA Inner Surface	270	720	K	2.75	0.61
937	TW 7	TWE160B-HLB	HLB Inner Surface	270	720	K	2.75	0.61
938	TW 8	TWE170B-HLB	HLB Inner Surface	270	720	K	2.75	0.61
939	TW 9	TWE190B-LSB	LSB Inner Surface	270	720	K	2.75	0.61
940	TW 10	TWE200B-PCB	PCB Inner Surface	270	720	K	2.75	0.61
941	TW 11	TWE210B-CLB	CLB Inner Surface	270	720	K	2.75	0.61
942	TW 12	TWE220B-CLB	CLB Inner Surface	270	720	K	2.75	0.61
943	TW 13	TWE280B-PR	Pressurizer Surge Line	270	720	K	2.75	0.61
944	TW 14	TWE431A-SGA	SGA Downcomer A Wall	270	670	K	2.63	0.66
945	TW 15	TWE432A-SGA	SGA Downcomer B Wall	270	670	K	2.63	0.66
946	TW 16	TWE433A-SGA	SGA Downcomer C Wall	270	670	K	2.63	0.66
947	TW 17	TWE434A-SGA	SGA Downcomer D Wall	270	670	K	2.63	0.66
948	TW 18	TWE471A-SGB	SGB Downcomer A Wall	270	670	K	2.63	0.66
949	TW 19	TWE472A-SGB	SGB Downcomer B Wall	270	670	K	2.63	0.66
950	TW 20	TWE473A-SGB	SGB Downcomer C Wall	270	670	K	2.63	0.66
951	TW 21	TWE474A-SGB	SGB Downcomer D Wall	270	670	K	2.63	0.66
952	TW 22	TWE-E-015B-PV	PV Inner Surf. EL.-1.5m,E	270	720	K	2.75	0.61
953	TW 23	TWE-W-015B-PV	PV Inner Surf. EL.-1.5m,W	270	720	K	2.75	0.61
954	TW 24	TWE-N000B-PV	PV Inner Surf. EL.0.0m,N	270	720	K	2.75	0.61
955	TW 25	TWE-S000B-PV	PV Inner Surf. EL.0.0m,S	270	720	K	2.75	0.61
956	TW 26	TWE-E000B-PV	PV Inner Surf. EL.0.0m,E	270	720	K	2.75	0.61
957	TW 27	TWE-W000B-PV	PV Inner Surf. EL.0.0m,W	270	720	K	2.75	0.61
958	TW 28	TWE-N018B-PV	PV Inner Surf. EL.1.8m,N	270	720	K	2.75	0.61
959	TW 29	TWE-S018B-PV	PV Inner Surf. EL.1.8m,S	270	720	K	2.75	0.61
960	TW 30	TWE-E018B-PV	PV Inner Surf. EL.1.8m,E	270	720	K	2.75	0.61
961	TW 31	TWE-W018B-PV	PV Inner Surf. EL.1.8m,W	270	720	K	2.75	0.61
962	TW 32	TWE-N036B-PV	PV Inner Surf. EL.3.6m,N	270	720	K	2.75	0.61
963	TW 33	TWE-S036B-PV	PV Inner Surf. EL.3.6m,S	270	720	K	2.75	0.61
964	TW 34	TWE-E036B-PV	PV Inner Surf. EL.3.6m,E	270	720	K	2.75	0.61
965	TW 35	TWE-W036B-PV	PV Inner Surf. EL.3.6m,W	270	720	K	2.75	0.61
966	TW 36	TWE-N060B-PV	PV Inner Surf. EL.6.0m,N	270	720	K	2.75	0.61
967	TW 37	TWE-S060B-PV	PV Inner Surf. EL.6.0m,S	270	720	K	2.75	0.61
968	TW 38	TWE-E060B-PV	PV Inner Surf. EL.6.0m,E	270	720	K	2.75	0.61
969	TW 39	TWE-W060B-PV	PV Inner Surf. EL.6.0m,W	270	720	K	2.75	0.61
970	TW 40	TWE-E080B-PV	PV Inner Surf. EL.8.0m,E	270	720	K	2.75	0.61
971	TW 41	TWE-W080B-PV	PV Inner Surf. EL.8.0m,W	270	720	K	2.75	0.61
972	TW 43	TWE-S000D-CB	CB Outer Surf. EL.0.0m,S	270	970	K	3.49	0.50
973	TW 44	TWE-E000D-CB	CB Outer Surf. EL.0.0m,E	270	970	K	3.49	0.50
974	TW 45	TWE-W000D-CB	CB Outer Surf. EL.0.0m,W	270	970	K	3.49	0.50
975	TW 50	TWE-N018D-CB	CB Outer Surf. EL.1.8m,N	270	970	K	3.49	0.50
976	TW 51	TWE-S018D-CB	CB Outer Surf. EL.1.8m,S	270	970	K	3.49	0.50
977	TW 52	TWE-E018D-CB	CB Outer Surf. EL.1.8m,E	270	970	K	3.49	0.50
978	TW 53	TWE-W018D-CB	CB Outer Surf. EL.1.8m,W	270	970	K	3.49	0.50
979	TW 57	TWE-W026D-CB	CB Outer Surf. EL.2.6m,W	270	970	K	3.49	0.50
980	TW 58	TWE-N036D-CB	CB Outer Surf. EL.3.6m,N	270	970	K	3.49	0.50
981	TW 59	TWE-S036D-CB	CB Outer Surf. EL.3.6m,S	270	970	K	3.49	0.50

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
982	TW 60	TWE-E036D-CB	CB Outer Surf. EL.3.6m,E	270	970	K	3.49	0.50
983	TW 61	TWE-W036D-CB	CB Outer Surf. EL.3.6m,W	270	970	K	3.49	0.50
984	TW 62	TWE-N049D-CB	CB Outer Surf. EL.4.9m,N	270	970	K	3.49	0.50
985	TW 63	TWE-S049D-CB	CB Outer Surf. EL.4.9m,S	270	970	K	3.49	0.50
986	TW 64	TWE-E049D-CB	CB Outer Surf. EL.4.9m,E	270	970	K	3.49	0.50
987	TW 65	TWE-W049D-CB	CB Outer Surf. EL.4.9m,W	270	970	K	3.49	0.50
988	TW 66	TWE-N060D-CB	CB Outer Surf. EL.6.0m,N	270	970	K	3.49	0.50
989	TW 67	TWE-S060D-CB	CB Outer Surf. EL.6.0m,S	270	970	K	3.49	0.50
990	TW 68	TWE-E060D-CB	CB Outer Surf. EL.6.0m,E	270	970	K	3.49	0.50
991	TW 69	TWE-W060D-CB	CB Outer Surf. EL.6.0m,W	270	970	K	3.49	0.50
992	TW 70	TWE-N000E-CB	CB Inner Surf. EL.0.0m,N	270	970	K	3.49	0.50
993	TW 71	TWE-S000E-CB	CB Inner Surf. EL.0.0m,S	270	970	K	3.49	0.50
994	TW 72	TWE-E000E-CB	CB Inner Surf. EL.0.0m,E	270	970	K	3.49	0.50
995	TW 73	TWE-W000E-CB	CB Inner Surf. EL.0.0m,W	270	970	K	3.49	0.50
996	TW 78	TWE-N018E-CB	CB Inner Surf. EL.1.8m,N	270	970	K	3.49	0.50
997	TW 79	TWE-S018E-CB	CB Inner Surf. EL.1.8m,S	270	970	K	3.49	0.50
998	TW 80	TWE-E018E-CB	CB Inner Surf. EL.1.8m,E	270	970	K	3.49	0.50
999	TW 81	TWE-W018E-CB	CB Inner Surf. EL.1.8m,W	270	970	K	3.49	0.50
1000	TW 86	TWE-N036E-CB	CB Inner Surf. EL.3.6m,N	270	970	K	3.49	0.50
1001	TW 87	TWE-S036E-CB	CB Inner Surf. EL.3.6m,S	270	970	K	3.49	0.50
1002	TW 88	TWE-E036E-CB	CB Inner Surf. EL.3.6m,E	270	970	K	3.49	0.50
1003	TW 92	TWE-E049E-CB	CB Inner Surf. EL.4.9m,E	270	970	K	3.49	0.50
1004	TW 94	TWE-N060E-CB	CB Inner Surf. EL.6.0m,N	270	970	K	3.49	0.50
1005	TW 95	TWE-S060E-CB	CB Inner Surf. EL.6.0m,S	270	970	K	3.49	0.50
1006	TW 96	TWE-E060E-CB	CB Inner Surf. EL.6.0m,E	270	970	K	3.49	0.50
1007	TW 97	TWE-W060E-CB	CB Inner Surf. EL.6.0m,W	270	970	K	3.49	0.50
1008	TW 108	TWE-063-B09-UCSP	UCSP L.Surf. EL.6.3m,B09	270	970	K	3.49	0.50
1009	TW 109	TWE-065-B09-UCSP	UCSP U.Surf. EL.6.5m,B09	270	970	K	3.49	0.50
1010	TW 110	TWE-E047G-UP	UP Str. Surf. EL.4.7m,East	270	970	K	3.49	0.50
1011	TW 111	TWE-W047G-UP	UP Str. Surf. EL.4.7m,West	270	970	K	3.49	0.50
1012	TW 112	TWE-E056G-UP	UP Str. Surf. EL.5.6m,East	270	970	K	3.49	0.50
1013	TW 113	TWE-W056G-UP	UP Str. Surf. EL.5.6m,West	270	970	K	3.49	0.50
1014	TW 114	TWE-080G-UH	UH Str. Surf. EL.8.0m,CTR	270	970	K	3.49	0.50
1015	TW 154	TWE-B03436	B03 Rod(4,3) Pos.6	270	1470	K	5.31	0.44
1016	TW 155	TWE-B03438	B03 Rod(4,3) Pos.8	270	1470	K	5.31	0.44
1017	TW 217	TWE-B08222	B08 Rod(2,2) Pos.2	270	970	K	5.31	0.44
1018	TW 218	TWE-B08224	B08 Rod(2,2) Pos.4	270	970	K	5.31	0.44
1019	TW 219	TWE-B08225	B08 Rod(2,2) Pos.5	270	970	K	5.31	0.44
1020	TW 220	TWE-B08226	B08 Rod(2,2) Pos.6	270	970	K	5.31	0.44
1021	TW 222	TWE-B08228	B08 Rod(2,2) Pos.8	270	970	K	5.31	0.44
1022	TW 225	TWE-B08435	B08 Rod(4,3) Pos.5	270	1470	K	5.31	0.44
1023	TW 227	TWE-B08437	B08 Rod(4,3) Pos.7	270	1470	K	5.31	0.44
1024	TW 236	TWE-B10442	B10 Rod(4,4) Pos.2	270	1470	K	5.31	0.44
1025	TW 237	TWE-B10444	B10 Rod(4,4) Pos.4	270	1470	K	5.31	0.44
1026	TW 239	TWE-B10447	B10 Rod(4,4) Pos.7	270	1470	K	5.31	0.44
1027	TW 259	TWE-B12262	B12 Rod(2,6) Pos.2	270	970	K	5.31	0.44
1028	TW 260	TWE-B12264	B12 Rod(2,6) Pos.4	270	970	K	5.31	0.44
1029	TW 261	TWE-B12265	B12 Rod(2,6) Pos.5	270	970	K	5.31	0.44
1030	TW 262	TWE-B12266	B12 Rod(2,6) Pos.6	270	970	K	5.31	0.44
1031	TW 264	TWE-B12268	B12 Rod(2,6) Pos.8	270	970	K	5.31	0.44
1032	TW 283	TWE-B13442	B13 Rod(4,4) Pos.2	270	1470	K	5.31	0.44
1033	TW 284	TWE-B13444	B13 Rod(4,4) Pos.4	270	1470	K	5.31	0.44
1034	TW 286	TWE-B13446	B13 Rod(4,4) Pos.6	270	1470	K	5.31	0.44
1035	TW 287	TWE-B13447	B13 Rod(4,4) Pos.7	270	1470	K	5.31	0.44
1036	TW 288	TWE-B13448	B13 Rod(4,4) Pos.8	270	1470	K	5.31	0.44
1037	TW 339	TWE-B17445	B17 Rod(4,4) Pos.5	270	1470	K	5.31	0.44
1038	TW 341	TWE-B17447	B17 Rod(4,4) Pos.7	270	1470	K	5.31	0.44
1039	TW 391	TWE-B21662	B21 Rod(6,6) Pos.2	270	1470	K	5.31	0.44
1040	TW 392	TWE-B21664	B21 Rod(6,6) Pos.4	270	1470	K	5.31	0.44
1041	TW 394	TWE-B21666	B21 Rod(6,6) Pos.6	270	1470	K	5.31	0.44
1042	TW 395	TWE-B21667	B21 Rod(6,6) Pos.7	270	1470	K	5.31	0.44
1043	TW 409	TWE-B22441	B22 Rod(4,4) Pos.1	270	1470	K	5.31	0.44
1044	TW 410	TWE-B22443	B22 Rod(4,4) Pos.3	270	1470	K	5.31	0.44
1045	TW 411	TWE-B22445	B22 Rod(4,4) Pos.5	270	1470	K	5.31	0.44
1046	TW 414	TWE-B22449	B22 Rod(4,4) Pos.9	270	1470	K	5.31	0.44
1047	TW 457	TWE-IN0641-SGA	SGA Inlet Plenum	270	720	K	2.75	0.61
1048	TW 459	TWE-IN0643-SGA	SGA Inlet Plenum	270	720	K	2.75	0.61
1049	TW 463	TWE-086B-SGA	SGA Inner Surf. Pos.1	270	670	K	2.63	0.66
1050	TW 464	TWE-137B-SGA	SGA Inner Surf. Pos.7	270	670	K	2.63	0.66
1051	TW 465	TWE-178B-SGA	SGA Inner Surf. Pos.10	270	670	K	2.63	0.66
1052	TW 466	TWE-223B-SGA	SGA Inner Surf.	270	670	K	2.63	0.66
1053	TW 467	TWE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	270	720	K	2.75	0.61
1054	TW 468	TWE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	270	720	K	2.75	0.61
1055	TW 469	TWE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	270	720	K	2.75	0.61
1056	TW 470	TWE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	270	720	K	2.75	0.61
1057	TW 471	TWE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	270	720	K	2.75	0.61
1058	TW 472	TWE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	270	720	K	2.75	0.61
1059	TW 473	TWE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	270	720	K	2.75	0.61
1060	TW 474	TWE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	270	720	K	2.75	0.61
1061	TW 475	TWE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	270	720	K	2.75	0.61
1062	TW 476	TWE-EX0992-SGA	SGA U-Tube(2,EX) Pos.3	270	720	K	2.75	0.61
1063	TW 477	TWE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	270	720	K	2.75	0.61

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1064	TW 478	TWE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	270	720	K	2.75	0.61
1065	TW 479	TWE-IN1121-SGA	SGA U-Tube(1,IN) Pos.5	270	720	K	2.75	0.61
1066	TW 480	TWE-EX1121-SGA	SGA U-Tube(1,EX) Pos.5	270	720	K	2.75	0.61
1067	TW 481	TWE-IN1122-SGA	SGA U-Tube(2,IN) Pos.5	270	720	K	2.75	0.61
1068	TW 482	TWE-EX1122-SGA	SGA U-Tube(2,EX) Pos.5	270	720	K	2.75	0.61
1069	TW 483	TWE-IN1123-SGA	SGA U-Tube(3,IN) Pos.5	270	720	K	2.75	0.61
1070	TW 484	TWE-EX1123-SGA	SGA U-Tube(3,EX) Pos.5	270	720	K	2.75	0.61
1071	TW 485	TWE-IN1371-SGA	SGA U-Tube(1,IN) Pos.7	270	720	K	2.75	0.61
1072	TW 486	TWE-EX1371-SGA	SGA U-Tube(1,EX) Pos.7	270	720	K	2.75	0.61
1073	TW 487	TWE-IN1372-SGA	SGA U-Tube(2,IN) Pos.7	270	720	K	2.75	0.61
1074	TW 488	TWE-EX1372-SGA	SGA U-Tube(2,EX) Pos.7	270	720	K	2.75	0.61
1075	TW 489	TWE-IN1373-SGA	SGA U-Tube(3,IN) Pos.7	270	720	K	2.75	0.61
1076	TW 490	TWE-EX1373-SGA	SGA U-Tube(3,EX) Pos.7	270	720	K	2.75	0.61
1077	TW 491	TWE-IN1632-SGA	SGA U-Tube(2,IN) Pos.9	270	720	K	2.75	0.61
1078	TW 492	TWE-EX1632-SGA	SGA U-Tube(2,EX) Pos.9	270	720	K	2.75	0.61
1079	TW 493	TWE-IN1633-SGA	SGA U-Tube(3,IN) Pos.9	270	720	K	2.75	0.61
1080	TW 494	TWE-EX1633-SGA	SGA U-Tube(3,EX) Pos.9	270	720	K	2.75	0.61
1081	TW 495	TWE-IN1701-SGA	SGA U-Tube(1,IN) Pos.10	270	720	K	2.75	0.61
1082	TW 496	TWE-IN1782-SGA	SGA U-Tube(2,IN) Pos.10	270	720	K	2.75	0.61
1083	TW 497	TWE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	270	720	K	2.75	0.61
1084	TW 498	TWE-IN0641-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
1085	TW 499	TWE-IN0642-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
1086	TW 500	TWE-IN0643-SGB	SGB Inlet Plenum	270	720	K	2.75	0.61
1087	TW 504	TWE-086B-SGB	SGB Inner Surf. Pos.1	270	670	K	2.63	0.66
1088	TW 505	TWE-137B-SGB	SGB Inner Surf. Pos.7	270	670	K	2.63	0.66
1089	TW 506	TWE-178B-SGB	SGB Inner Surf. Pos.10	270	670	K	2.63	0.66
1090	TW 507	TWE-223B-SGB	SGB Inner Surf.	270	670	K	2.63	0.66
1091	TW 508	TWE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	270	720	K	2.75	0.61
1092	TW 509	TWE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	270	720	K	2.75	0.61
1093	TW 510	TWE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	270	720	K	2.75	0.61
1094	TW 511	TWE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	270	720	K	2.75	0.61
1095	TW 512	TWE-IN0863-SGB	SGB U-Tube(3,IN) Pos.1	270	720	K	2.75	0.61
1096	TW 513	TWE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	270	720	K	2.75	0.61
1097	TW 514	TWE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	270	720	K	2.75	0.61
1098	TW 515	TWE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	270	720	K	2.75	0.61
1099	TW 516	TWE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	270	720	K	2.75	0.61
1100	TW 517	TWE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	270	720	K	2.75	0.61
1101	TW 518	TWE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	270	720	K	2.75	0.61
1102	TW 519	TWE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	270	720	K	2.75	0.61
1103	TW 520	TWE-IN1121-SGB	SGB U-Tube(1,IN) Pos.5	270	720	K	2.75	0.61
1104	TW 521	TWE-EX1121-SGB	SGB U-Tube(1,EX) Pos.5	270	720	K	2.75	0.61
1105	TW 522	TWE-IN1122-SGB	SGB U-Tube(2,IN) Pos.5	270	720	K	2.75	0.61
1106	TW 523	TWE-EX1122-SGB	SGB U-Tube(2,EX) Pos.5	270	720	K	2.75	0.61
1107	TW 524	TWE-IN1123-SGB	SGB U-Tube(3,IN) Pos.5	270	720	K	2.75	0.61
1108	TW 525	TWE-EX1123-SGB	SGB U-Tube(3,EX) Pos.5	270	720	K	2.75	0.61
1109	TW 526	TWE-IN1371-SGB	SGB U-Tube(1,IN) Pos.7	270	720	K	2.75	0.61
1110	TW 527	TWE-EX1371-SGB	SGB U-Tube(1,EX) Pos.7	270	720	K	2.75	0.61
1111	TW 528	TWE-IN1372-SGB	SGB U-Tube(2,IN) Pos.7	270	720	K	2.75	0.61
1112	TW 529	TWE-EX1372-SGB	SGB U-Tube(2,EX) Pos.7	270	720	K	2.75	0.61
1113	TW 530	TWE-IN1373-SGB	SGB U-Tube(3,IN) Pos.7	270	720	K	2.75	0.61
1114	TW 531	TWE-EX1373-SGB	SGB U-Tube(3,EX) Pos.7	270	720	K	2.75	0.61
1115	TW 532	TWE-IN1632-SGB	SGB U-Tube(2,IN) Pos.9	270	720	K	2.75	0.61
1116	TW 533	TWE-EX1632-SGB	SGB U-Tube(2,EX) Pos.9	270	720	K	2.75	0.61
1117	TW 534	TWE-IN1633-SGB	SGB U-Tube(3,IN) Pos.9	270	720	K	2.75	0.61
1118	TW 535	TWE-EX1633-SGB	SGB U-Tube(3,EX) Pos.9	270	720	K	2.75	0.61
1119	TW 536	TWE-IN1701-SGB	SGB U-Tube(1,IN) Pos.10	270	720	K	2.75	0.61
1120	TW 537	TWE-IN1782-SGB	SGB U-Tube(2,IN) Pos.10	270	720	K	2.75	0.61
1121	TW 538	TWE-IN1863-SGB	SGB U-Tube(3,IN) Pos.11	270	720	K	2.75	0.61
1122	TW 545	TWE270A-PR	PZR Spray Line Outer Surf.	270	720	K	2.75	0.61
1123	TW 598	TWE-121D-UHDP	PLR-UH-9 Outer Surf.	270	970	K	3.49	0.50
1124	TW 631	TWE-B01225	B01 Rod(2,2) Pos.5	270	1470	K	6.32	0.53
1125	TW 635	TWE-B04221	B04 Rod(2,2) Pos.1	270	970	K	3.69	0.53
1126	TW 638	TWE-B04226	B04 Rod(2,2) Pos.6	270	970	K	3.69	0.53
1127	TW 640	TWE-B04229	B04 Rod(2,2) Pos.9	270	970	K	3.69	0.53
1128	TW 649	TWE-B11225	B11 Rod(2,2) Pos.5	270	1470	K	6.32	0.53
1129	TW 650	TWE-B11226	B11 Rod(2,2) Pos.6	270	1470	K	6.32	0.53
1130	TW 653	TWE-B16221	B16 Rod(2,2) Pos.1	270	970	K	3.69	0.53
1131	TW 654	TWE-B16223	B16 Rod(2,2) Pos.3	270	970	K	3.69	0.53
1132	TW 656	TWE-B16226	B16 Rod(2,2) Pos.6	270	970	K	3.69	0.53
1133	TW 658	TWE-B16229	B16 Rod(2,2) Pos.9	270	970	K	3.69	0.53
1134	TW 673	TWE-EN037B-PV	PV East-North EL.3662	270	630	K	3.05	0.85
1135	TW 674	TWE-E037B-PV	PV East EL.3662	270	630	K	3.05	0.85
1136	TW 676	TWE-EN040B-PV	PV East-North EL.4037	270	630	K	3.05	0.85
1137	TW 678	TWE-ES040B-PV	PV East-South EL.4037	270	630	K	3.05	0.85
1138	TW 679	TWE-E042B-PV	PV East EL.4210	270	630	K	3.05	0.85
1139	TW 680	TWE-WN037B-PV	PV West-North EL.3662	270	630	K	3.05	0.85
1140	TW 681	TWE-W037B-PV	PV West EL.3662	270	630	K	3.05	0.85
1141	TW 682	TWE-WS037B-PV	PV West-South EL.3662	270	630	K	3.05	0.85
1142	TW 685	TWE-WS040B-PV	PV West-South EL.4037	270	630	K	3.05	0.85
1143	TW 687	TWE-SW045B-PV	PV South-West EL.4497	270	630	K	3.05	0.85
1144	TW 688	TWE-S045B-PV	PV South EL.4497	270	630	K	3.05	0.85
1145	TW 689	TWE-SE045B-PV	PV South-East EL.4497	270	630	K	3.05	0.85

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1146	TW 690	TWE-SW051B-PV	PV South-West EL.5074	270	630	K	3.05	0.85
1147	TW 691	TWE-S051B-PV	PV South EL.5074	270	630	K	3.05	0.85
1148	TW 692	TWE-SE051B-PV	PV South-East EL.5074	270	630	K	3.05	0.85
1149	TW 693	TWE-S054B-PV	PV South EL.5363	270	630	K	3.05	0.85
1150	TW 694	TWE-NE045B-PV	PV North-East EL.4497	270	630	K	3.05	0.85
1151	TW 696	TWE-NW045B-PV	PV North-West EL.4497	270	630	K	3.05	0.85
1152	TW 697	TWE-NE051B-PV	PV North-East EL.5074	270	630	K	3.05	0.85
1153	TW 698	TWE-N051B-PV	PV North EL.5074	270	630	K	3.05	0.85
1154	TW 700	TWE-N054B-PV	PV North EL.5363	270	630	K	3.05	0.85
1155	TW 709	TWE-IN038B02-UCP	UCP L.Surf. EL.3.8m,B02	270	970	K	3.49	0.50
1156	TW 710	TWE-IN038B04-UCP	UCP L.Surf. EL.3.8m,B04	270	970	K	3.49	0.50
1157	TW 711	TWE-IN038B06-UCP	UCP L.Surf. EL.3.8m,B06	270	970	K	3.49	0.50
1158	TW 712	TWE-IN038B08-UCP	UCP L.Surf. EL.3.8m,B08	270	970	K	3.49	0.50
1159	TW 713	TWE-IN038B21-UCP	UCP L.Surf. EL.3.8m,B21	270	970	K	3.49	0.50
1160	TW 714	TWE-EX040B02-UCP	UCP U.Surf. EL.4.0m,B02	270	970	K	3.49	0.50
1161	TW 715	TWE-EX040B04-UCP	UCP U.Surf. EL.4.0m,B04	270	970	K	3.49	0.50
1162	TW 716	TWE-EX040B06-UCP	UCP U.Surf. EL.4.0m,B06	270	970	K	3.49	0.50
1163	TW 717	TWE-EX040B08-UCP	UCP U.Surf. EL.4.0m,B08	270	970	K	3.49	0.50
1164	TW 718	TWE-EX040B21-UCP	UCP U.Surf. EL.4.0m,B21	270	970	K	3.49	0.50
1165	TW 727	TWE-B03437	B03 Rod(4,3) Pos.7	270	1470	K	5.31	0.44
1166	TW 732	TWE-B08431	B08 Rod(4,3) Pos.1	270	1470	K	5.31	0.44
1167	TW 733	TWE-B08433	B08 Rod(4,3) Pos.3	270	1470	K	5.31	0.44
1168	TW 734	TWE-B08439	B08 Rod(4,3) Pos.9	270	1470	K	5.31	0.44
1169	TW 739	TWE-B10446	B10 Rod(4,4) Pos.6	270	1470	K	5.31	0.44
1170	TW 740	TWE-B10448	B10 Rod(4,4) Pos.8	270	1470	K	5.31	0.44
1171	TW 757	TWE-B17441	B17 Rod(4,4) Pos.1	270	1470	K	5.31	0.44
1172	TW 758	TWE-B17443	B17 Rod(4,4) Pos.3	270	1470	K	5.31	0.44
1173	TW 759	TWE-B17449	B17 Rod(4,4) Pos.9	270	1470	K	5.31	0.44
1174	TW 768	TWE-B22447	B22 Rod(4,4) Pos.7	270	1470	K	5.31	0.44
1175	TW 773	TWE211A-PR	PZR Wall DL.2025	270	720	K	2.75	0.61
1176	TW 774	TWE211B-PR	PZR Wall DL.4238	270	720	K	2.75	0.61
1177	TW 775	TWE211C-PR	PZR Wall DL.5995	270	720	K	2.75	0.61
1178	TW 776	TWE211D-PR	PZR Wall DL.7965	270	720	K	2.75	0.61
1179	TW 777	TWE211E-PR	PZR Wall DL.9795	270	720	K	2.75	0.61
1180	TW 778	TWE211F-PR	PZR Wall DL.11321	270	720	K	2.75	0.61
1181	TW 779	TWE678-ACC	Acc-Cold Tank Wall	270	720	K	2.75	0.61
1182	TW 780	TWE688-ACH	Acc-Hot Tank Wall	270	720	K	2.75	0.61
1183	TW 783	TWE-A80-ADS	RSV(1-3) Line	270	720	K	2.75	0.61
1184	TW 845	TWE111A-PR	PZR Outer Wall DL.-289	270	720	K	2.75	0.61
1185	TW 846	TWE115A-PR	PZR Outer Wall DL.105	270	720	K	2.75	0.61
1186	TW 847	TWE189A-PR	PZR Outer Wall DL.7219	270	720	K	2.75	0.61
1187	TW 848	TWE198A-PR	PZR Outer Wall DL.8417	270	720	K	2.75	0.61
1188	TW 849	TWE-022A-PV	PV Outer Wall EL.-2245	270	720	K	2.75	0.61
1189	TW 850	TWE-027A-PV	PV Outer Wall EL.-2657	270	720	K	2.75	0.61
1190	TW 851	TWE-028A-PV	PV Outer Wall EL.-2677	270	720	K	2.75	0.61
1191	TW 852	TWE731A-HLA	HLA Outer Wall	270	720	K	2.75	0.61
1192	TW 853	TWE078A-SGA	SGA Outer Wall DL.-161	270	670	K	2.63	0.66
1193	TW 854	TWE245A-SGA	SGA Outer Wall DL.16572	270	670	K	2.63	0.66
1194	TW 859	TWE-A82-ADS	RSV123 Spool Piece	270	720	K	2.75	0.61
1195	TW 860	TWE-A83-ADS	RSV1 Orifice	270	720	K	2.75	0.61
1196	TW 862	TWE-A84-ADS	RSV AOV81 Body Wall	270	720	K	2.75	0.61
1197	TW 863	TWE-A85-ADS	RSV AOV81 Outer Frame	270	720	K	2.75	0.61
1198	TW 864	TWE292-PR	PZR VP-Line Pipe Wall	270	720	K	2.75	0.61
1199	TW 865	TWE442-SGA	SGA 8B MSL Pipe Wall	270	570	K	2.42	0.81
1200	TW 866	TWE441-SGA	SGA 8B MSL Support	270	570	K	2.42	0.81
1201	TW 867	TWE444-SGA	SGA 3B MSL Pipe Wall	270	570	K	2.42	0.81
1202	TW 868	TWE445-SGA	SGA 3B MSL Support	270	570	K	2.42	0.81
1203	TW 869	TWE446-SGA	SGA MSIV Body Wall	270	570	K	2.42	0.81
1204	TW 870	TWE447-SGA	SGA MSIV Outer Frame	270	570	K	2.42	0.81
1205	TW 871	TWE443-SGA	SGA BU-Line Pipe Wall	270	570	K	2.42	0.81
1206	TW 873	TWE-B03432	B03 Rod(4,3) Pos.2	270	1470	K	6.32	0.53
1207	TW 874	TWE-B03434	B03 Rod(4,3) Pos.4	270	1470	K	6.32	0.53
1208	FE 1	FE010-HLA	HLA Leakage (Normal)	0	0.4	kg/s	0.01	1.54
1209	FE 2	FE020A-LSA	Primary Loop LSA (High)	0	90	kg/s	1.25	1.39
1210	FE 3	FE020B-LSA	Primary Loop LSA (Low)	0	15.81	kg/s	0.22	1.37
1211	FE 4	FE150-HLB	HLB Leakage (Normal)	0	0.4	kg/s	0.01	1.54
1212	FE 5	FE160A-LSB	Primary Loop LSB (High)	0	90	kg/s	1.25	1.39
1213	FE 6	FE160B-LSB	Primary Loop LSB (Low)	0	15.81	kg/s	0.22	1.37
1214	FE 13	FE430-SGA	SGA Feedwater	0	4	kg/s	0.05	1.35
1215	FE 14	FE431-SGA	SGA Downcomer	0	7	kg/s	0.09	1.26
1216	FE 15	FE432-SGA	SGA Downcomer	0	7	kg/s	0.09	1.26
1217	FE 16	FE433-SGA	SGA Downcomer	0	7	kg/s	0.09	1.26
1218	FE 17	FE434-SGA	SGA Downcomer	0	7	kg/s	0.09	1.26
1219	FE 18	FE440-SGA	SGA Steam Line	0	5	kg/s	0.10	2.04
1220	FE 19	FE450-SGA	SGA Relief Valve Line	0	4	kg/s	0.07	1.82
1221	FE 21	FE470-SGB	SGB Feedwater	0	4	kg/s	0.05	1.35
1222	FE 22	FE471-SGB	SGB Downcomer	0	7	kg/s	0.09	1.26
1223	FE 23	FE472-SGB	SGB Downcomer	0	7	kg/s	0.09	1.26
1224	FE 24	FE473-SGB	SGB Downcomer	0	7	kg/s	0.09	1.26
1225	FE 25	FE474-SGB	SGB Downcomer	0	7	kg/s	0.09	1.26
1226	FE 26	FE480-SGB	SGB Steam Line	0	5	kg/s	0.10	2.04

Table A-1 (Cont'd)

SEQ No.	Function ID.		Tagname	Location	Range		Unit	Uncertainty	
					LO	HI		±ABS.	±%FR
1227	FE	27	FE490-SGB	SGB Relief Valve Line	0	4	kg/s	0.07	1.82
1228	FE	29	FE510-SH	Main-Steam Header	0	10	kg/s	0.22	2.16
1229	FE	35	FE580-ST	ST Vent Line	0	0.3	kg/s	–	–
1230	FE	36	FE590-ST	ST Bleed Line	0	20	kg/s	–	–
1231	FE	37	FE650-ACC	Acc-Cold Flow to CLA	0	15	kg/s	0.19	1.25
1232	FE	40	FE680-ACH	Acc-Hot to CLB	0	10	kg/s	0.12	1.23
1233	FE	62	FE010B-HLA	HLA Leakage (Reverse)	0	0.4	kg/s	0.01	1.53
1234	FE	63	FE150B-HLB	HLB Leakage (Reverse)	0	0.4	kg/s	0.01	1.53
1235	FE	65	FE440B-SGA	SGA Main Steam Line (Low)	0	1	kg/s	0.02	2.04
1236	FE	67	FE480B-SGB	SGB Main Steam Line (Low)	0	1	kg/s	0.02	2.04
1237	FE	70	FE520-PAA	Aux. Feedwater A (High)	0	1.5	kg/s	0.02	1.23
1238	FE	71	FE520B-PAA	Aux. Feedwater A (Low)	0	1	kg/s	0.01	1.23
1239	FE	72	FE530B-PAB	Aux. Feedwater B (Low)	0	1	kg/s	0.01	1.23
1240	PE	1	PE561-BU	BU-1 Venturi	0	20	MPa	0.1077	0.54
1241	PE	2	PE581-BU	Break Venturi	0	20	MPa	0.1077	0.54
1242	PE	3	PE010-SGA	SGA Inlet Plenum	0	20	MPa	0.1077	0.54
1243	PE	4	PE020-LSA	PCA Suction	0	20	MPa	0.1077	0.54
1244	PE	5	PE030-CLA	PCA Delivery	0	20	MPa	0.1077	0.54
1245	PE	6	PE150-SGB	SGB Inlet Plenum	0	20	MPa	0.1077	0.54
1246	PE	7	PE160-LSB	PCB Suction	0	20	MPa	0.1077	0.54
1247	PE	8	PE170-CLB	PCB Delivery	0	20	MPa	0.1077	0.54
1248	PE	9	PE290-PV	PV Upper Head	0	20	MPa	0.1077	0.54
1249	PE	10	PE280A-PV	PV Upper Plenum (High)	0	20	MPa	0.1077	0.54
1250	PE	11	PE280B-PV	PV Upper Plenum (Low)	0	5	MPa	0.0269	0.54
1251	PE	12	PE270-PV	PV Lower Plenum	0	20	MPa	0.1077	0.54
1252	PE	13	PE300A-PR	PR (High Range)	0	20	MPa	0.1077	0.54
1253	PE	14	PE300B-PR	Pressurizer (Low)	0	5	MPa	0.0269	0.54
1254	PE	19	PE430-SGA	SGA Steam Dome	0	10	MPa	0.0539	0.54
1255	PE	20	PE440-SGA	SGA Steam Line	0	10	MPa	0.0539	0.54
1256	PE	21	PE450-SGB	SGB Steam Dome	0	10	MPa	0.0539	0.54
1257	PE	22	PE460-SGB	SGB Steam Line	0	10	MPa	0.0539	0.54
1258	PE	23	PE470-SH	Main-Steam Header	0	10	MPa	0.0539	0.54
1259	PE	24	PE480-JC	Jet Condenser	0	10	MPa	0.0539	0.54
1260	PE	28	PE580-BU	Break Orifice Upstream	0	20	MPa	0.1077	0.54
1261	PE	29	PE590-BU	Break Orifice Downstream	0	20	MPa	0.1077	0.54
1262	PE	31	PE650-ACC	Acc-Cold Tank	0	10	MPa	0.0539	0.54
1263	PE	32	PE660-ACH	Acc-Hot Tank	0	10	MPa	0.0539	0.54
1264	PE	35	PE011-HLA	HLA Spool Piece	0	20	MPa	0.1077	0.54
1265	PE	36	PE071-CLA	CLA Spool Piece	0	20	MPa	0.1077	0.54
1266	PE	37	PE151-HLB	HLB Spool Piece	0	20	MPa	0.1077	0.54
1267	PE	38	PE211-CLB	CLB Spool Piece	0	20	MPa	0.1077	0.54
1268	PE	43	PE571-BU	RSV123 Inlet	0	20	MPa	0.1118	0.56
1269	PE	44	PE591-BU	Break Spool Piece	0	20	MPa	0.1118	0.56
1270	PE	53	PE430B-SGA	SGA Steam Dome (Low)	0	1	MPa	0.0032	0.32
1271	PE	54	PE450B-SGB	SGB Steam Dome (Low)	0	1	MPa	0.0032	0.32
1272	PE	62	PE-A50-DVIA	PV-DCA ECCS Line	0	20	MPa	0.0641	0.32
1273	PE	63	PE-A51-DVIA	PV-DCA ECCS Line	0	20	MPa	0.0641	0.32
1274	PE	64	PE-A55-DVIB	PV-DCB ECCS Line	0	20	MPa	0.0641	0.32
1275	PE	65	PE-A56-DVIB	PV-DCB ECCS Line	0	20	MPa	0.0641	0.32
1276	PE	78	PE435-SGA	SGA Steam Dome	0	10	MPa	0.0224	0.22
1277	PE	79	PE455-SGB	SGB Steam Dome	0	10	MPa	0.0224	0.22
1278	MI	1	RE010-PCA	PCA (Rotational Speed)	0	70	rps	0.39	0.55
1279	MI	2	RE150-PCB	PCB (Rotational Speed)	0	70	rps	0.39	0.55
1280	MI	5	OPE430-SGA	SGA Feedwater (FCV430)	0	100	%	0.54	0.54
1281	MI	6	OPE470-SGB	SGB Feedwater (FCV470)	0	100	%	0.54	0.54
1282	MI	8	OPE510-SH	Steam Flow (FCV510)	0	100	%	0.54	0.54
1283	MI	11	VBE010-PCA	PCA (Vibration)	0	200	um	0.10	5.01
1284	MI	12	VBE150-PCB	PCB (Vibration)	0	200	um	0.10	5.01
1285	MI	13	TQE010-PCA	PCA (Torque)	0	100	Nm	1.60	1.60
1286	MI	14	TQE150-PCB	PCB (Torque)	0	100	Nm	1.60	1.60
1287	MI	15	AE010-PCA	PCA (Electric Current)	0	150	A	1.56	1.04
1288	MI	16	AE150-PCB	PCB (Electric Current)	0	150	A	1.56	1.04
1289	MI	17	WE270A-T	Total Core Power	0	16	MW	0.07	0.44
1290	MI	18	WE270B-M	Core Power (Mid. Flux)	0	2	MW	0.01	0.44
1291	MI	19	WE270C-H1	Core Power (High Flux 1)	0	4	MW	0.02	0.44
1292	MI	20	WE270D-H2	Core Power (High Flux 2)	0	4	MW	0.02	0.44
1293	MI	21	WE270E-L1	Core Power (Low Flux 1)	0	2	MW	0.01	0.44
1294	MI	22	WE270F-L2	Core Power (Low Flux 2)	0	2	MW	0.01	0.44
1295	MI	23	WE270G-L3	Core Power (Low Flux 3)	0	2	MW	0.01	0.44
1296	MI	25	WE280B-PR	PZR Base Heater	0	150	kW	0.59	0.39
1297	MI	26	WE010-PCA	PCA Power	0	30	kW	–	–
1298	MI	27	WE150-PCB	PCB Power	0	30	kW	–	–
1299	MI	29	WE020-HLA	HLA Heater Power	0	5	kW	0.01	1.50
1300	MI	30	WE030-LSA	LSA Heater Power	0	7.5	kW	0.01	1.50
1301	MI	31	WE040-CLA	CLA Heater Power	0	2	kW	0.003	1.50
1302	MI	32	WE160-HLB	HLB Heater Power	0	5	kW	0.01	1.50
1303	MI	33	WE170-LSB	LSB Heater Power	0	7.5	kW	0.01	1.50
1304	MI	34	WE180-CLB	CLB Heater Power	0	2	kW	0.003	1.50
1305	MI	35	WE271A-PV	PV Heater Power	0	15	kW	0.02	1.50
1306	MI	36	WE271B-PV	PV Heater Power	0	15	kW	0.02	1.50

Table A-1 (Cont'd)

SEQ No.	Function ID.		Tagname	Location	Range		Unit	Uncertainty	
					LO	HI		±ABS.	±%FR
1307	MI	37	WE271C-PV	PV Heater Power	0	15	kW	0.02	1.50
1308	MI	38	WE271D-PV	PV Heater Power	0	15	kW	0.02	1.50
1309	MI	39	WE430A-SGA	SGA Heater Power	0	4	kW	0.01	1.50
1310	MI	40	WE430B-SGA	SGA Heater Power	0	4	kW	0.01	1.50
1311	MI	41	WE430C-SGA	SGA Heater Power	0	4	kW	0.01	1.50
1312	MI	42	WE430D-SGA	SGA Heater Power	0	4	kW	0.01	1.50
1313	MI	43	WE440A-SGA	SGA Downcomer Heater Power	0	2	kW	0.003	1.50
1314	MI	44	WE440B-SGA	SGA Downcomer Heater Power	0	2	kW	0.003	1.50
1315	MI	45	WE440C-SGA	SGA Downcomer Heater Power	0	2	kW	0.003	1.50
1316	MI	46	WE440D-SGA	SGA Downcomer Heater Power	0	2	kW	0.003	1.50
1317	MI	47	WE290-PR	PZR Surge Line Heater Power	0	4	kW	0.01	1.50
1318	MI	48	WE300-PR	PZR Spray Line Heater Power	0	7.5	kW	0.01	1.50
1319	MI	49	WE450A-SGB	SGB Heater Power	0	4	kW	0.01	1.50
1320	MI	50	WE450B-SGB	SGB Heater Power	0	4	kW	0.01	1.50
1321	MI	51	WE450C-SGB	SGB Heater Power	0	4	kW	0.01	1.50
1322	MI	52	WE450D-SGB	SGB Heater Power	0	4	kW	0.01	1.50
1323	MI	53	WE460A-SGB	SGB Downcomer Heater Power	0	2	kW	0.003	1.50
1324	MI	54	WE460B-SGB	SGB Downcomer Heater Power	0	2	kW	0.003	1.50
1325	MI	55	WE460C-SGB	SGB Downcomer Heater Power	0	2	kW	0.003	1.50
1326	MI	56	WE460D-SGB	SGB Downcomer Heater Power	0	2	kW	0.003	1.50
1327	LE	1	LE270-PV	PV	0	11	m	0.29	2.68
1328	LE	2	LE280-PR	PZR Overall Level	0	11.24	m	0.25	2.22
1329	LE	3	LE430-SGA	SGA Wide Range	0	17	m	0.38	2.26
1330	LE	4	LE440-SGA	SGA Narrow Range	0	6	m	0.14	2.32
1331	LE	5	LE441-SGA	SGA Boiling Section	0	11	m	0.25	2.27
1332	LE	6	LE450-SGB	SGB Wide Range	0	17	m	0.38	2.26
1333	LE	7	LE460-SGB	SGB Narrow Range	0	6	m	0.14	2.32
1334	LE	8	LE461-SGB	SGB Boiling Section	0	11	m	0.25	2.27
1335	LE	9	LE470-JC	Jet Condenser	0	5.5	m	0.13	2.33
1336	LE	10	LE560-ST	ST Wide Range	0	12	m	0.27	2.26
1337	LE	11	LE570-ST	ST Low Level	0	4	m	0.09	2.25
1338	LE	12	LE580-ST	ST Middle Level	0	4	m	0.11	2.65
1339	LE	13	LE590-ST	ST High Level	0	4	m	0.11	2.65
1340	LE	14	LE650-ACC	Acc-Cold Tank	0	7.5	m	0.12	-
1341	LE	15	LE660-ACH	Acc-Hot Tank	0	7.5	m	0.15	-
1342	LE	17	LE830-RWST	RWST Overall	0	10	m	-	-
1343	LE	18	LE442-SGA	SGA Downcomer	0	12	m	0.27	2.25
1344	LE	19	LE462-SGB	SGB Downcomer	0	12	m	0.27	2.25
1345	LE	20	DLE270-PV	PV Overall	0	111.06	kPa	1.07	0.96
1346	LE	21	DLE280-PR	PZR Overall	0	113.63	kPa	0.48	0.42
1347	LE	22	DLE430-SGA	SGA Wide Range	0	171.64	kPa	0.69	0.40
1348	LE	23	DLE440-SGA	SGA Narrow-Range	0	60.58	kPa	0.57	0.93
1349	LE	24	DLE441-SGA	SGA Boiling Section	0	111.06	kPa	0.61	0.55
1350	LE	25	DLE442-SGA	SGA Downcomer	0	114.27	kPa	0.62	0.54
1351	LE	26	DLE450-SGB	SGB Wide Range	0	171.64	kPa	0.69	0.40
1352	LE	27	DLE460-SGB	SGB Narrow-Range	0	60.58	kPa	0.57	0.93
1353	LE	28	DLE461-SGB	SGB Boiling Section	0	111.06	kPa	0.61	0.55
1354	LE	29	DLE462-SGB	SGB Downcomer	0	114.27	kPa	0.62	0.54
1355	LE	30	DLE470-JC	JC	0	55.53	kPa	0.56	1.01
1356	LE	31	DLE560-ST	ST Overall Level	0	121.16	kPa	0.59	0.49
1357	LE	32	DLE570-ST	ST Lower Region	0	40.39	kPa	0.16	0.40
1358	LE	33	DLE580-ST	ST Middle Region	0	40.39	kPa	0.27	0.68
1359	LE	34	DLE590-ST	ST Upper Region	0	40.39	kPa	0.27	0.68
1360	LE	35	DLE650-ACC	Acc-Cold Tank	0	55.53	kPa	0.53	0.95
1361	LE	36	DLE660-ACH	Acc-Hot Tank	0	55.53	kPa	1.02	1.84
1362	LE	38	DLE830-RWST	RWST	0	196.14	kPa	0.55	0.28
1363	DP	1	DPE010-HLA	Upper Plenum - HLA Nozzle	-40	40	kPa	1.02	1.28
1364	DP	2	DPE020-HLA	HLA Nozzle - HLA Break	-40	40	kPa	1.02	1.28
1365	DP	4	DPE040-HLA	HLA Break - SGA Inlet	-40	40	kPa	1.02	1.28
1366	DP	5	DPE050A-SGA	SGA Inlet - Tube 3 Top	-150	50	kPa	2.03	1.02
1367	DP	6	DPE050B-SGA	SGA Inlet - Tube 2 Top	-150	50	kPa	2.03	1.02
1368	DP	7	DPE050C-SGA	SGA Inlet - Tube 1 Top	-150	50	kPa	2.03	1.02
1369	DP	8	DPE050D-SGA	SGA Inlet - Tube 4 Top	-150	50	kPa	2.03	1.02
1370	DP	9	DPE050E-SGA	SGA Inlet - Tube 5 Top	-150	50	kPa	2.03	1.02
1371	DP	10	DPE050F-SGA	SGA Inlet - Tube 6 Top	-150	50	kPa	2.03	1.02
1372	DP	11	DPE060A-SGA	SGA Outlet - Tube 3 Top	-150	50	kPa	2.03	1.02
1373	DP	12	DPE060B-SGA	SGA Outlet - Tube 2 Top	-150	50	kPa	2.03	1.02
1374	DP	13	DPE060C-SGA	SGA Outlet - Tube 1 Top	-150	50	kPa	2.03	1.02
1375	DP	14	DPE060D-SGA	SGA Outlet - Tube 4 Top	-150	50	kPa	2.03	1.02
1376	DP	15	DPE060E-SGA	SGA Outlet - Tube 5 Top	-150	50	kPa	2.03	1.02
1377	DP	16	DPE060F-SGA	SGA Outlet - Tube 6 Top	-150	50	kPa	2.03	1.02
1378	DP	17	DPE070-LSA	SGA Outlet - LSA Bottom	-80	80	kPa	1.08	0.67
1379	DP	18	DPE080-LSA	LSA Bottom - PCA Suction	-50	50	kPa	1.03	1.03
1380	DP	19	DPE090-PCA	PCA Suction - Delivery	-50	50	kPa	1.03	1.03
1381	DP	20	DPE100-CLA	PZR Spray Line	-200	200	kPa	2.21	0.55
1382	DP	21	DPE110-CLA	PCA Delivery - CLA Break	-50	50	kPa	1.03	1.03
1383	DP	22	DPE120-CLA	CLA Break - CLA Nozzle	-50	50	kPa	1.03	1.03
1384	DP	23	DPE130-CLA	CLA Nozzle - Downcomer	-50	50	kPa	1.03	1.03
1385	DP	24	DPE140-HLA	Upper Plenum - Downcomer	-30	30	kPa	1.01	1.69
1386	DP	25	DPE150-HLB	Upper Plenum - HLB Nozzle	-30	30	kPa	1.01	1.69

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1387	DP 26	DPE160-HLB	HLB Nozzle - HLB Break	-30	30	kPa	1.01	1.69
1388	DP 27	DPE170-HLB	HLB Break - SGB Break	-30	30	kPa	1.01	1.69
1389	DP 28	DPE180-HLB	SGB Break - SGB Inlet	-30	30	kPa	1.01	1.69
1390	DP 29	DPE190A-SGB	SGB Inlet - Tube 3 Top	-150	50	kPa	2.03	1.02
1391	DP 30	DPE190B-SGB	SGB Inlet - Tube 2 Top	-150	50	kPa	2.03	1.02
1392	DP 31	DPE190C-SGB	SGB Inlet - Tube 1 Top	-150	50	kPa	3.96	1.98
1393	DP 32	DPE190D-SGB	SGB Inlet - Tube 4 Top	-150	50	kPa	3.96	1.98
1394	DP 33	DPE190E-SGB	SGB Inlet - Tube 5 Top	-150	50	kPa	3.96	1.98
1395	DP 34	DPE190F-SGB	SGB Inlet - Tube 6 Top	-150	50	kPa	3.96	1.98
1396	DP 35	DPE200A-SGB	SGB Outlet - Tube 3 Top	-150	50	kPa	3.96	1.98
1397	DP 36	DPE200B-SGB	SGB Outlet - Tube 2 Top	-150	50	kPa	3.96	1.98
1398	DP 37	DPE200C-SGB	SGB Outlet - Tube 1 Top	-150	50	kPa	3.96	1.98
1399	DP 38	DPE200D-SGB	SGB Outlet - Tube 4 Top	-150	50	kPa	3.96	1.98
1400	DP 39	DPE200E-SGB	SGB Outlet - Tube 5 Top	-150	50	kPa	3.96	1.98
1401	DP 40	DPE200F-SGB	SGB Outlet - Tube 6 Top	-150	50	kPa	3.96	1.98
1402	DP 41	DPE210-LSB	SGB Outlet - LSB Bottom	-80	80	kPa	1.08	0.67
1403	DP 42	DPE220-LSB	LSB Bottom - PCB Suction	-50	50	kPa	1.03	1.03
1404	DP 43	DPE230-PCB	PCB Suction - Delivery	-50	50	kPa	1.03	1.03
1405	DP 44	DPE240-CLB	PCB Delivery - CLB Break	-20	20	kPa	1.01	2.51
1406	DP 45	DPE250-CLB	CLB Break - CLB Nozzle	-20	20	kPa	1.01	2.51
1407	DP 46	DPE260-CLB	CLB Nozzle - Downcomer	-20	20	kPa	1.01	2.51
1408	DP 47	DPE270-PV	PV Bottom - Top	-100	400	kPa	4.12	0.82
1409	DP 48	DPE280-PV	PV Lower Plenum	-50	100	kPa	1.07	0.71
1410	DP 49	DPE290-PV	Lower Core Support Plate	-50	100	kPa	1.07	0.71
1411	DP 50	DPE300-PV	Core (EL.-35 -3945)	-50	100	kPa	1.07	0.71
1412	DP 51	DPE320-PV	Upper Plenum	-50	100	kPa	1.07	0.71
1413	DP 52	DPE330-PV	Upper Head (EL.6135 - 9653)	-50	100	kPa	1.07	0.71
1414	DP 53	DPE310-PV	Upper Core Support Plate	-100	100	kPa	3.96	1.98
1415	DP 54	DPE350A-PV	CR Guide Tube Top Orifice	-100	100	kPa	3.96	1.98
1416	DP 55	DPE350B-PV	CR Guide Tube Top Orifice	-100	100	kPa	3.96	1.98
1417	DP 56	DPE360-PV	PV Downcomer Overall	-100	300	kPa	4.05	1.01
1418	DP 57	DPE370-PV	Lower Downcomer	-50	150	kPa	3.96	1.98
1419	DP 58	DPE380-PV	Upper Downcomer	-50	150	kPa	3.96	1.98
1420	DP 59	DPE390-PV	UP-DC Check Valve A	-50	100	kPa	1.12	0.56
1421	DP 62	DPE332-PV	Upper Head - Downcomer	-100	100	kPa	3.96	1.98
1422	DP 63	DPE331-PV	Upper Head	-100	100	kPa	3.96	1.98
1423	DP 70	DPE030B-HLA	PZR Surge Line (Low)	-300	300	kPa	2.48	0.41
1424	DP 71	DPE072-LSA	LSA (SG-Side)	0	45	kPa	0.34	0.75
1425	DP 72	DPE073-LSA	LSA (SG-Side)	-10	10	kPa	0.32	1.60
1426	DP 73	DPE074-LSA	LSA (SG-Side)	-10	10	kPa	0.32	1.60
1427	DP 74	DPE075-LSA	LSA (SG-Side)	-10	10	kPa	0.32	1.60
1428	DP 75	DPE076-LSA	LSA (SG-Side)	0	30	kPa	0.33	1.08
1429	DP 76	DPE212-LSB	LSB (SG-Side)	0	45	kPa	0.34	0.75
1430	DP 77	DPE213-LSB	LSB (SG-Side)	-10	10	kPa	0.32	1.60
1431	DP 78	DPE214-LSB	LSB (SG-Side)	-10	10	kPa	0.32	1.60
1432	DP 79	DPE215-LSB	LSB (SG-Side)	-10	10	kPa	0.32	1.60
1433	DP 80	DPE216-LSB	LSB (SG-Side)	0	30	kPa	0.33	1.08
1434	DP 81	DPE430-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1435	DP 82	DPE431-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1436	DP 83	DPE432-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1437	DP 84	DPE433-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1438	DP 85	DPE434-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1439	DP 86	DPE435-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1440	DP 87	DPE436-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1441	DP 88	DPE437-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1442	DP 89	DPE438-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1443	DP 90	DPE439-SGA	SGA Boiling Section	-30	0	kPa	0.33	1.08
1444	DP 91	DPE440-SGA	SGA Boiling Section	-40	0	kPa	0.33	0.83
1445	DP 92	DPE450-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1446	DP 93	DPE451-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1447	DP 94	DPE452-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1448	DP 95	DPE453-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1449	DP 96	DPE454-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1450	DP 97	DPE455-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1451	DP 98	DPE456-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1452	DP 99	DPE457-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1453	DP 100	DPE458-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1454	DP 101	DPE459-SGB	SGB Boiling Section	-30	0	kPa	0.33	1.08
1455	DP 102	DPE460-SGB	SGB Boiling Section	-40	0	kPa	0.33	0.83
1456	DP 103	DPE011-HLA	HLA Spool Piece	-10	10	kPa	0.32	1.60
1457	DP 104	DPE071-CLA	CLA Spool Piece	-10	10	kPa	0.32	1.60
1458	DP 105	DPE151-HLB	HLB Spool Piece	-10	10	kPa	0.32	1.60
1459	DP 106	DPE211-CLB	CLB Spool Piece	-10	10	kPa	0.32	1.60
1460	DP 107	DPE571-BU	RSV123 Inlet	0	200	kPa	1.12	0.56
1461	DP 109	DPE041-PR	PZR (DL.9795 - 11321)	-14.95	0	kPa	0.25	1.69
1462	DP 110	DPE042-PR	PZR (DL.7965 - 9795)	-17.93	0	kPa	0.23	1.27
1463	DP 111	DPE043-PR	PZR (DL.5995 - 7965)	-19.31	0	kPa	0.23	1.18
1464	DP 112	DPE044-PR	PZR (DL.4238 - 5995)	-17.22	0	kPa	0.23	1.32
1465	DP 113	DPE045-PR	PZR (DL.2025 - 4238)	-21.68	0	kPa	0.23	1.06
1466	DP 114	DPE046-PR	PZR (DL.80 - 2025)	-19.06	0	kPa	0.23	1.20
1467	DP 115	DPE101-PR	PZR-CLA	-200	200	kPa	1.30	0.32
1468	DP 116	DPE055A-SGA	SGA U-Tube I/O (High)	-30	30	kPa	0.29	0.49

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1469	DP 117	DPE055B-SGA	SGA U-Tube I/O (Low)	-3	3	kPa	0.2	3.37
1470	DP 118	DPE195A-SGB	SGB U-Tube I/O (High)	-30	30	kPa	0.29	0.49
1471	DP 119	DPE195B-SGB	SGB U-Tube I/O (Low)	-3	3	kPa	0.2	3.37
1472	DP 120	DPE056-SGA	SGA Inlet Plenum	-40	40	kPa	1.02	1.28
1473	DP 121	DPE057-SGA	SGA Primary-Secondary	-1000	1000	kPa	9.44	0.47
1474	DP 122	DPE196-SGB	SGB Inlet Plenum	-40	40	kPa	0.48	0.60
1475	DP 123	DPE197-SGB	SGB Primary-Secondary	-1000	1000	kPa	9.44	0.47
1476	DP 133	DPE333-PV	Upper Head (EL.6634 - 8860)	-35	0	kPa	0.23	0.67
1477	DP 170	DPE-A75-IRWST	IRWST Overall	-60	0	kPa	-	-
1478	DP 171	DPE-A76-IRWST	IRWST Narrow Range DP	-25	0	kPa	-	-
1479	DP 182	DPE491-SGB	SGB Feedwater Line	0	0	kPa	Not used	-
1480	DP 183	DPE492-SGB	SGB Feedwater Line	-40	10	kPa	Not used	-
1481	DP 187	DPE-A80B-ADS	ADS(1-3)-IRWST Sparger	-50	200	kPa	-	-
1482	DE 1	DE011A-HLA	HLA Spool Piece, Beam A	0	10	V	-	-
1483	DE 2	DE011B-HLA	HLA Spool Piece, Beam B	0	10	V	-	-
1484	DE 3	DE011C-HLA	HLA Spool Piece, Beam C	0	10	V	-	-
1485	DE 4	DE051A-LSA	LSA Spool Piece, Beam A	0	10	V	-	-
1486	DE 5	DE051B-LSA	LSA Spool Piece, Beam B	0	10	V	-	-
1487	DE 6	DE051C-LSA	LSA Spool Piece, Beam C	0	10	V	-	-
1488	DE 7	DE071A-CLA	CLA Spool Piece, Beam A	0	10	V	-	-
1489	DE 8	DE071B-CLA	CLA Spool Piece, Beam B	0	10	V	-	-
1490	DE 9	DE071C-CLA	CLA Spool Piece, Beam C	0	10	V	-	-
1491	DE 10	DE151A-HLB	HLB Spool Piece, Beam A	0	10	V	-	-
1492	DE 11	DE151B-HLB	HLB Spool Piece, Beam B	0	10	V	-	-
1493	DE 12	DE151C-HLB	HLB Spool Piece, Beam C	0	10	V	-	-
1494	DE 13	DE191A-LSB	LSB Spool Piece, Beam A	0	10	V	-	-
1495	DE 14	DE191B-LSB	LSB Spool Piece, Beam B	0	10	V	-	-
1496	DE 15	DE191C-LSB	LSB Spool Piece, Beam C	0	10	V	-	-
1497	DE 16	DE211A-CLB	CLB Spool Piece, Beam A	0	10	V	-	-
1498	DE 17	DE211B-CLB	CLB Spool Piece, Beam B	0	10	V	-	-
1499	DE 18	DE211C-CLB	CLB Spool Piece, Beam C	0	10	V	-	-
1500	DE 19	DE052-LSA	PCA Suction	0	10	V	-	-
1501	DE 20	DE192-LSB	PCB Suction	0	10	V	-	-
1502	DE 21	DE281-PR	PZR Surge Line	0	10	V	-	-
1503	DE 33	DE591A-BU	Break Spool Piece, Beam A	0	10	V	-	-
1504	DE 34	DE591B-BU	Break Spool Piece, Beam B	0	10	V	-	-
1505	DE 35	DE591C-BU	Break Spool Piece, Beam C	0	10	V	-	-
1506	DE 40	DE291-SGB	SGB Feedwater Line	0	10	V	-	-
1507	RC 31	DE011A-HLA-EU	HLA Spool Piece, Beam A	-	-	kg/m^3	27	-
1508	RC 32	DE011B-HLA-EU	HLA Spool Piece, Beam B	-	-	kg/m^3	20	-
1509	RC 33	DE011C-HLA-EU	HLA Spool Piece, Beam C	-	-	kg/m^3	22	-
1510	RC 34	DE151A-HLB-EU	HLB Spool Piece, Beam A	-	-	kg/m^3	27	-
1511	RC 35	DE151B-HLB-EU	HLB Spool Piece, Beam B	-	-	kg/m^3	20	-
1512	RC 36	DE151C-HLB-EU	HLB Spool Piece, Beam C	-	-	kg/m^3	22	-
1513	RC 37	DE071A-CLA-EU	CLA Spool Piece, Beam A	-	-	kg/m^3	94.8	-
1514	RC 38	DE071B-CLA-EU	CLA Spool Piece, Beam B	-	-	kg/m^3	94.8	-
1515	RC 39	DE071C-CLA-EU	CLA Spool Piece, Beam C	-	-	kg/m^3	94.8	-
1516	RC 40	DE211A-CLB-EU	CLB Spool Piece, Beam A	-	-	kg/m^3	94.8	-
1517	RC 41	DE211B-CLB-EU	CLB Spool Piece, Beam B	-	-	kg/m^3	94.8	-
1518	RC 42	DE211C-CLB-EU	CLB Spool Piece, Beam C	-	-	kg/m^3	94.8	-
1519	RC 56	DE051A-LSA-EU	LSA Spool Piece, Beam A	-	-	kg/m^3	94.8	-
1520	RC 57	DE051B-LSA-EU	LSA Spool Piece, Beam B	-	-	kg/m^3	94.8	-
1521	RC 58	DE051C-LSA-EU	LSA Spool Piece, Beam C	-	-	kg/m^3	94.8	-
1522	RC 59	DE191A-LSB-EU	LSB Spool Piece, Beam A	-	-	kg/m^3	94.8	-
1523	RC 60	DE191B-LSB-EU	LSB Spool Piece, Beam B	-	-	kg/m^3	94.8	-
1524	RC 61	DE191C-LSB-EU	LSB Spool Piece, Beam C	-	-	kg/m^3	94.8	-
1525	RC 62	DE052-LSA-EU	PCA Suction	-	-	kg/m^3	94.8	-
1526	RC 63	DE192-LSB-EU	PCB Suction	-	-	kg/m^3	94.8	-
1527	RC 64	DE281-PR-EU	PZR Surge Line	-	-	kg/m^3	94.8	-
1528	RC 73	DE591A-BU-EU	Break Spool Piece, Beam A	-	-	kg/m^3	94.8	-
1529	RC 74	DE591B-BU-EU	Break Spool Piece, Beam B	-	-	kg/m^3	94.8	-
1530	RC 75	DE591C-BU-EU	Break Spool Piece, Beam C	-	-	kg/m^3	94.8	-
1531	RC 139	CL-CORE	Core (EL.-35 - 3945)	-	-	m	0.216	-
1532	RC 140	CL-UP	Upper Plenum (EL.4060 - 6135)	-	-	m	0.197	-
1533	RC 141	CL-UH	Upper Head (EL.6634 - 8860)	-	-	m	0.21	-
1534	RC 142	CL-DC	Downcomer	-	-	m	0.746	-
1535	RC 143	CL-HLA-SGA	HLA Riser Part	-	-	m	0.181	-
1536	RC 144	CL-TUA-U3	SGA Tube 3 Inlet - Top	-	-	m	0.43	-
1537	RC 145	CL-TUA-U2	SGA Tube 2 Inlet - Top	-	-	m	0.42	-
1538	RC 146	CL-TUA-U1	SGA Tube 1 Inlet - Top	-	-	m	0.413	-
1539	RC 147	CL-TUA-U4	SGA Tube 4 Inlet - Top	-	-	m	0.43	-
1540	RC 148	CL-TUA-U5	SGA Tube 5 Inlet - Top	-	-	m	0.42	-
1541	RC 149	CL-TUA-U6	SGA Tube 6 Inlet - Top	-	-	m	0.425	-
1542	RC 150	CL-TUA-D3	SGA Tube 3 Outlet - Top	-	-	m	0.442	-
1543	RC 151	CL-TUA-D2	SGA Tube 2 Outlet - Top	-	-	m	0.431	-
1544	RC 152	CL-TUA-D1	SGA Tube 1 Outlet - Top	-	-	m	0.422	-
1545	RC 153	CL-TUA-D4	SGA Tube 4 Outlet - Top	-	-	m	0.422	-
1546	RC 154	CL-TUA-D5	SGA Tube 5 Outlet - Top	-	-	m	0.431	-
1547	RC 155	CL-TUA-D6	SGA Tube 6 Outlet - Top	-	-	m	0.422	-
1548	RC 156	CL-LSA-D	SGA Out.Plenum - LSA Bottom	-	-	m	0.207	-

Table A-1 (Cont'd)

SEQ No.	Function ID.	Tagname	Location	Range		Unit	Uncertainty	
				LO	HI		±ABS.	±%FR
1549	RC 157	CL-LSA-U	LSA Bottom - PCA Suction	-	-	m	0.188	-
1550	RC 158	CL-SGA-IPL	SGA Inlet Plenum	-	-	m	0.185	-
1551	RC 159	CL-HLB-SGB	HLB Riser Part	-	-	m	0.179	-
1552	RC 160	CL-TUB-U3	SGB Tube 3 Inlet - Top	-	-	m	0.445	-
1553	RC 161	CL-TUB-U2	SGB Tube 2 Inlet - Top	-	-	m	0.433	-
1554	RC 162	CL-TUB-U1	SGB Tube 1 Inlet - Top	-	-	m	0.73	-
1555	RC 163	CL-TUB-U4	SGB Tube 4 Inlet - Top	-	-	m	0.74	-
1556	RC 164	CL-TUB-U5	SGB Tube 5 Inlet - Top	-	-	m	0.734	-
1557	RC 165	CL-TUB-U6	SGB Tube 6 Inlet - Top	-	-	m	0.73	-
1558	RC 166	CL-TUB-D3	SGB Tube 3 Outlet - Top	-	-	m	0.951	-
1559	RC 167	CL-TUB-D2	SGB Tube 2 Outlet - Top	-	-	m	0.74	-
1560	RC 168	CL-TUB-D1	SGB Tube 1 Outlet - Top	-	-	m	0.735	-
1561	RC 169	CL-TUB-D4	SGB Tube 4 Outlet - Top	-	-	m	0.747	-
1562	RC 170	CL-TUB-D5	SGB Tube 5 Outlet - Top	-	-	m	0.74	-
1563	RC 171	CL-TUB-D6	SGB Tube 6 Outlet - Top	-	-	m	0.735	-
1564	RC 172	CL-LSB-D	SGB Out.Plenum - LSB Bottom	-	-	m	0.207	-
1565	RC 173	CL-LSB-U	LSB Bottom - PCB Suction	-	-	m	0.188	-
1566	RC 174	CL-SGB-IPL	SGB Inlet Plenum	-	-	m	0.094	-
1567	RC 175	MC-UH	Upper Head (EL.6614 - 9653)	-	-	kg	79.08	-
1568	RC 176	MC-LSA-DW	SGA Out.Plenum+LSA Downflow	-	-	kg	42.68	-
1569	RC 177	MC-LSB-DW	SGB Out.Plenum+LSB Downflow	-	-	kg	41.33	-
1570	RC 178	MS-CORE	Core (EL.-35 - 3945)	-	-	kg	15.4	-
1571	RC 179	MS-UP	Upper Plenum (EL.4060 - 6135)	-	-	kg	24.37	-
1572	RC 180	MS-DC	Downcomer	-	-	kg	46.31	-
1573	RC 181	MS-TUA-UP-AV	SGA Tubes Upflow side	-	-	kg	8.3	-
1574	RC 182	MS-TUA-DW-AV	SGA Tubes Downflow side	-	-	kg	8.3	-
1575	RC 183	MS-SGA-IPL	SGA Inlet Plenum	-	-	kg	27.81	-
1576	RC 184	MS-LSA-UP	LSA Upflow side	-	-	kg	3.57	-
1577	RC 185	MS-TUB-UP-AV	SGB Tubes Upflow side	-	-	kg	9.65	-
1578	RC 186	MS-TUB-DW-AV	SGB Tubes Downflow side	-	-	kg	10.25	-
1579	RC 187	MS-SGB-IPL	SGB Inlet Plenum	-	-	kg	14.61	-
1580	RC 188	MS-LSB-UP	LSB Upflow side	-	-	kg	3.57	-
1581	RC 189	MS-ACC	Acc-Cold Tank	-	-	kg	39.26	-
1582	RC 190	MS-ACH	Acc-Hot Tank	-	-	kg	74.26	-
1583	RC 191	MS-ST	Break Flow Supp. Tank	-	-	kg	323.61	-
1584	RC 192	DM-ACC	Acc-Cold Tank	-	-	kg/s	13.55	-
1585	RC 193	DM-ACH	Acc-Hot Tank	-	-	kg/s	26.08	-
1586	RC 194	IM-ST	Break Flow Supp. Tank	-	-	kg/s	3.35	-
1587	RC 195	DM-RWST	RWST	-	-	kg/s	51.9	-
1588	RC 196	LG-HLA	HLA Water Level	-	-	m	0.012	-
1589	RC 197	LG-CLA	CLA Water Level	-	-	m	0.028	-
1590	RC 198	LG-HLB	HLB Water Level	-	-	m	0.012	-
1591	RC 199	LG-CLB	CLB Water Level	-	-	m	0.028	-
1592	RC 200	TS-UP	Upper Plenum	-	-	K	17.64	-
1593	RC 202	TS-SGA	Steam Generator-A	-	-	K	7.82	-
1594	RC 203	TS-SGB	Steam Generator-B	-	-	K	7.82	-
1595	RC 236	IM-IRWST	IRWST	-	-	kg/s	-	-
1596	RC 279	DE291-SGB-EU	SGB Feedwater Line	-	-	kg/m^3	-	-
1597	RC 296	IM-IRWSTL	IRWST	-	-	kg/s	-	-

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