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ROSA-IV LARGE SCALE TEST FACILITY (LSTF) SYSTEM DESCRIPTION FOR SECOND SIMULATED FUEL ASSEMBLY

October 1990

The ROSA-IV Group

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Japan Atomic Energy Research Institute

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ROSA-IV Large Scale Test Facility (LSTF) System Description for Second Simulated Fuel Assembly

The ROSA-IV Group※

Department of Nuclear Safety Research
Tokai Research Establishment
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken

(Received September 12, 1990)

The ROSA-IV Program's Large Scale Test Facility (LSTF) is a test facility for integral simulation of thermal-hydraulic response of a pressurized water reactor (PWR) during small break loss-of-coolant accidents (LOCAs) and transients. In this facility, the PWR core nuclear fuel rods are simulated using electric heater rods. The simulated fuel assembly which was installed during the facility construction was replaced with a new one in 1988. The first test with this second simulated fuel assembly was conducted in December 1988. This report describes the facility configuration and characteristics as of this date (December 1988) including the new simulated fuel assembly design and the facility changes which were made during the testing with the first assembly as well as during the renewal of the simulated fuel assembly.

Keywords: ROSA-IV, LSTF, PWR, Small Break LOCA, System Description, 2nd Simulated Fuel Assembly

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ROSA－Ⅳ大型非定常試験装置（ＬＳＴＦ）の概要
（第２次模擬燃料集合体）

日本原子力研究所東海研究所原子炉安全工学部
ROSA－Ⅳグループ

（1990年9月12日受理）

ROSA－Ⅳ計画では，大型非定常試験装置（Large Scale Test Facility：LSTF）を用いてPWR小破断冷却材喪失事故及び運転時の異常過渡に関する総合実験を行っている。本装置では，PWRの炉心を電気ヒータ（模擬燃料集合体）により模擬しているが，装置完成（1985年5月）以来使用してきた模擬燃料集合体（第1次模擬燃料集合体）を新たな模擬燃料集合体（第2次模擬燃料集合体）と交換する作業を1988年8月から12月にかけて実施した。また，模擬燃料集合体の交換とあわせて，種々の部分的な装置改造を行った。第2次模擬燃料集合体による最初の実験（Run SB－CL－20）は，1988年12月15日に行われた。

本報は，第2次模擬燃料体使用開始の時点におけるLSTFに関する最新の情報を提供し，実験結果の解析に役立てることを目的としている。

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Nomenclature

AC	:	Air compressor
ACB	:	Air circuit breaker
ACC-Cold	:	Cold water accumulator
ACC-Hot	:	Hot water accumulator
AOV	:	Air operated valve
AT	:	Air accumulator tank
B&W	:	Babcock and Wilcox Company
CA	:	Chromel alumel thermocouple
CFCV	:	Coolant flow control valve
CL-A, CL-B	:	Cold leg of primary loop-A, Cold leg of primary loop-B
COL-A, COL-B	:	Cross-over leg of primary loop-A, Cross-over leg of primary loop-B
COP	:	Center of pipe
CP	:	Conduction probe
CPT	:	Conduction probe with thermocouple
CT-1	:	Cooling tower 1
CT-2	:	Cooling tower 2
CVCF	:	Stabilized power supply system
CWT	:	Cooling water storage tank
ECC	:	Emergency core cooling
ECCS	:	Emergency core cooling system
EL	:	Elevation (mm) measured from the bottom of heated zone in the core
FCV	:	Flow control valve
FE	:	Tag for fluid flow measurement
FRG	:	Federal Republic of Germany
FT	:	Flow transducer
HCV	:	Hand control valve
HL-A, HL-B	:	Hot leg of primary loop A, Hot leg of primary loop B
HPIS	:	High pressure injection system
HX	:	Heat exchanger
IECH	:	Demineralizer
JC	:	Jet condenser
LOCA	:	Loss-of-coolant accident
LOFT	:	Loss-of-Fluid Test
LPIS	:	Low pressure injection system

LPWR	:	Large presurized water reactor
LSTF	:	Large Scale Test Facility
LT	:	Liquid level transducer
MSIV	:	Main steam isolation valve
PA	:	Auxiliary feedwater pump
PC-A,PC-B	:	Reactor coolant pump in primary loop A, Reactor coolant pump in primary loop B
PCV	:	Pressure control valve
PF	:	Main feedwater pump
PD	:	Drain pump
PH	:	High pressure injection pump
PJ	:	Charging pump
PKL	:	Primäkreislauf test facility
PL	:	Low pressure injection pump
PORV	:	Power operated relief valve
PPR	:	Pressurizer spray pump
PR	:	Pressurizer
PS	:	Water service pump
PT	:	Pressure transducer
PU	:	Sump pump
PV	:	Pressure vessel
PW	:	Cooling water pump
PWR	:	Pressurized water reactor
PY	:	Suppression tank circulation pump
RHR	:	Residual heat removal system
RO	:	Orifice
ROSA-IV	:	Rig of Safety Assessment Number 4
RV	:	Relief valve
RWST	:	Simulated refueling water storage tank
SBLOCA	:	Small break loss-of-coolant accident
SCR	:	Thyristor (Silicon controled rectifier)
SG-A,SG-B	:	Steam generator A, Steam generator B
ST	:	Bread flow Storage Tank
SV	:	Safety valve
T/C	:	Thermocouple
TCV	:	Thermostatic control valve
TE	:	Tag for fluid temperature measurement

TMI	:	Three mile Island Nuclear Power Station
TPTF	:	Two-Phase Flow Test Facility
TWE	:	Tag for wall temperature measurement
USA	:	The United States of America
USNRC	:	United States Nuclear Regulatory Commission
VC	:	Check valve
VD	:	Variable damper
VS motor	:	Variable speed motor
VV	:	Variable voltage controller
W	:	Westinghouse Electric Company

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1. Introduction

The Japan Atomic Energy Research Institute (JAERI) initiated the Rig of Safety Assessment No. 4 (ROSA-IV) Program[1] in 1980, the year after the accident at the Three Mile Island Unit 2 (TMI-2), for experimental and analytical investigation of thermal-hydraulic responses of a pressurized water reactor during small-break loss-of-coolant accidents (SBLOCAs) and operational/abnormal transients. The ROSA-IV Program comprises three major tasks: (1) conducting large-scale integral simulation of a Westinghouse (W)-type pressurized water reactor (PWR) plant behavior using the Large Scale Test Facility (LSTF); (2) conducting separate effects tests using the Two-Phase Flow Test Facility[2] (TPTF); and (3) developing and verifying an advanced computer code. Results from the TPTF separate effects tests are used to develop and improve empirical correlations and analytical models which are used in the code, while results from the LSTF integral tests are used for verifying the code for accuracy.

The LSTF was designed to simulate thermal-hydraulic phenomena peculiar to SBLOCAs and operational transients by having prototypical component elevation differences, large loop piping diameters, prototypical primary pressure levels, simulated system controls, and core power level sufficient to simulate the core power decay starting from a few seconds after scram. The LSTF has volumes scaled at 1/48 of a typical 3423 MWt W-type 4-loop PWR plant, i.e., the reference PWR. Although the LSTF design is based on a W-type reference PWR, it allows simulation of innovative plant recovery methods including use of equipment specific to other vendor designs. Thus the LSTF can be used to investigate the PWR plant behavior including the effects of plant recovery methods for a wide spectrum of accident and transient conditions.

The LSTF became operational in the end of 1984, and, after conducting a series of commissioning tests, the first official test was conducted in May 1985. The as-designed facility geometry and component specifications are documented in the ROSA-IV LSTF System Description report [1] issued January 1985. This report has been amended by Ref. 3 which documents system modifications made before August 1988 and supplemental system description.

The first phase of the LSTF program ended in August 1988 conducting forty-two integral tests. Then, the simulated core fuel-rod assembly was renewed between August 1988 and March 1989. In addition to replacing the core, several hardware modifications were made during this period to enhance the facility capability as well as to reduce uncertainty in the test boundary conditions, whereas the basic facility construction was unchanged. The first test in the second phase of the LSTF program, i.e., the first test with the second core, was conducted in December 1988.

The present system description report concerns the facility state as of the beginning of the second phase program. The major differences between the LSTF hardware as of the end of the first phase program and the beginning of the second phase program are:

(1) The second core assembly includes segmental differential pressure measurement along the core heated length. For this purpose, eight oil-cooled pressure lines, penetrating the vessel lower head into the core heated region, were installed. Since these lines had fairly large outer diameter (30 mm) because of oil cooling requirement, the number of core rods was reduced relative to that for the first core assembly.

(2) Overall differential pressure measurement for the vessel upper head was added. The purpose of this measurement is to track the water level behavior in the upper head.

(3) The construction of the upper vessel internals was changed such that unintentional leak would not occur between the upper vessel volumes.

(4) The construction of the steam generator plenums was also changed such that leak would not occur between the inlet and outlet plenums.

2. Objectives and Approach

The LSTF will provide data useful in three fundamental areas:

(1) Plant behavior definition - plant behavior and thermal-hydraulic phenomena during representative SBLOCA and operational transients for a W type PWR will be simulated and defined.

(2) Plant recovery methods investigation - operator procedures and innovative recovery equipment will be investigated for possible use on operational PWRs during operational transients or SBLOCAs.

(3) Creation of code assessment data base - a data base for assessment and verification of advanced thermal-hydraulic codes will be obtained.

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Within the three general objectives listed above, there are many secondary objectives. The program scope for each of the above areas will be discussed in the following subsections.

2.1 Plant Behavior Definition

The LSTF systems simulate the major components of the primary system, e.g., pressure vessel, steam generators, and the reactor protection system, e.g., the emergency core cooling systems (ECCS), that impact the system behavior during SBLOCAs and operational transients. Equipment controls allow the test operators to either follow procedures defined in standard plant manuals or to follow variations of standard procedures.

Other systems, e.g., the secondary and various auxiliary systems, are capable of achieving a pretest steady-state condition and simulating the primary to secondary interactions. These systems include feedwater, condensate and steam systems together with component service systems such as the cooling water, instrument air, water purification etc.

2.2 Plant Recovery Methods Investigation

One of the strengths of the ROSA-IV Program is the inherent capability of the LSTF to serve as a test site for new approaches and techniques for recovery from abnormal transients. For example, the LSTF can be used to investigate operator actions different from the licensed operating procedures during recovery from a SBLOCA or transient.

In addition to operator actions, the LSTF also has the capability to investigate non-standard or innovative plant recovery equipment not present in operating W type PWRs. Thus the LSTF can be used to study plant recovery methods including:

(1) Non-standard operator actions
(2) Pressure vessel to pressurizer vent valve
(3) Modified relief valve, letdown and charging pump operational envelopes
(4) Various ECCS injection points and flow rates at:
   a. Cold leg
   b. Hot leg
   c. Crossover leg
   d. Pressure vessel upper plenum
   e. Pressure vessel lower plenum
(5) Hot accumulator injection

(6) Pressurizer surge line routed to the pressure vessel upper head
(7) Core barrel vent valves

2.3 Creation of Code Assessment Data Base

The LSTF data base will be a unique, primary ingredient of the computer code assessment. The existing codes, such as RELAP5[4] will be first assessed. THen the data base will be used to assess new models and code developed in the ROSA-IV Program.

3. Experiment Description

3.1 Test Categories

3.1.1 System Effects Tests

The Primary objective of the system effects tests is to characterize the overall system performance of a LPWR during a SBLOCA or a transient. The following test serieses are designed to meet above objective.

(1) Small Break LOCA Tests

These tests are to be direct, continuous simulations of a PWR SBLOCA from the time of break to completion of plant recovery. Parameters to be investigated are:

(a) Break area

Break areas ranging up to 10% of the scaled (1/48) reference PWR loop piping cross-sectional area will be tested. Examples of smaller break tests include the simulated failure of one or more pressurizer power operated relief valve (PORV) and rupture of one or more steam generator U-tubes.

(b) Break location

The simulated break locations will include the cold leg (both upstream and downstream of the ECCS injection port), crossover leg, hot leg (both upstream and downstream of the hot leg ECCS injection port), pressurizer steam dome, pressure vessel lower plenum and upper head, steam generator U-tube wall, main steam line and main feedwater line. Combined breaks (e.g., a steam generator U-tube rupture followed by a secondary piping rupture) are also to be simulated.

(c) Break orientation

Breaks at the top, side and bottom of a large horizontal pipes will

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(c) Break orientation

Breaks at the top, side and bottom of a large horizontal pipes will be simulated.

(d) ECCS capacity

Both full and degraded ECCS operations will be simulated.

(2) Operational Transient Tests

These tests are to be direct, continuous simulations of PWR operational transients from the time following scram to completion of plant recovery. Transients to be investigated are:

(a) Reactor undercooling transients

Reactor coolant system undercooling resulting from, e.g., loss of feedwater, loss of load or loss of residual heat removal (RHR) system, will be simulated.

(b) Reactor overcooling transients

Reactor coolant system overcooling resulting from, e.g., sudden increase in the feedwater flow, or a main steam line or feedwater line rupture, will be simulated.

(c) Loss of electrical power

Transients resulting from loss of off-site power or loss of total AC power (station blackout) will be simulated.

(3) TMI Simulation Tests

These tests are to be simulations of TMI-type accidents in W-type LPWR, and may not necessarily include a direct simulation of the March 1979 accident at the Babcock and Wilcox (B&W) designed TMI-2 reactor. The most important characteristics of the TMI-type accidents are:

(a) Slow but continued loss of reactor coolant, due to failure to isolate the break, combined with insufficient replenishment of the reactor coolant inventory by ECCS, and

(b) Degraded heat transfer on the steam generator secondaries, due to insufficient replenishment of the secondary coolant.

3.1.2 Advanced Tests

These tests are to be simulations of the performance of alternate ECCS designs, or alternate plant recovery procedures, or both, during a SBLOCA or a transient.

Alternate ECCS designs to be tested include alternate injection locations (e.g., pressure vessel lower and upper plena), enhanced ECCS pump heads and capacities, higher ECCS water temperatures, and alternate combinations of these parameters.

Plant recovery procedures to be tested include use of pressure vessel high-point vent valve, and core barrel internal valve to assist the operation of ECCS. Neither of these valves is included in domestic PWRs. Standard plant recovery techniques, e.g., primary or secondary system feed-and-bleed or bleed-and-feed, will be tested in the SBLOCA and transient test series.

3.1.3 Core Cooling Tests (Separate Effects Tests)

These tests are to be experiments on the overall system behavior of a LPWR under specific, pre-determined thermal-hydraulic conditions. Series of steady-state or relatively slow transient tests are expected. These tests will supplement separate effects tests at the TPTF, and will provide data for developing and verifying analytical models to be used in the 2V2T computer code which is being developed. Test series to be performed include:

(1) Forced (pumped) circulation core cooling tests, with circulation flow rate, reactor coolant inventory, and core power level as parameters.

(2) Natural circulation core cooling tests, with reactor coolant inventory, secondary coolant inventory, core power level, and amount of non-condensibles, etc., as parameters.

(3) Once-through mode core cooling tests, with once-through core flow due to break flow, or due to deliberate system bleed through the pressurizer PORVs, and without forced or natural circulation.

These tests will cover the range of system inventories from full capacity to partial core uncovering, and investigate the various core cooling modes, i.e., single-phase circulation, two-phase circulation, and two-phase reflux cooling. These tests will also investigate steam generator secondary side heat transfer for various secondary side mass inventories.

3.2 Test Procedure

3.2.1 Test Initial Conditions

Test initial conditions will represent the spatial distribution of fluid temperature in the reactor coolant system during full-power operation of a LPWR. With a maximum core power limited to 14% of the scaled (1/48) LPWR rated core power, core flow rate during the initial steady state will be also 14% of the scaled LPWR core flow rate. The reactor coolant pumps and loop throttle valves will be used to establish the required core flow.

The primary-to-secondary heat transfer rate will be also limited to 14% of the scaled LPWR heat transfer rate, i.e., 14% of the scaled LPWR rated core power, during the initial steady state. Limited primary-to-secondary heat transfer could be obtained, with steam generator heat transfer surface area scaled correctly, by having a lower than prototypical steam generator secondary level[5], or having a smaller than prototypical temperature difference between the primary and secondary system, i.e., having a higher than prototypical secondary temperature[6]. The latter method resulted in better simulation of the reference PWR system behavior than the former method in pretest calculations with the RELAP5/MOD1 computer code[4].

3.2.2 Operation during Transient

Each test will be initiated by either initiating a simulated pipe rupture, or initiating a certain simulated event, and will proceed following a programmed component operational sequence. The component operational sequence shall simulate the automatic trips of the reference PWR, core power decay after scram, pump coastdown characteristics, standard, non-standard and inadvertent operator actions, and component failures.

Attempts will be made to develop a component operational sequence to mitigate the effects of atypical initial conditions with respect to, e.g., core flow rate and primary-to-secondary heat transfer rate, on the later portion of tests.

4. Design Philosophy

The philosophy and criteria used to design the LSTF are described in the following paragraphs.

4.1 Fundamental Design Requirements

The LSTF is an experimental facility designed to model a full height primary system of the reference PWR. The four primary loops of the reference PWR are represented by two equal-volume loops. The overall facility scaling factor is 1/48. The overall scaling factor was used as follows:

(1) Elevations: preserved, i.e., one to one correspondence with the reference PWR. Because the LSTF hot and cold leg inner diameters (IDs) are smaller than those of the reference PWR, only the top of the primary hot and could legs (IDs) were set equal to those of the reference PWR.

(2) Volumes: scaled by the facility scaling factor 1/48.

(3) FLow area: scaled by 1/48 in the pressure vessel and 1/24 in the steam generators. However, the hot and cold legs were scaled to conserve the ratio of the length to the square root of pipe diameter[7], i.e., $L/\sqrt{D}$ for the reference PWR. Such an approach was taken to better simulate the flow regime transitions in the primary loops.

(4) Core power: scaled by 1/48 at core powers equal to or less than 14% of the scaled reference PWR rated power. The LSTF rated and steady-state power is 10 MWt, i.e., 14% of the rated reference PWR core power scaled by 1.48.

(5) Fuel assembly: dimensions, i.e., fuel rod diameter, pitch and length, guide thimble diameter pitch and length, and ratio of number of fuel rods to number of guide thimbles, designed to be the same as the 17 x 17 fuel assembly of the reference PWR to preserve the heat transfer characteristics of the core. The total number of rods was scaled by 1/48 and is 1064 for heated and 104 for unheated rods.

(6) Design pressures: roughly the same as the reference PWR.

(7) Fluid flow differential pressures (ΔPs): designed to be equal to the reference PWR for scaled flow rates.

(8) Flow capacities: scaled by the overall scaling factor where practicable.

4.2 Primary Coolant System

The 10 MWt LSTF power capability set a limit on the steady-state flow at 14% of the scaled reference PWR flow to obtain an initial primary temperature distribution equal to that of the reference PWR. Although restricted by the maximum rated power capability of 10 MWt, the primary coolant system can simulate reference PWR thermal-hydraulic states over most of a SBLOCA or operational transient following scram.

4.2.1 Pressure Vessel

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4.2.1 Pressure Vessel

(1) The vessel accommodates a core of 1064 electrically heated and 104 unheated rods representing full length 17 x 17 fuel bundles.

(2) Wall thickness has a pressure rating of 17.26 MPa.

(3) Two hot leg nozzles are present. The elevation of the top of the hot leg ID is the same as the reference PWR.

(4) Two cold leg nozzles are present. The elevation of the cold leg centerline is the same as those of the hot legs.

4.2.2 Vessel Internals

(1) Core barrel

(a) The simulated core barrel is full length.

(b) Core barrel vent valves can be simulated to investigate the ECCS injection scheme used in Babcock & Wilcox type plants. External piping simulates the vent valves.

(2) Lower plenum

The lower plenum design maintains, to the extent practicable, the volume and flow resistances typical of the reference PWR.

(3) Downcomer

(a) The simulated downcomer is full length.

(b) The downcomer flow area was scaled from the reference PWR's downcomer flow area including the bypass flow area inside the core barrel.

(c) The bypass leakage between the top of the downcomer and the upper plenum at the periphery of the hot leg nozzles can be simulated.

(4) Upper plenum

(a) The upper plenum includes scaled internal structures typical of the reference PWR.

(b) The upper plenum is full height. The elevations of the upper core support plate and cop plate of the internals assembly relative to the top of the hot legs are preserved.

4.2.3 Core

(1) The core geometry is typical of the reference PWR 17x17 fuel bundles including unheated rods. Fuel rods are simulated with electrically heated rods.

(2) Flow paths at the core upper end are geometrically similar to the reference PWR end boxes and upper core support plate. The remainder of the core flow path geometry simulates the reference PWR fuel

bundle geometry where practicable.

(3) The core can provide axial power profiles typical of the reference PWR. Radial profiles are adjustable as a test parameter.

(4) The core power transient is controllable to simulate the full spectrum of fuel rod power decay variations in the reference PWR.

4.2.4 Loop Piping

(1) Two identical reactor coolant loops, each representating two loops of the reference PWR, and provided.

(2) The hot leg, cold leg and pump suction IDs are 207 mm.

(3) Piping wall thickness is based on the pressure rating.

4.2.5 Reactor Coolant Pumps

(1) Reactor coolant pumps geometrically similar to the reference PWR pumps are provided. However, the rated LSTF pump flow is 20% of the scaled rated flow.

(2) The pump coast-down characteristics are controllable over a wide range including that of the reference PWR reactor coolant pumps.

(3) Flow control valves are provided upstream of the reactor coolant pumps to allow considerable variation in the primary loop flow during an experimental transient.

4.2.6 pressurizer

(1) The pressurizer was scaled in accordance with the facility volume scaling requirements. Height to diameter (H/D) ratio is conserved.

(2) The pressurizer is equipped with heaters and spray for control of temperature and pressure typical of the reference PWR. Heater capacity was designed to provide a power-to-volume ratio typical of reference PWR. Spray capacity is 4.3 m^3/h in accordance with the scaling requirements.

(3) The pressurizer surge line is typical of the reference PWR, i.e. the surge line is connected to the vessel hot leg.
Provisions were also made to connect the surge line to the reactor vessel upper head.

(4) The normal pressurizer spray line flow path is routed from the reactor coolant pump discharge portion of the cold leg, as it is in the reference PWR.

(5) Vent lines are provided between the reactor vessel head and the

pressurizer vapor region to permit testing alternate means of primary system control.

(6) The pressurizer is equipped with primary safety and relief valves at the vapor region in a manner typical of the reference PWR.

4.2.7 Safety and Relief Valves

(1) The reference PWR safety and relief valves are simulated. The pressure reliefing capacity of the safety and relief valves can be either increased or decreased to simulate the failure of single or multiple valves.

(2) Nominal opening and closing setpoint pressures are typical of the reference PWR. Specifically, nominal opening setpoints are 17.26 MPa and 16.18 MPa for safety and relief simulation valves respectively. Corresponding nominal closing setpoints are 16.1 MPa and 16.09 MPa. These setpoints can be changed as test parameters.

(3) Valve elevations, orientations and piping connection locations on the pressurizer are typical of the reference PWR. The locations of the safety and/or relief valves can be changed to other portions of the primary system, e.g., the reactor vessel upper head.

4.2.8 Facility Water Chemistry Control

The facility water chemistry will be monitored and varied to approximate an operational reactor system.

4.3 Emergency Core Cooling and Residual Heat Removal Systems

The emergency core cooling systems (ECCS) and the residual heat removal (RHR) systems have operational envelopes which include scaled operation of the reference PWR plus additional capacity to enable extended parametric experiments to be conducted.

4.3.1 High Pressure Injection System

(1) A high pressure injection system(HPIS) is provided. The system is capable of simulating the scaled flow rate as a function of system pressure typical of the reference PWR. The flow rate is controllable to simulate degraded and enhanced ECCS.

(2) The HPIS has setpoints typical of the reference PWR. In addition,the HPIS setpoints are changeable.

(3) Injection points for the HPIS system include:

(a) Both cold legs

(b) Both hot legs
(c) Lower plenum
(d) Upper plenum
(e) Both cross-over legs

The design of the HPIS permits different combinations of injection points as well as switching between injection points during a test.

(4) The HPIS design permits testing of alternate HPIS designs.

4.3.2 Low Pressure Injection System

(1) A low pressure injection system (LPIS) is provided. The system is capable of simulating scaled flow rate as a function of system pressure typical of the reference PWR. Flow rates are controllable to simulate degraded ECCS conditions.

(2) The LPIS has setpoints typical of the reference PWR. In addition, the LPIS setpoints are changeable with respect to the monitored variables.

(3) Injection points for the LPIS include:
(a) Both cold legs
(b) Both hot legs
(c) Lower plenum
(d) Upper plenum

4.3.3 Accumulator Injection System

(1) An accumulator injection system is provided. Two accumulator tanks are included. Each tank can be valved to provide ECCS to both legs. The system is capable of simulating scaled water flow typical of the reference plant accumulator systems. Flow rates are controllable to simulate degraded and enhanced ECCS conditions.

(2) Accumulator piping and check valve arrangement are typical of the reference PWR.

(3) Injection points for the accumulators include:
(a) Both cold legs
(b) Both hot legs
(c) Lower plenum
(d) Upper plenum

(4) The injection of non-condensibles (accumulator ullage gas) into the reactor primary system following the accumulator tank blowdown can be simulated using a separate gas injection system.

(5) The temperature of the accumulators and piping can be controlled over their operating range. In addition, one of the accumulator tanks has the capability to inject inventory heated to 470 K.

4.3.4 Residual Heat Removal Systems (RHR)

(1) A RHR system is provided capable of simulating the scaled RHR head-flow characteristics of the reference PWR. In addition, provisions are made to permit variation of RHR on/off setpoints with respect to the magnitudes of the monitored system properties.
(2) The RHR inlet and outlet are connected to the reactor coolant system at locations typical of the reference PWR.
(3) The RHR design permits testing alternate RHR designs including high pressure, high temperature fluid capable of removing 2% core decay heat at operating temperature and corresponding saturation pressure.

4.4 Secondary Coolant System

The secondary system was designed to simulate the reference PWR primary-to-secondary interactions over most of a SBLOCA or operational transient following scram. The rated 10 MWt LSTF power capability will set the steady-state flow requirements at 14% of the scaled reference PWR flow.

4.4.1 Steam Generator Secondary Side

The steam generators were designed in accordance with the facility scaling requirements.

4.4.2 Steam System

(1) Main steam
  (a) The main steam system transient steam demand can be simulated, including the demand from the turbine bypass and atmospheric relief valves to the extent practicable. Flow rates are to be scaled in accordance with the facility scaling factors.
  (b) Main steam line rupture accidents can be modeled.
(2) Safety and relief valves
  (a) The rated flows for the main steam safety and relief valves were scaled from typical rated flows for the reference PWR.
  (b) The opening and closing setpoints for the safety and relief valves are typical of the reference PWR. These setpoints can be varied.

In addition, stuck open/failed closed valves can be simulated.

4.4.3 Main Feedwater System

(1) Transient feedwater flow to the steam generators typical of the reference PWR can be simulated in accordance with the scaling factor of each steam generator (1/24).

(2) The feedwater temperature can be varied over a range typical for the reference PWR.

(3) main feedline rupture transients can be simulated.

(4) The LStF main feedwater system rated conditions were designed to provide 14% of the scaled reference PWR rated flow. Such capability is provided using the LSTF jet condenser.

4.4.4 Auxiliary Feedwater System

(1) The scaled auxiliary/emergency feedwater flow to the steam generators, typical of the reference PWR can be simulated.

(2) The auxiliary feedwater system operating envelope is capable of typical or enhanced reference PWR operation.

(3) Auxiliary feedwater temperatures are controllable over the range available in the reference PWR.

4.5 Simulated Containment System

A simulated containment system is available to collect and contain the effluent from simulated breaks. The simulated containment system was designed to ensure that the break flow will always be choked.

4.6 Process Instrumentation and Control Systems

The process instrumentation and control system includes logic which considers four separate experimental needs: (1) The steady-state and transient events are directed by the sequence control program, which is altered based on the requirements of each experiment; (2) the interlock program incorporates special control features of the reference PWR for facility equipment trip control; (3) the component control program contains logic specific to key individual component control, e.g. core power decay, pump coastdown; and (4) the facility protection control system governs the equipment safety interlocks, e.g., core overtemperature protection.

The above control systems include the following component specific design requirements.

4.6.1 Heater Power Supply Controls

(1) The heater rod power supply can be programed to simulate the scaled core power decay of the reference PWR.

(2) The heater power supply output can be controlled so that a variety of power decay curves can be simulated.

(3) The heater power supply is controlled to protect the heater rod from overheating. It is tentatively controlled never to exceed 873 K.

4.6.2 Valve Controls

(1) The valves can be controlled to simulate standard and inadvertent valve actuations postulated for the reference PWR.

(2) The valves can be controlled with predetermined setpoints typical of the reference PWR based on process and/or experimental instrumentation.

(3) Valves to be controlled include:

(a) Simulated break line valve.

(b) Simulated feedwater block and control valves.

(c) Simulated main steam isolation, turbine throttle and turbine bypass valves.

(d) Simulated main steam safety and relief valves.

(e) Simulated pressurizer safety and relief valves.

(f) ECCS valves.

(g) Primary loop valves.

(h) Pressure vessel and core barrel vent valves.

4.6.3 Flow Controls

(1) The facility mass flow can be controlled to simulate the reference PWR mass flow control within the LSTF operational envelope.

(2) The mass flow controls are programmable. Predetermined flow rates will be determined as a function of time or facility parameters measured by either process or experimental instrumentation.

(3) Systems for which flow control are required include:

(a) Reactor coolant system, e.g. pump coastdown.

(b) Emergency core cooling system.

(c) RHR system.

(d) Feedwater system.

(e) Main steam system.

(f) Non-condensibles injection system.

4.6.4 Trip Simulations

(1) Controls are provided to simulate the trips, interlocks, and other automatic functions of the reference PWR engineered safeguards systems.

(2) Trips and interlocks included in the system are:

(a) Reactor scram trips (for heater rods).

(b) Pressurizer heater and spray controls and trips.

(c) Reactor coolant pump trips.

(d) Steam generator isolation trips.

(e) ECCS initiation trips.

(f) Turbine and turbine bypass trips.

(g) Main and auxiliary feedwater system trips.

4.6.5 Interface with Experimental Instrument System

(1) The experimental instrumentation system will provide data as required to control the control systems to conduct the desired experiments.

(2) The automatic control systems will provide and event chronology to the experimental instrument data acquisition system.

4.6.6 Control Room

A control room is provided which contains the process and experimental instrumentation displays, alarms, controls, etc., required to conduct each experiment and to acquire and record the test data.

4.7 System Breaks

System breaks in the reference PWR are simulated in the LSTF by using a break unit (attached to the appropriate component, and including an orifice plate and a break valve). The maximum break size was designed to be 10% of the 1/48-scaled cold leg flow area of the reference PWR. The 10% maximum area was chosen to provide sufficient break size margin such that a full spectrum of small breaks can be tested.

4.7.1 System Break Locations

(1) Cold leg - oriented at 90 degree increments in the plane normal to the pipe axis (hereafter labeled : oriented at 90' increments)

(2) Crossover leg (loop seal)

(3) Hot leg - oriented at 90 degree increments

(4) Pressurizer power operated relief valve and pressurizer vessel wall.

(5) Steam generator U-tube

(6) Main Steam line

(7) Main feedwater line

(8) Pressure vessel wall : lower plenum, upper head

4.7.2 System Break Valve

The valves were designed to open in less than 0.1 s.

5. Description of Test Apparatus

5.1 General

5.1.1 General Functions and Systems

The LSTF is a scaled model of a PWR with an electrically heated core. The facility design objective is to model the thermal-hydraulic phenomena which would take place in a PWR during small break LOCAS and transients. The coolant volumes and flow areas are scaled with a ratio of 1/48. The height and elevation of each component were made to be the same as those of the reference PWR as practicable as possible. The components used in the LSTF are similar in design to those of the reference PWR. Because of scaling and component design as such, the LSTF experiments are expected to closely model LPWR behavior during small break LOCAs and transients.

The flow diagram of the LSTF is shown in Fig. 5.1.1. The general facility view is presented in Fig. 5.1.2. The major design characteristics are compared with those of the reference PWR in Table 5.1.1. Fig. 5.1.3 gives comparision of the LSTF and reference PWR system configurations.

Nineteen break nozzles are provided in the LSTF. One (or two) break locations(s) will be selected out of these depending on the test objectives. Several ECC injection nozzles typical and atypical of the reference PWR are also provided. The injection locations can be changed as a test parameter.

The second simulated fuel assembly was first used in a 10% cold leg test, Run SB-CL-20, conducted on December 15, 1988.

The main difference between the first and second assembly lies in the number of rods: 1008 for the second assembly vs. 1064 for the first assembly. The number of rods was reduced as compared to the first assembly to make place for the pressure lead pipes which were installed in the core peripheval region to measure the core differential pressures. However, the total core power and the core flow area are the same as for the first assembly. Also, the rod diameter, lattice pitch, heated length and configuration and location of spacers, are unchanged between the first and the second fuel assemblies. The measurements locations in the core are basically consistent with that for the first fuel assembly.

Sections 5.2 through 5.6 describe the following test facility subsystems:

5.2 Primary Coolant System
5.3 Secondary Coolant System
5.4 Blowdown and Pressure Suppresion System
5.5 Emergency Core Cooling System
5.6 Power Supply and Other Supplement Systems

These descriptions are provided to help interpretation and analyses of LSTF experimental data.

5.1.2 Arrangement

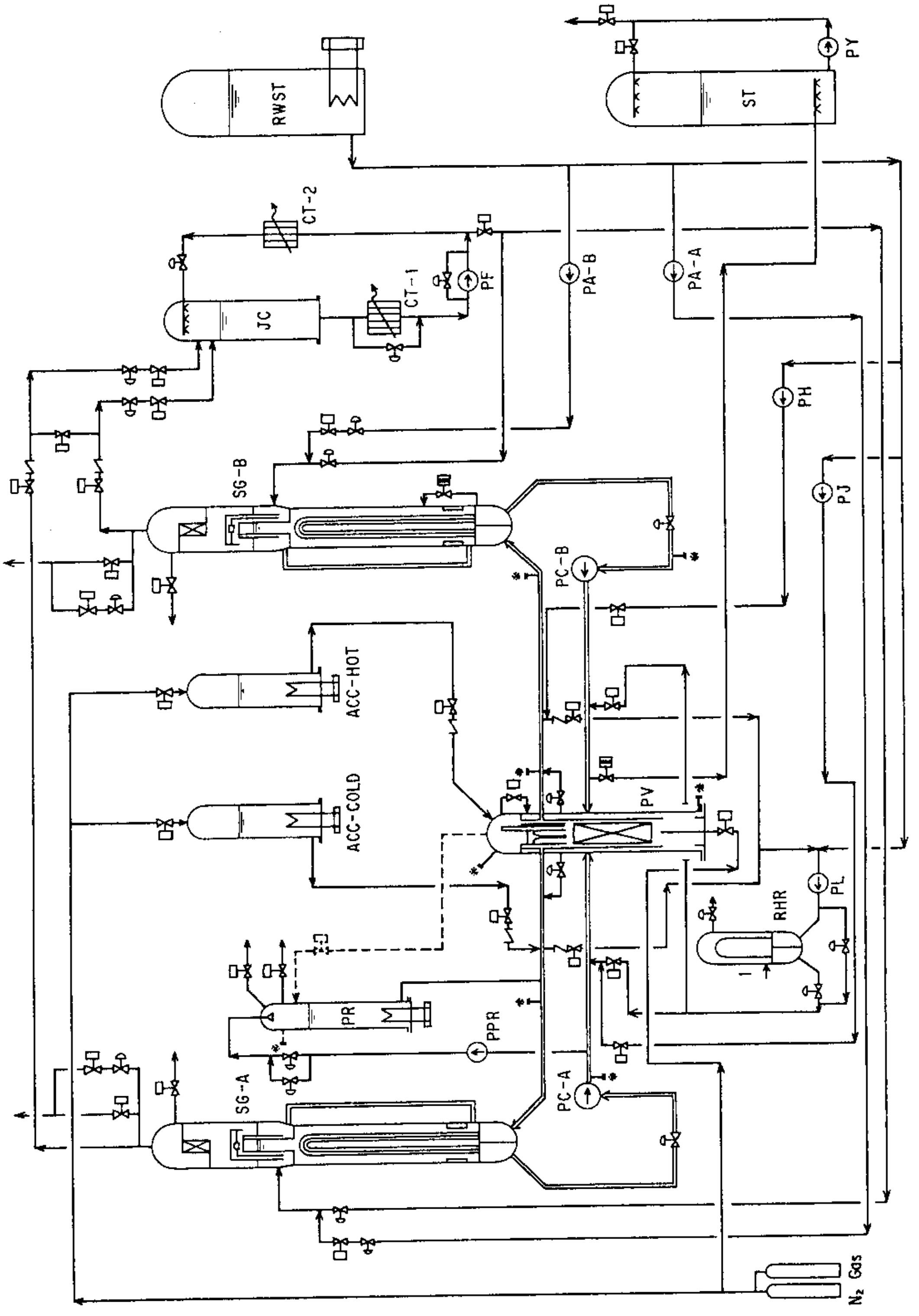
The LSTF is located at the Tokai Research Establishment of the Japan Atomic Energy Research Institute.

The test facility building is shown in Fig. 5.1.4 and the general test facility arrangement inside the building is shown in Fig. 5.1.5.

The building has a facility area, an experiment control room and an electric power control room.

Table 5.1.1 Major Design Characteristics of LSTF and PWR

		LSTF	PWR	PWR/LSTF
Pressure	(MPa)	16	16	1
Temperature	(K)	598	598	1
No. of fuel rods		1008	50952	50.52
Core height	(m)	3.66	3.66	1
Fluid volume V	(m^3)	7.83	347	44.3
Core power P	(MW)	10	3423(t)	342
P/V	(MW/m^3)	1.28	9.9	7.7
Core inlet flow	(ton/s)	0.0488	16.7	342
Downcomer gap	(m)	0.053	0.260	4.91
Hot leg D	(m)	0.207	0.737	3.56
L	(m)	3.69	6.99	1.89
$L/\sqrt{D}$	($m^{1/2}$)	8.15	8.15	1.0
$\frac{\pi}{4}D^2L$	(m^3)	0.124	2.98	24.0
No. of loops		2	4	2
No. of tubes in steam generator		141	3382	24.0
Length of steam generator tube (average)	(m)	20.2	20.2	1.0



※ Break Point

NOTE ECCS can be also connected to hot legs and upper and lower plena of pressure vessel.

Fig. 5.1.1 Flow Diagram of LSTF

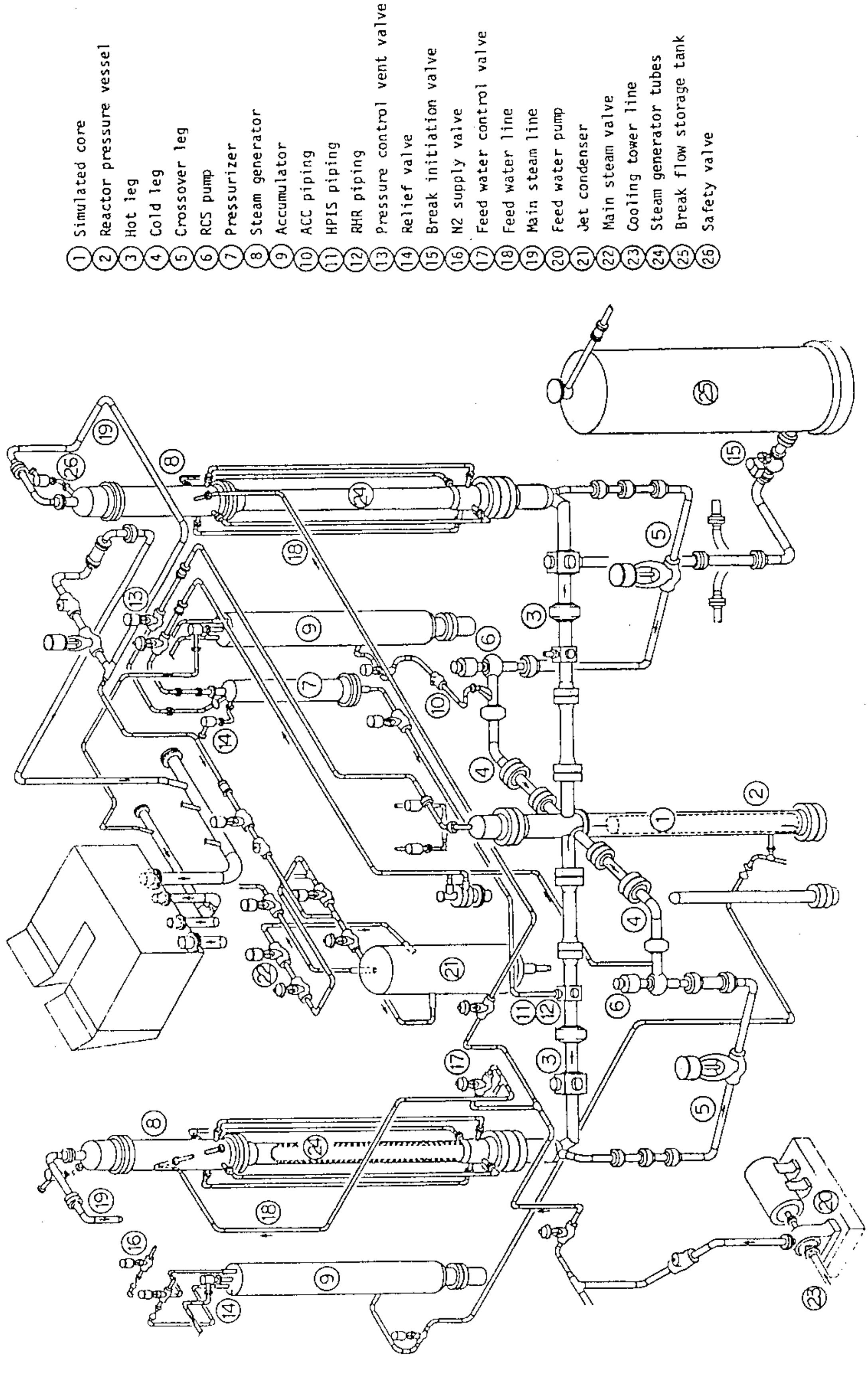


Fig. 5.1.2　General View of LSTF

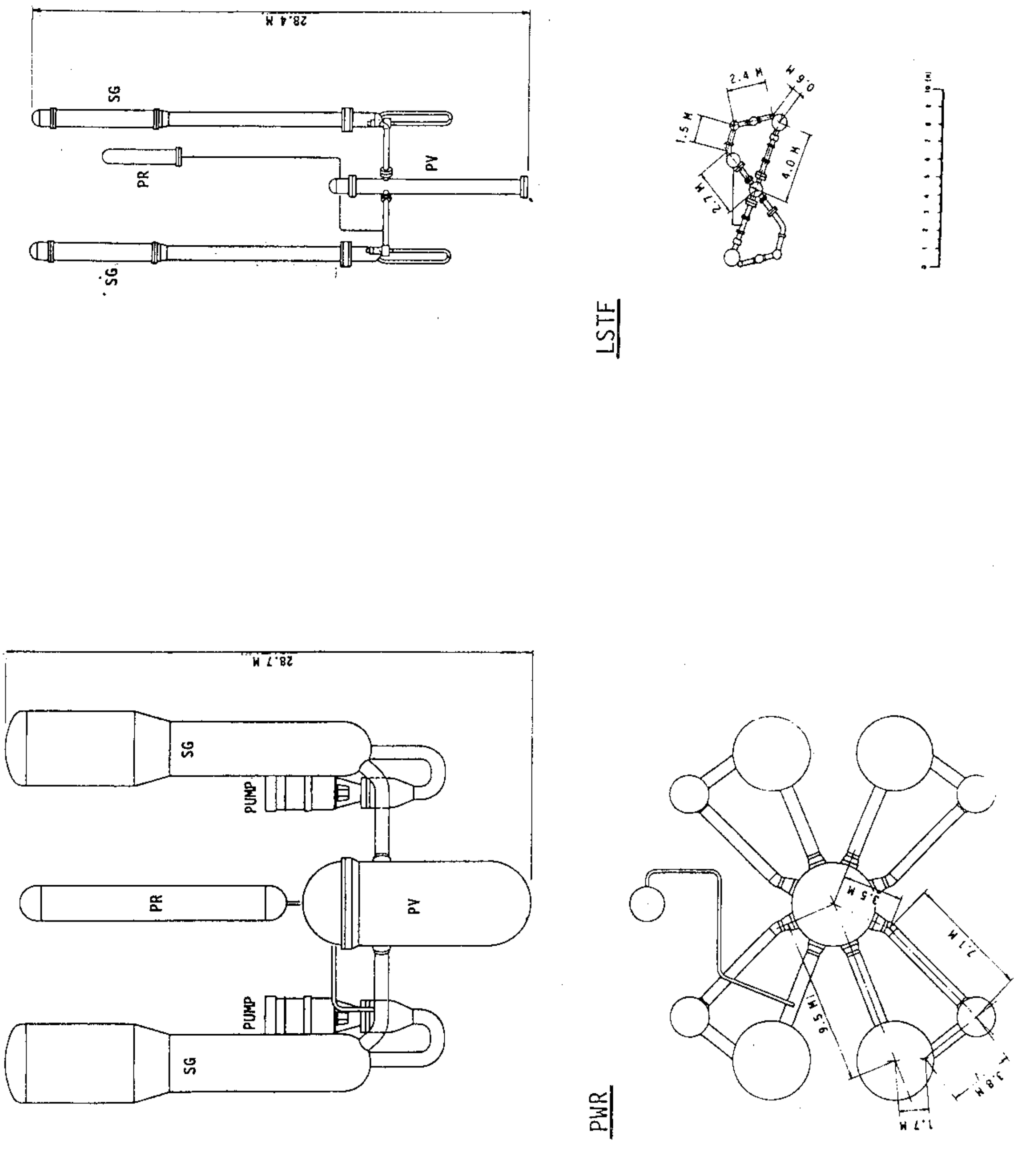


Fig. 5.1.3 Comparison of LSTF and PWR

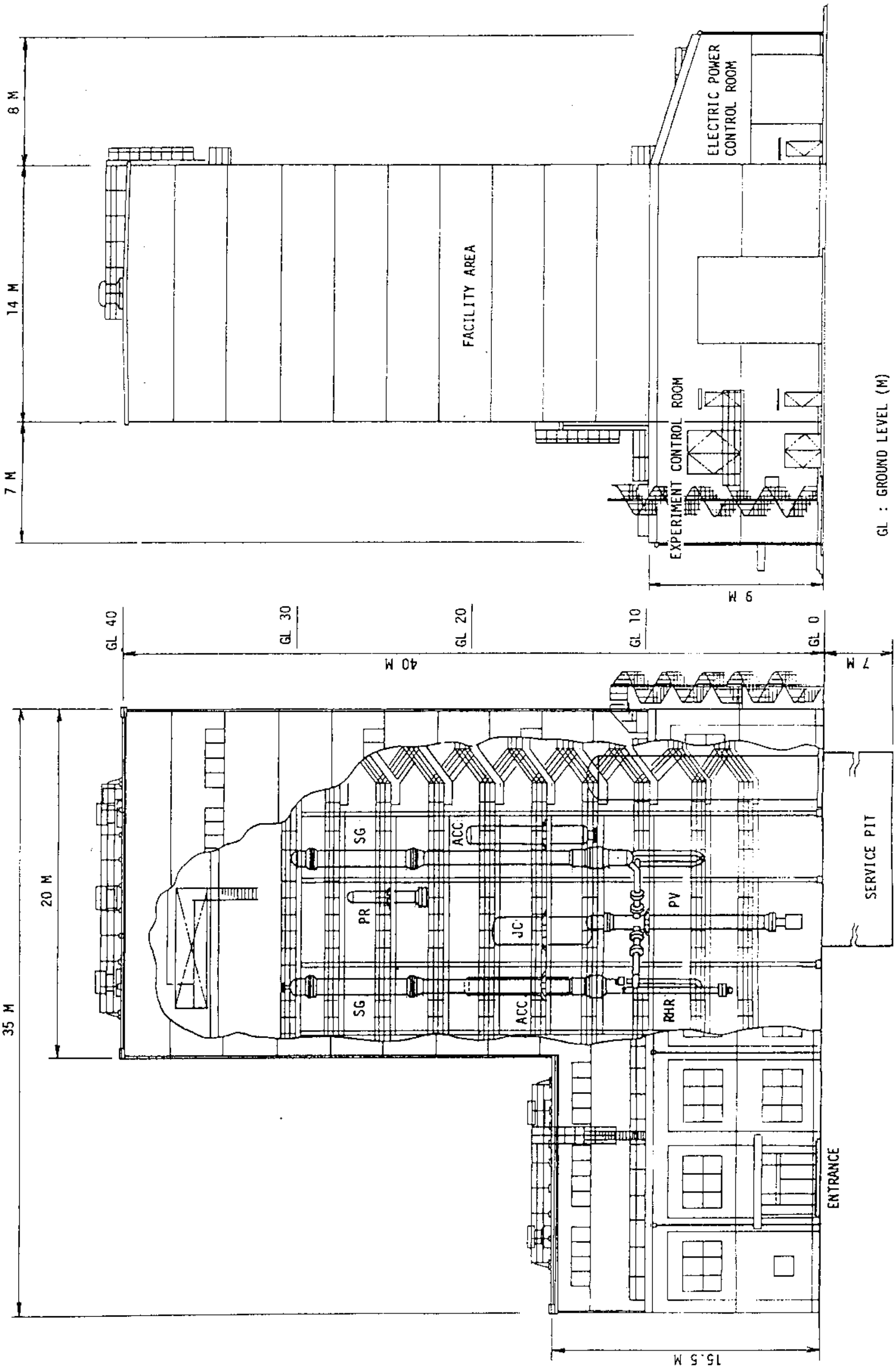


Fig. 5.1.4 LSTF Facility Building

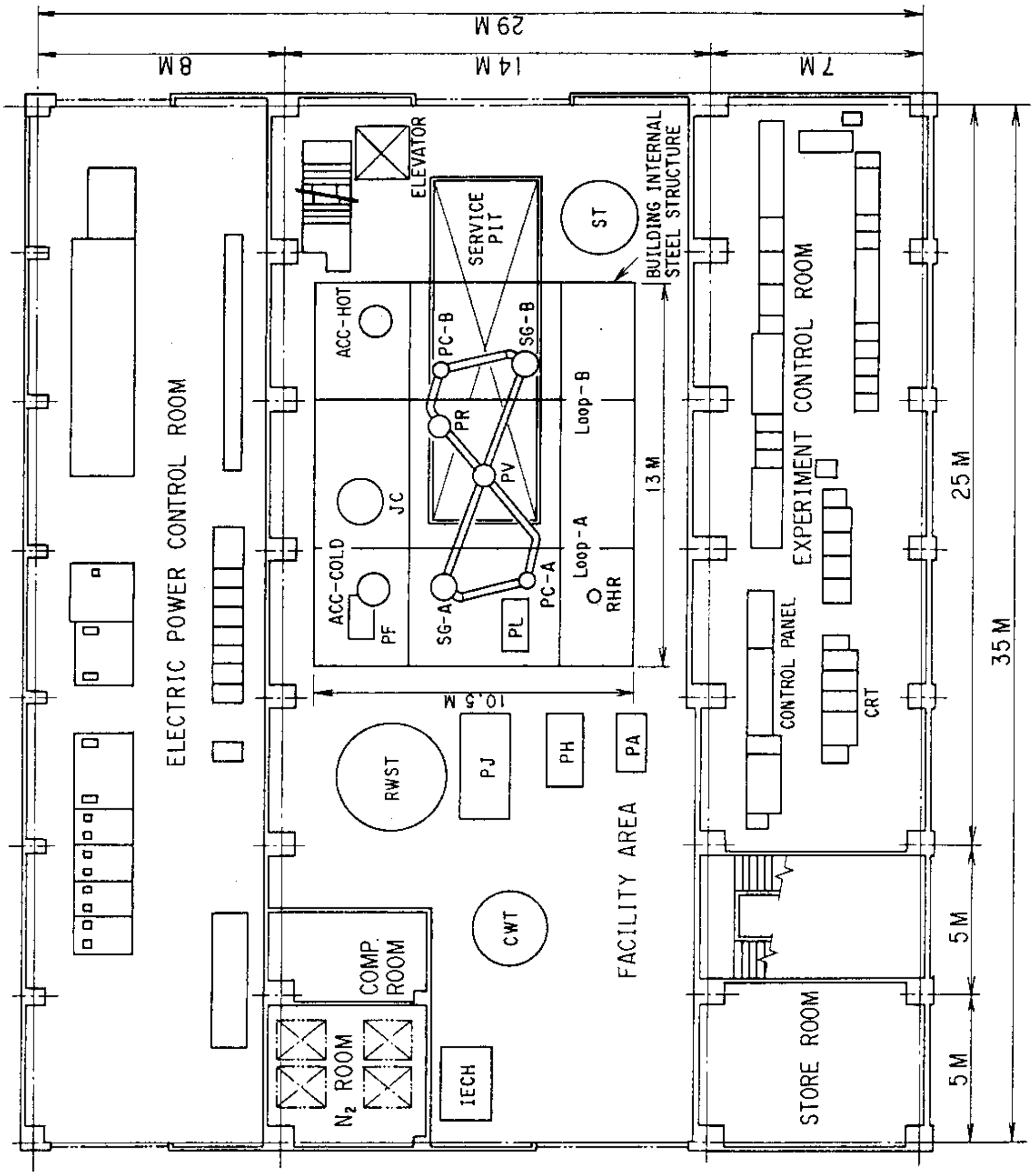


Fig. 5.1.5 General Arrangement (A)

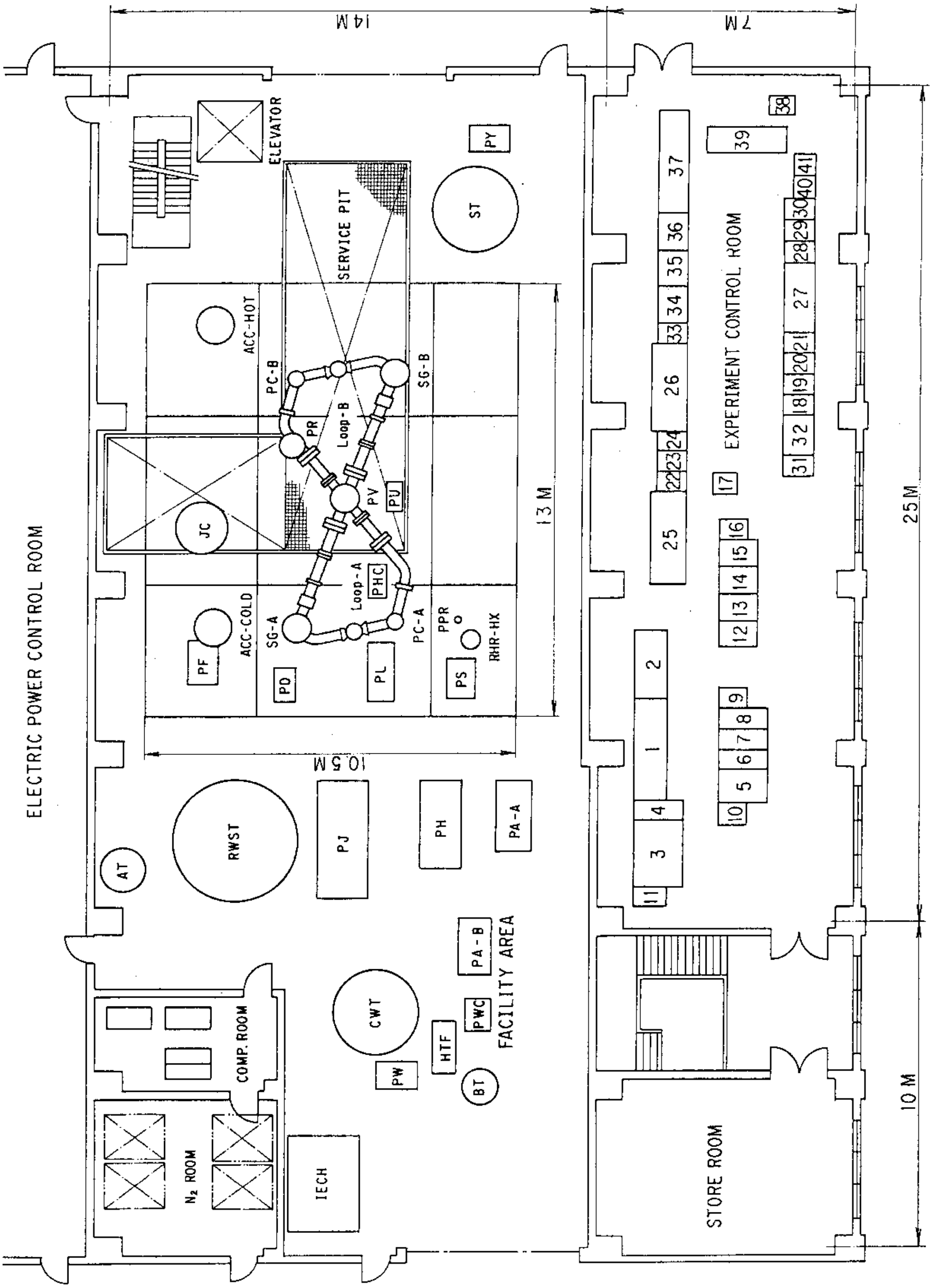
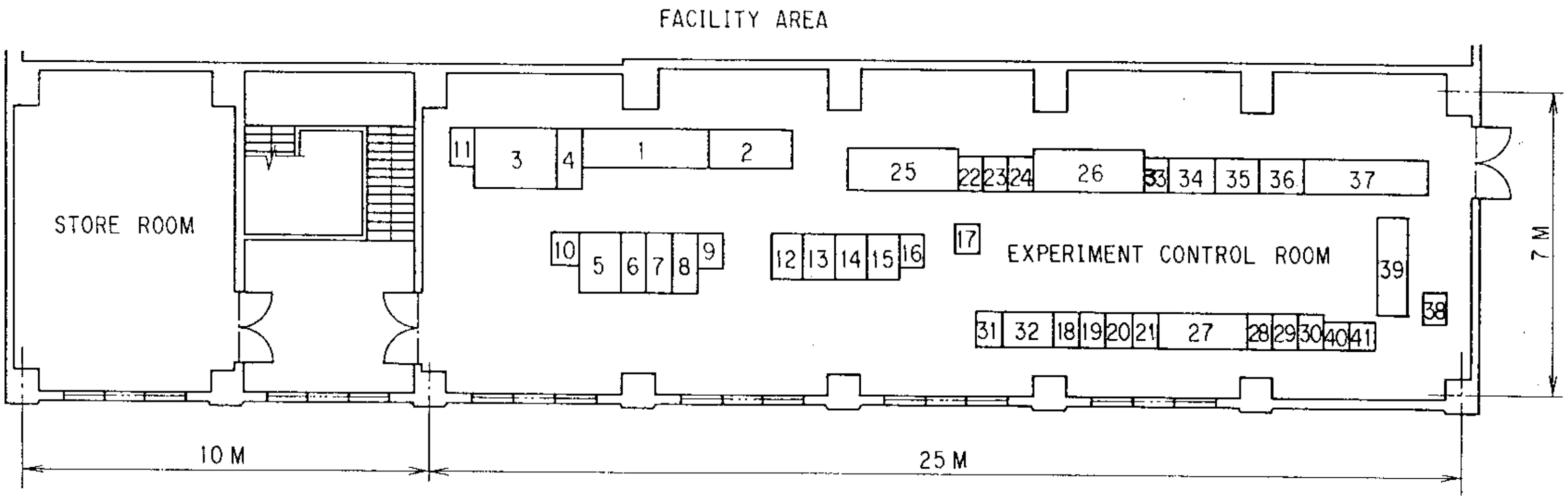


Fig. 5.1.5 General Arrangement (B)



1 OPERATIONAL PANEL
2 ELECTRICAL OPERATIONAL PANEL
3 CONTROL PANEL - 1
4 CONTROL PANEL - 2
5 OPERATORS STATION (31)
6 OPERATORS CONSOLE (30)
7 〃 〃 (29)
8 〃 〃 (28)
9 SERIAL PRINTER
10 HERD COPY UNIT
11 SERIAL PRINTER
12 SERIAL PRINTER (FACOM)
13 SYSTEM CONSOLE (FACOM)
14 SYSTEM CONSOLE
15 GRAPHIC TERMINAL
16 HERD COPY
17 SERIAL PRINTER
18 TERMINAL BOARD CUBICLE
19 FIELD CONTROL STATION - 1
20 〃 〃 〃 - 2
21 〃 〃 〃 - 3
22 CENTRAL COMPUTER
23 MAGNETIC DISK UNIT
24 〃 〃 〃
25 PROCESS I/O UNIT - 1
26 〃 〃 〃 - 2
27 RELAY UNIT
28 YEWCOM TERMINAL BOARD
29 CONVERTER - 1
30 〃 - 3
31 〃 - 7
32 DISTRIBUTION BOARD
33 CONVERTER - 6
34 〃 - 4
35 〃 - 5
36 〃 - 8
37 FACOM S-3300
38 DISK UNIT (FACOM)
39 VIDEO PROVE UNIT
40 CONTROL PANEL (PITOR TUBE)
41 CONVERTER - 9

Fig. 5.1.5 General Arrangement (C)

5.2 Primary Coolant System

The primary coolant system is composed of the pressure vessel containing an electrically heated core, primary loop piping, coolant pumps and a pressurizer. Materials used for major components in the primary coolant system are listed in Table 5.2.1, and are further described in Appendix A.2. Each component is described in detail below.

5.2.1 Pressure Vessel and Internal Structures

(1) Pressure Vessel Assembly

The pressure vessel houses a full-length core consisting of 1008 electrically heated rods and 96 unheated rods. The vessel is made of stainless steel (SUS316L) clad with carbon steel (SB49) and rated at a pressure of 17.95 MPa and temperature of 630.2 K. It is 11.0 m tall cylindrical vessel with an inside diameter of 0.64 m and wall thickness of 61 mm including the clad thickness. The major characteristics of the pressure vessel are summarized in Table 5.2.2. The LSTF pressure vessel and the reactor vessel of the reference PWR are compared graphically in Fig. 5.2.1.

As shown in Fig. 5.2.2, the vessel internal volume is divided into the core, annular downcomer, lower plenum and upper plenum regions. The lengths of the core and downcomer as well as the elevations (EL) of various internal components relative to the bottom of the heated zone are conserved full scale to the extent practicably possible. The relative elevations of the pressure vessel components in the LSTF and PWR are compared in Table 5.2.3.

The major nozzles on the pressure vessel are shown in Fig. 5.2.3 and listed in Table 5.2.4. The nozzles for the hot and cold leg pipings are located at the same elevation. The two primary coolant loops are attached to the pressure vessel at these locations.

In addition to the hot and cold leg nozzles, the pressure vessel has nozzles for:

a) ECCS injection (upper plenum and lower plenum injection),
b) lower plenum and upper head break simulation,
c) nitrogen gas injection,
d) vent line connected to the top of the pressurizer,
e) external piping to simulate core barrel vent valves,
f) code safety valve,

g) autobleed system for volume control,
h) hot leg leakage simulation,
i) reflux flowmeter,
j) alternate pressurizer surge line connection,
k) instruments.

The Nitrogen gas injection nozzles are provided for tests on the effect of non-condensible gas generated in the core on the system behavior during a small-break LOCA. Nitrogen gas is injected into the upper head directly through a nozzle (N5) and into the lower plenum through four tubes of 6.22 mm ID. The injection points in the lower plenum are located at a height of EL-1.01 m, and below the tie rods whose positions in the core bundle are B1466, B1626, and B1822. (refer to Fig. 6.10 for bundle designation) The vent line between the pressure vessel upper head and the pressurizer is provided to vent the non-condensibles accumulating in the upper head of the pressure vessel.

The core barrel vent valves in the B&W reactors are provided to reduce the upper plenum back pressure and enhance coolant penetration into the core via downcomer during ECC injection. In the LSTF, nozzles were attached to the downcomer and upper plenum and connected to an external piping to simulate the function of these core barrel vent valve.

The autobleed nozzle is used to control the primary coolant volume by bleeding, together with makeup with use of a charging pump. The hot leg leakage nozzles are provided to simulate the leak flow between the hot leg and downcomer. The reflux flow meter nozzle is provided for measurement of the liquid condensate flow from the steam generator back to hot leg during the reflux condensation cooling mode. The pressurizer surge line nozzle attached to the pressure vessel upper head is provided for tests on the effect of alternate surgeline location on the system behavior during LOCA and operational transients.

Additionally, there are many small diameter nozzles for installation of various instruments for measurement of vessel pressure, structural and fluid temperatures, downcomer flow rate and liquid level.

In-core instruments for measurements of fuel rod surface and fluid temperatures, liquid level and power lead lines are routed through the pressure vessel end plate.

The coolant flow paths inside the vessel under normal and accident or transient conditions are shown in Fig. 5.2.4.

(2) Pressure Vessel Internals

The upper plenum structure and internals are shown in Figs. 5.2.5 through 5.2.14 and their design characteristics summarized in Table 5.2.5. Most of the components are made of stainless steel (SUS304). The upper core support plate and upper core plate are located the same alleviations as in the reference PWR. The upper core support plate is attached to the support barrel which is fixed to the pressure vessel shell head. The details of the downcomer-upper head spray nozzles are shown in Fig. 5.2.6. A cross-sectional view indicating the downcomer-upper head spray nozzle locations as well as control rod guide tubes is shown in Fig. 5.2.7. The upper core plate (Fig. 5.2.10) is also attached to the bottom of the top section of the core barrel and hung from the upper core support plate being supported by core support columns (Fig. 5.2.13). An endbox (Fig. 5.2.11) is located at the top of the core, just below the core plate as shown in Fig. 5.2.12. Attached to both the core support plate and upper core plate are the control rod guide tube simulators (Fig. 5.2.14).

The core barrel consists of three separate barrels stacked up in series. The middle and bottom sections of the core barrel are connected by a bellows-type joint to allow thermal expansion in the mid-section as shown in Fig. 5.2.12.

5.2.2 Core and Lower Plenum

The major characteristics of the core are summarized in Table 5.2.6, and the cross sections are shown in Fig. 5.2.15 through 5.2.17. The length of the heated zone, fuel rod diameter and pitch, power peaking factor and number of spacers are typical of a PWR. The core volume and the number of fuel rods are scaled at ratios of 1/43 and 1/50, respectively.

The bottom section of the core barrel has openings which form the flow channel between the downcomer and the lower plenum. The top elevation of the openings relative to the bottom of the heated zone is the same as in a PWR.

As shown in Fig. 5.2.17, the core consists of 16 square 7 x 7 bundles and 8 semi-crescent shaped bundles. The core power axial profile is chopped-cosine with a peaking factor of 1.495 (Fig. 5.1.18). As summarized in Table 5.2.7, eight bundles contain high power-density heater rods (1.4 kW), and the remaining bundles contain low power-density heater rods (0.97 kW). Each bundle contains heated fuel rods (Fig. 5.2.19) of both non-instrumented and instrumented types. Boron nitride (BN) is used as an electric insulator in the heater rod for a upper region above 1.221 m. For the rest, the magnesium oxide (MgO) is used. BN is chemically more stable than MgO under high temperature condition. The heater rods are connected to a 3-phase, 400 V AC power supply system.

The core instrumentation consists of heater rod cladding and fluid thermocouples, conduction probes attached to heating and non-heating instrumented rods and differential pressure probes as shown in Figs. 5.2.17 through 5.2.21. The vertical differential pressure distribution along the core is measured for the second assembly, whereas this measurement was not available for the first assembly.

The core rod bundles contain tie rods and dummy (non-heating) rods. The dummy rods were installed to conserve the coolant flow area to 1/48 of that of the reference PWR to the extent practicable.

The core grid located at the bottom of the heated zone is shown in Fig. 5.2.22. The spacers in the lower plenum and at the top and bottom of the core do not have mixing vanes as shown in Fig. 5.2.23 through 5.2.25 in contrast with those equipped with mixing vanes located in the middle of the core as shown in Figs. 5.2.26 and 5.2.27.

5.2.3 Pressurizer

The pressurizer's function is to control the primary loop pressure and to accommodate any changes in the coolant volume during normal and abnormal plant conditions.

The LSTF pressurizer is shown in Fig. 5.2.28. It consists of a 4.19 m tall cylindrical vessel, immersion-type electrical heaters and nozzles used to connect the surge line, pressure vessel vent line, and safety and pressure relief valve lines. Major characteristics are summarized in Table 5.2.8.

The LSTF pressurizer is scaled to have 1/48 of the volume and the same height-to-diameter ratio as the pressurizer of a PWR. The normal coolant volume is also scaled at 1/48, while the coolant level above the bottom of the core is the same as that of a PWR.

The pressurizer is normally connected through the surge line to the hot leg of the A loop. Provisions have also been made to allow connection of the pressurizer to the upper head of the pressure vessel to test the effectiveness of system pressure control for this alternate method.

The vent line between the pressurizer and the pressure vessel is intended to provide a means of venting non-condensible gas accumulating in the pressure vessel out of the primary system.

The power operated relief valve and safety valve are designed to simulate those in a PWR. The spray line is connected to the cold leg of loop A to provide relatively cooler primary coolant for pressure control.

The pressurizer control logic built into the LSTF is the same as that of the reference PWR as compared in Table 5.2.8. The system pressure is controlled by either heating the coolant in the pressurizer or by spraying relatively cooler primary coolant taken from the cold leg. Pressurizer spray pump is always turned on under normal operating conditions and turned off automatically by a safety injection signal. The spray flow rate is controlled by a combination of the main and bypass valves located in the spray line. The bypass valve is adjusted to supply a fixed rate of coolant flow at 0.011 kg/s. The main valve is operated according to the control logic shown in Table 5.2.8, and supplies additional coolant flow. The flow rate varies linearly from zero flow at pressures below 15.68 MPa and to a maximum of 0.98 kg/s at pressures above 16.03 MPa. The pressurizer heater consists of 21 heater rods with sheath made of SUS 316L. The heater rods are 1075 mm long with effective heated length of 850 mm located at the bottom of the pressurizer as shown in Fig. 5.2.28. Both the backup and proportional heaters are switched on at a pressure below 15.34 MPa. Only the proportional heater is used to control the pressure between 15.41 MPa and 15.62 MPa.

The piping schematics for surge line, vent line, spray line and pressure relief and safety valve lines are given in Figs. 5.2.29 through 5.2.32. The piping schedule is listed in Appendix A.1. Thermal insulation and insulation heaters are described in section 5.6.

5.2.4 Primary Coolant Loops

The LSTF primary coolant loop consists of two identical loops each one representing two loops of the reference four-loop PWR.

The major characteristics of the primary loop are summarized and also compared with those of a PWR in Table 5.2.9. The details of the loop are shown in Figs. 5.2.33 through 5.2.38.

The length of each piece of piping that comprizes the entire primary loop is shown in Figs. 5.2.33 and 5.2.34. The diameters of the piping are listed in Table 5.2.9. Basically, there are only two different diameter pipes used in the whole loop. Pipes with 207 mm ID and 295 mm OD are used for hot and cold legs, while those for the cross-over legs have 168.2 mm ID and 240.2 mm OD. All of the pipes are made of stainless steel, SUS316L-TP.

The piping length (L) and diameter (D) were selected to conserve the volume scaling ratio as well as the $L/\sqrt{D}$ ratio, which is considered to be important in simulating the two-phase flow phenomena.

The nozzles attached on the primary loop are shown in Figs. 5.2.35 and 5.2.37. Each nozzle carries an identification number, and the function of each nozzle is listed in Table 5.2.10. The nozzles are connected to the ECCS, break line, spray line, surge line and drain. Some are used for instrumentation such as pressure, differential pressure, fluid and piping wall temperature measurements. There are also several types of two-phase flow instruments attached to these nozzles including the video probe and drag disk transducers.

Some nozzles unique to the LSTF are the hot leg leakage simulation nozzle and a charging pump (PJ) nozzle. The latter is used for the control of the coolant volume in the primary system.

The coolant flowrate in the primary loop is controlled by the reactor coolant pumps and primary coolant flow control valves (CFCV) which will be described in detail in Sections 5.2.5 and 5.7, respectively.

The entire piping system is covered with thermal insulation and also equipped with a heating system to control the rate of heat loss to the surroundings as described in Section 5.6.

5.2.5 Reactor Coolant Pumps

The reactor coolant pumps (PCs) installed in both primary loops drive the primary coolant into the core to remove the heat generated in the core.

In order to simulate the pump characteristics of the reference PWR, the PC of the LSTF was designed as follows.

(1) The type of PC is a canned-type centrifugal pump with the configuration of the impeller, casing, inlet and outlet regions similar to those of the PWR reactor coolant pump.

(2) Pump speed can be controlled electrically to simulate the transient flow characteristics of the PWR reactor coolant pump.

(3) The capacity of PC is larger than 14% of the 2/48 scaled cold leg

flow rate of the reference PWR. The two PCs (PC-A and PC-B) have the same pump characteristics.

(4) The reverse rotation of PC is not permitted as is the case in the PWR.

The design specifications of PC are compared with those of the PWR reactor coolant pump in Table 5.2.11. Figures 5.2.39 and 5.2.40 show the overall cross-section of PC and the rotor. The moment of inertia of the PC rotor is shown in Table 5.2.11. A latch mechanism is provided to the shaft to prevent reverse rotation. The details of the pump discharge nozzle are shown in Fig. 5.2.41.

Figure 5.2.42 shows the single-phase head-flow characteristics (Q-H curves) for normal and reverse flows under forward rotation at room temperature. Figure 5.2.43 shows non-dimensional homologous head curves of PC-A derived from the Q-H curves and rated conditions shown in Table 5.2.11. The pump torque characteristics of PC-A were experimentally obtained for a single-phase water flow. Figures 5.2.44 and 5.2.45 show the torque homologous curves and frictional torque of PC-A, respectively. The pump torque was obtained by subtracting the frictional torque from the motor torque. The homologous data of head and torque are listed in Table 5.2.12. The head and torque homologous curves for the reverse rotation are not prepared because the reverse rotation is not allowed in LSTF. The pump performance data for PC-A can also be used for PC-B, which has the same design specification.

Table 5.2.1 Materials for Primary Loop Components

Component	Material
Pressure Vessel	SB49 + SUS316L clad
Primary Loop Piping	SCS13A
Pressurizer	SB49 + SUS316L clad
Pressurizer Piping	SUS316L - TP
Primary Coolant Pumps	SCS13A and SUS304

Table 5.2.2 Primary Characteristics of the Pressure Vessel

	LSTF	PWR	LSTF/PWR
Total Volume (m^3)	2.6673	131.7	1/49.37
Upper Head Volume (m^3)	0.5134	24.6	1/47.92
Upper Plenum Volume (incl. Endbox)(m^3)	0.4842	28.4	1/58.65
Core Volume (m^3)	0.4069	17.5	1/43.01
Lower Plenum Volume (m^3)	0.5702	29.62	1/51.95
Downcomer + Core Bypass Vol. (m^3)	0.6926	31.58	1/45.60
Core Flow Area (at spacer) (m^2)	0.06418	3.70	1/57.65
Core Flow Area (m^2)	0.1134	4.75	1/41.89
Downcomer Flow Area (m^2)	0.09774	3.38	1/34.58
(incl. Bypass)		5.23	1/53.51
Downcomer Gap Width (m)	0.053	0.26	1/4.91
Spray Nozzle Flow Area (mm^2)	72.63	3352	1/48.91
Normal Core Flow Rate (m^3/s)	0.0651	22.30	1/342.9
Leakage bet. Hot Leg and D.C.		1% of Core Flow	
Leakage bet. D.C. and Upper Head		0.5% of Core Flow	
Press. Drop in PV (kPa)			
Cold Leg - Hot Leg		251.75	
Inlet Nozzle		39.83	
Downcomer		3.39	
Lower Plenum		56.78	
Core		137.30	
Outlet Nozzle		14.41	

Table 5.2.3 Comparison of Various Elevations

Location	LSTF	PWR
Shell top	8600.2	9469.7
Upper Head Break Nozzle	8500.6	
Nitrogen Injection Nozzle	8145.	
Surge Line Nozzle	7936.	
Upper Core Support Plate (B)(t)	6170.2 (304)	6170.2 (304)
Vent Valve/Upper Plenum ECCS	6086.9	6086.9
Hot Leg Pipe Center (ID)	5502.8 (207)	5238. (736.6)
Cold Leg Pipe Center (ID)	5502.8 (207)	5238. (698.5)
Downcomer (T)	5399.3	4888.5
Upper Core Plate (B)(t)	3968. (76.2)	3968. (76.2)
Upper End Box (B)(t)	3864.5 (19.5)	3854. (19.5)
Spacer #9 (T)	3710.	3807.
Top of Heated Zone	3660.	3660.
Spacer #8 (T)	3299.	3299.
Spacer #7 (T)	2791.	2791.
Spacer #6 (T)	2338.	2338.
Spacer #5 (T)	1920.	1884.
Cross Over Leg (B)	1701.1	1701.1
Spacer #4 (T)	1514.	1431.
Spacer #3 (T)	977.	977.
Spacer #2 (T)	524.	524.
Spacer #1 (T)	140.	54.
Bottom of Heated Zone	EL 0.0	EL 0.0
Lower End Box (T)	- 41.3	- 41.3
Lower Core Plate (T)(t)		- 109. (50.8)
Lower Core Support Plate (T)(t)		- 750.8 (508)
Downcomer (B)	- 1258.8	- 1258.8
Lower Plenum ECCS/Break Nozzle	- 1735.	
Shell (B)	- 2357.	- 3098.8

Notes: (B) and (T) indicate elevations measured at the bottom and top surfaces respectively.
(t) indicates thickness, (ID) is the inside diameter.
All dimensions are in mm.
Component locations are graphically shown in Fig. 5.2.2.

Table 5.2.4 **Pressure Vessel Nozzles**

Nozzle No.	Service	Inner Diameter (mm)	Qty
N-1 a b	Hot Leg	265	2
N-2 a b	Cold Leg	207	2
N-3	ECCS Injection	87.3	1
N-4	Safety Valve	66.9	1
N-5	N_2 Gas Injection	12.3	1
N-6 a b	Break	87.3	2
N-7 a b	Vent Valve	87.3	2
N-7 c d	Vent Valve	87.3	2
N-8	Auto. Bleed	21.2	1
N-9	Press. Relief Valve	12.3	1
N-10	PV-PR Ventline	43.1	1
N-11 a b	Hot Leg Leakage	21.2	2
N-12	ECCS Injection	101.3	1
N-13	Spare (Surge line)	66.9	1

Table 5.2.5 Primary Characteristics of Upper Plenum Structures

	LSTF	PWR	LSTF/PWR
Upper Plenum Structures			
Control Rod Guide Tubes	8	57	
Upper Core Support Columns	10	50	
Orifice Plate	2	16	
Inlet Holes	12	70	
Upper Core Plate Opening (m^2) for			
Coolant Flow	0.03114	1.440	1/46.24
Control Rod Guide Tubes	0.03427	1.605	1/46.83
Support Columns	0.02017	0.9680	1/47.99
Coolant Flow Area between			
Upper Plenum and Upper Head (m^2)	0.001263	0.05778	1/45.75

Table 5.2.6 **Major Core Characteristics**

Item	LSTF	PWR	Ratio
Number of Rod Bundles	24	193	
Bundle Size	7 x 7 (square)	17 x 17	
	40 rods (semi-crescent)		
Total Number of Rods	1,104	55,777	(1/50.52)
Heater Rods	1,008	50,952	(1/50.55)
Non-Heating Rods	96	4,825	(1/50.26)
Rod Diameter (mm)			
Heater Rod	9.5	9.5	1/1
Non-Heating Rod	12.24	12.24	1/1
Rod pitch (mm)	12.6	12.6	1/1
Effective Heated Length (m)	3.66	3.66	1/1
Output Power (MWth)	10.0	3,423	1/342.3
Peaking Factor	1.495	1.495	1/1
Cladding Thickness (mm)	1.0	0.57	1.754/1
Cladding Material	Inconel	Zr-4	
Number of Spacers in Core	9	9	1/1
Core Barrel			
Inner Diameter (mm)	514	3,759	1/7.313
Outer Diameter (mm)	534	3,875	1/7.255
Thickness (mm)	10	57.5	1/5.75
Core Volume (m^3)	0.4069	17.5	1/43.01
Flow Area (m^2)			
Core (at spacer)	0.06418	3.70	1/57.65
Core (below spacer)	0.1134	4.75	1/41.89
Grid (or Lower nozzle)	0.06425	2.988	1/46.51
End Box (or Upper Nozzle)	0.08720	4.187	1/48.02

Table 5.2.7 Heater Rod Specification

High-Power Rod Specification

DIVISION		DESIGN VALUES			
		Power Ratio	Output (kW)	Heat Flux (W/cm^2)	Resistance (Ω)
1	9	0.3633	0.674	5.5	0.130
2	8	0.8135	1.498	12.4	0.290
3	7	1.1736	2.161	17.8	0.418
4	6	1.4071	2.591	21.4	0.501
5		1.4945	2.752	22.7	0.533
TOTAL		Average 1.0000	16.6	Average 15.2	3.211

Total Number of Rods = 360
Location (Bundle Number) 13-20

Low-Power Rod Specification

DIVISION		DESIGN VALUES			
		Power Ratio	Output (kW)	Heat Flux (W/cm^2)	Resistance (Ω)
1	9	0.3628	0.446	3.7	0.197
2	8	0.8138	0.993	8.2	0.437
3	7	1.1736	1.432	11.8	0.631
4	6	1.4071	1.717	14.2	0.756
5		1.4948	1.824	15.1	0.805
TOTAL		Average 1.0000	11.0	Average 10.1	4.847

Total Number of Rods = 648
Location (Bundle Number) 1-12
21-24

Table 5.2.8 Pressurizer Characteristics

Parameter	LSTF	PWR	LSTF/PWR
Volume	1.147 m^3	51 m^3	1/44.5
Water Volume (at Normal Liquid Level)	0.764 m^3	32 m^3	1/41.9
Steam Volume (at Normal Liquid Level)	0.383 m^3 (0.401 m^3 including pipings)	19.2 m^3	1/50.1 (1/47.9)
Inside Diameter	0.6 m	2.1 m	1/3.5
Vessel Height	4.187 m	15.5 m	1/3.7
Nominal Pressure	15.55 MPa	15.52 MPa	-
Nominal Temperature	618.1 K	617.4 K	-
Elevation from Bottom of Core Heated Zone			
PR Spray Nozzle Upper Surface	-	26.67 m	-
PR Shell Top	21.4928 m	-	-
Nominal Water Level	20.088 m	20.088 m	1/1
PR Shell Bottom	17.2828 m	-	-
PR Surge Nozzle Lower Surface	-	10.488 m	-
Spray Line Flow Rate (Max.)	-	0.0567 m^3/s	-
Spray Set Point Close	16.03 MPa*	16.03 MPa	-
Open	15.68 MPa*	15.68 MPa	-
Proportional Heater Capacity	7.5 kW	350 kW	1/46.7
Backup Heater Capacity	112.5 kW	1160 kW	1/10.3
Proportional Heaters at Max. Power	15.41 MPa*	15.41 MPa	-
Proportional Heaters Off	15.62 MPa*	15.62 MPa	-
Backup Heaters On	15.34 MPa*	15.34 MPa	-
Backup Heaters Off	15.4 MPa*	15.4 MPa	-
Surge Line Flow Rate (Max.)	-	0.2384 m^3/s	-

Note * values may depend on type of tests.

Table 5.2.9 Characteristics of Primary Loop Piping

	LSTF	PWR	LSTF/PWR
Hot Leg Inner Diameter (D)	0.207 m	0.7366 m	
Hot Leg Length (L)	3.6860 m	6.9927 m	
Hot Leg Volume	0.1240 m^3	2.980 m^3	1/24.03
Hot Leg $L/\sqrt{D}$	8.102	8.148	1/1.006
Cold Leg Inner Diameter (D)	0.207 m	0.6985 m	
Length	3.4381 m	7.2465 m	
Volume	0.1157 m^3	2.777 m^3	1/24.00
Cross Over Leg Inner Diameter (D)	0.1682 m	0.7874 m	
Length	9.5498 m	8.3458 m	
Volume*1)	0.2122 m^3	4.064 m^3	1/19.15
Surge Line Inner Diameter	0.0669 m	0.2842 m	
Length	20.15 m	20.306 m	
Volume	0.07081 m^3	1.288 m^3	1/18.19
Spray Line Inner Diameter	0.0212 m	0.0873 m	
Length	48.283 m	69.701 m	
Volume*2)	0.01855 m^3	0.4172 m^3	1/22.49
Vent Line Inner Diameter (PR∿PV)	0.0431 m	-	-
Length	39.03 m	-	-
Volume	0.05695 m^3	-	-
Safety Valve Line (PR∿Rϕ1-1)			
Inner Diameter	0.0431 m	-	-
Length	23.97 m	-	-
Volume	$3.497\times10^{-2} m^3$	-	-
Pressure Relief Valve Line (PR∿Rϕ1-2)			
Inner Diameter	0.0344 m	-	-
Length	17.06 m	-	-
Volume	$1.585\times10^{-2} m^3$	-	-
Normal Flow Rate (per loop)		5.5835 m^3/s	
Surge Line Max. Flow Rate		0.2384 m^3/s	
Spray Line Max. Flow Rate		0.05667 m^3/s	
Primary Loop Pressure Drop			
Core		137.3 kPa	
PV inlet and outlet		245.2 kPa	
SG inlet and outlet		196.1 kPa	
Loop Piping		58.8 kPa	

Note : 1) not include primary coolant pump volume
2) inlcude spray pump volume

Table 5.2.10 Services for Nozzles in Primary Loop

Symbol	Nominal Size	Schedule Number	Service
N-1 a,b	1 B	160	Hot Leg Leak Simulation
N-2 a～i,l o～s	1/2 B	-	Differential Pressure
N-3 a,d	1 1/2 B	160	Video probe or CPT rake
N-3 b,c	1 1/2 B	160	Pitot-tube or CPT rake
N-3 e,f	1 1/2 B	160	CPT rake
N-4 a～w	1/2 B	160	Fluid temperature
N-5 a～l	1/2 B	160	Pipe temperature
N-6 a～l	-	-	Pipe temperature
N-7 a,b,f, h～k	4 B	ID 87.3 t 32.6	Break
N-7 c,d,e	4 B	ID 87.3 t 32.6	Break or Video probe
N-8 a～d	ID 130	-	Spare
N-9 a,b	1 B	160	Drain
N-10	1 1/2 B	160	HPIS
N-11	2 1/2 B	160	HPIS
N-12 a,b	4 B	ID 87.3 t 50.2	ECCS
N-13	3 B	ID 66.9 t 26.9	Surge line
N-14 a,b	4 B	160	ECCS
N-15	1 B	160	Spray line
N-16	1/2 B	160	Charge pump nozzle
N-17	1/2 B	160	Fluid temperature
N-18 a,c	ID 130	-	Video probe
N-18 b,d	ID 130	-	Drag disk
N-19 a～d	1 1/2 B	160	Spare
N-20 a	4 B	160	Spare
N-20 b	4 B	160	Break
N-21 a～h	ID 43	-	Drag disk

Table 5.2.11 Comparison of Major Design Specification of Reactor Coolant Pumps in LSTF and PWR

Items		LSTF	PWR
Number of Pumps		2	4
Pump Type		Centrifugal Pump Canned Type	Centrifugal Pump Shaft-Seal Type
Rated Flow Rate	(m^3/s)	0.054	5.58
Rated Pump Speed	(rad/s)	188.5	124.6
Rated Pump Head	(m)	10	84
Rated Pump Torque	(N-m)	55.2	-
Moment of Inertia	($kg \cdot m^2$)	0.54	-
Water Volume (m^3)		0.0235	2.4
Reverse Rotation		not allowed	not allowed

Table 5.2.12 Single-phase Head and Torque Homologous Data for PC-A
(a) Head Homologous Curves
(b) Torque Homologous Curves

(a) Head homologous curves ($\alpha > 0$)

Curve		Data						
1	v/α	0.00	0.10	0.24	0.40	0.60	0.80	1.00
	h/α^2	1.36	1.38	1.42	1.41	1.32	1.19	1.00
2	α/v	0.00	0.20	0.50	0.65	0.80	1.00	
	h/v^2	-0.97	-0.68	-0.20	0.07	0.40	1.00	
3	v/α	-1.00	-0.90	-0.80	-0.60	-0.40	-0.20	0.00
	h/α^2	3.20	2.80	2.46	1.94	1.57	1.41	1.36
4	α/v	-1.00	-0.80	-0.60	-0.40	-0.20	0.00	
	h/v^2	3.20	2.76	2.41	2.09	1.81	1.58	

where $v = Q/Q_R$: Flow Ratio

$\alpha = \omega/\omega_R$: Speed Ratio

$h = H/H_R$: Head Ratio

(b) Torque homologous curves ($\alpha > 0$)

Curve		Data						
1	v/α	0.00	0.12	0.20	0.30	0.50	0.70	1.00
	β/α^2	0.36	0.38	0.44	0.58	0.73	0.81	1.00
2	α/v	0.00	0.10	0.30	0.50	0.65	0.86	1.00
	β/v^2	-1.26	-0.88	-0.31	0.09	0.30	0.63	1.00
3	v/α	-1.00	-0.85	-0.65	-0.50	-0.40	-0.20	0.00
	β/α^2	2.40	1.70	1.12	0.84	0.69	0.59	0.36
4	α/v	-1.00	-0.80	-0.60	-0.30	0.00		
	β/v^2	2.40	2.12	1.80	1.32	0.80		

where $v = Q/Q_R$: Flow Ratio

$\alpha = \omega/\omega_R$: Speed Ratio

$\beta = T/T_R$: Torque Ratio

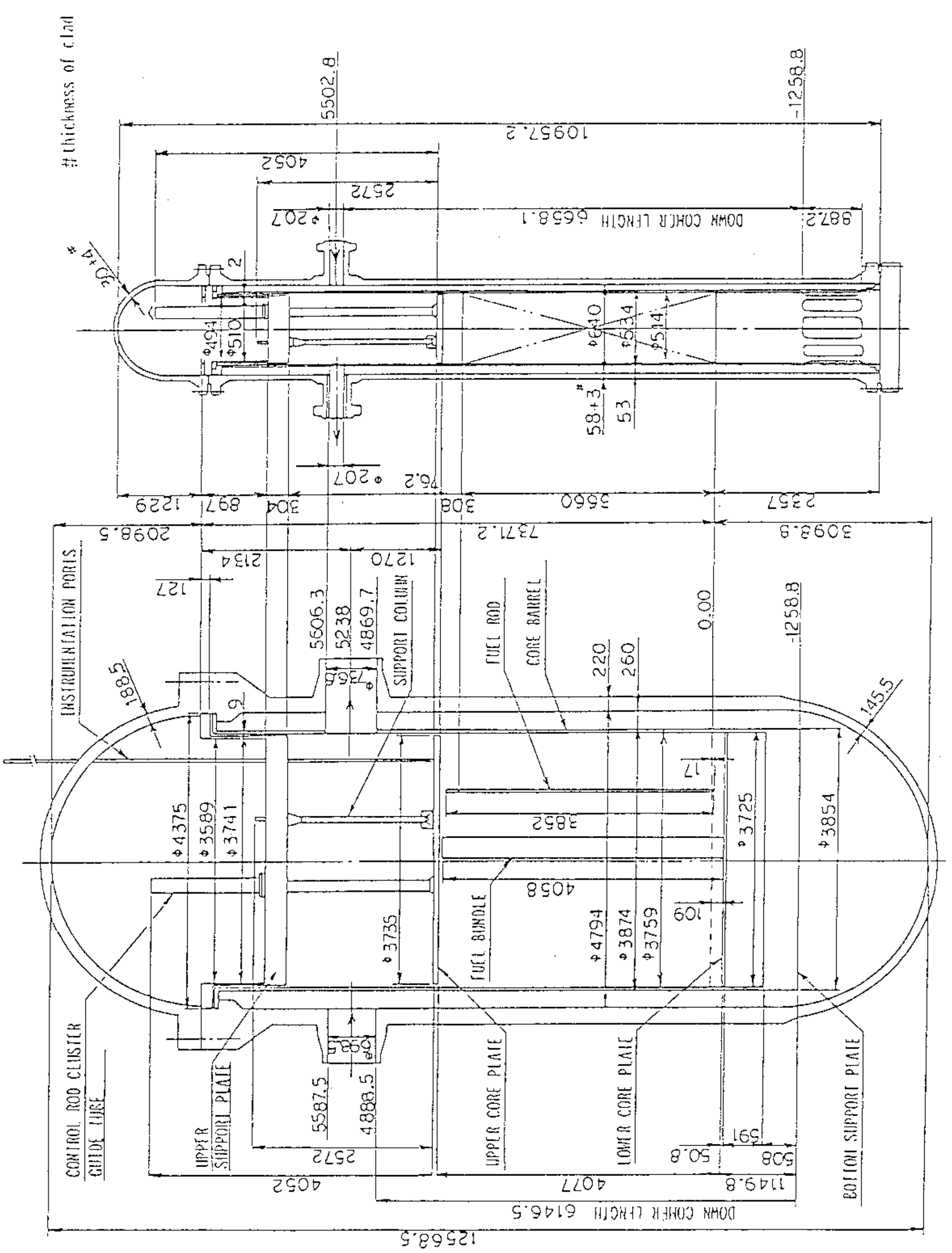


Fig. 5.2.1 Comparison of LSTF and PWR Pressure Vessel Dimensions

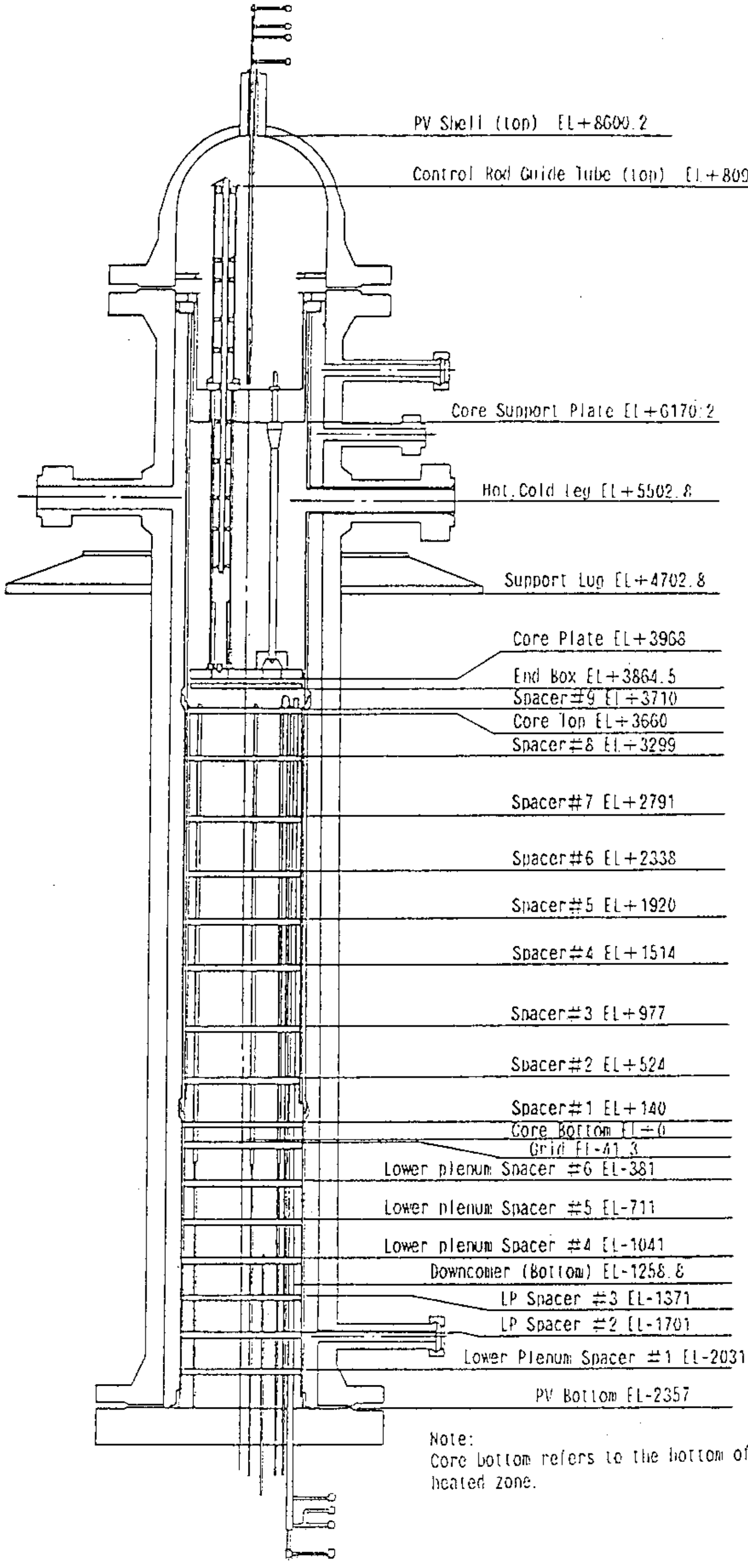
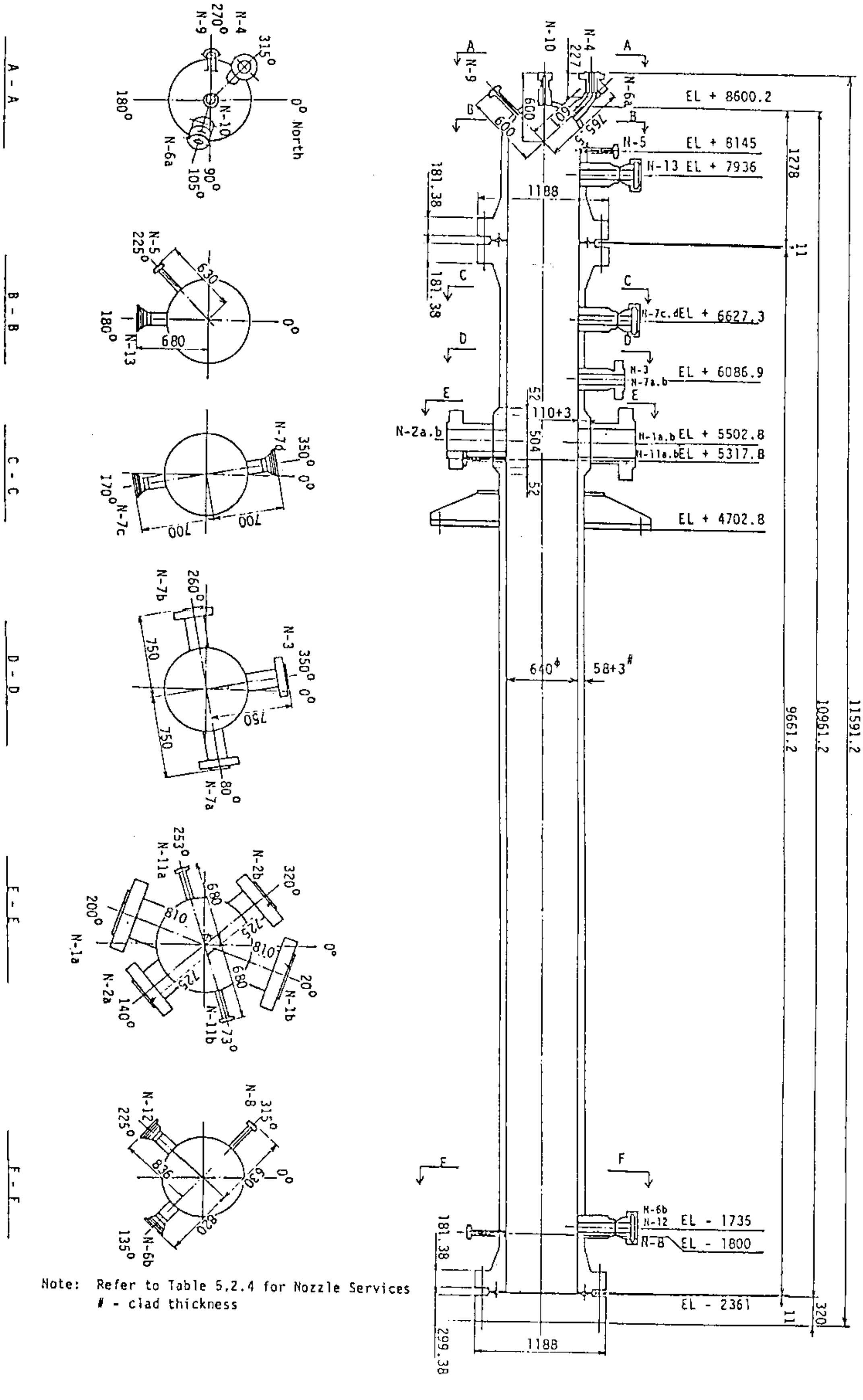


Fig. 5.2.2 Pressure Vessel Assembly



Note: Refer to Table 5.2.4 for Nozzle Services
\# - clad thickness

Fig. 5.2.3 Major Vessel Nozzle Locations

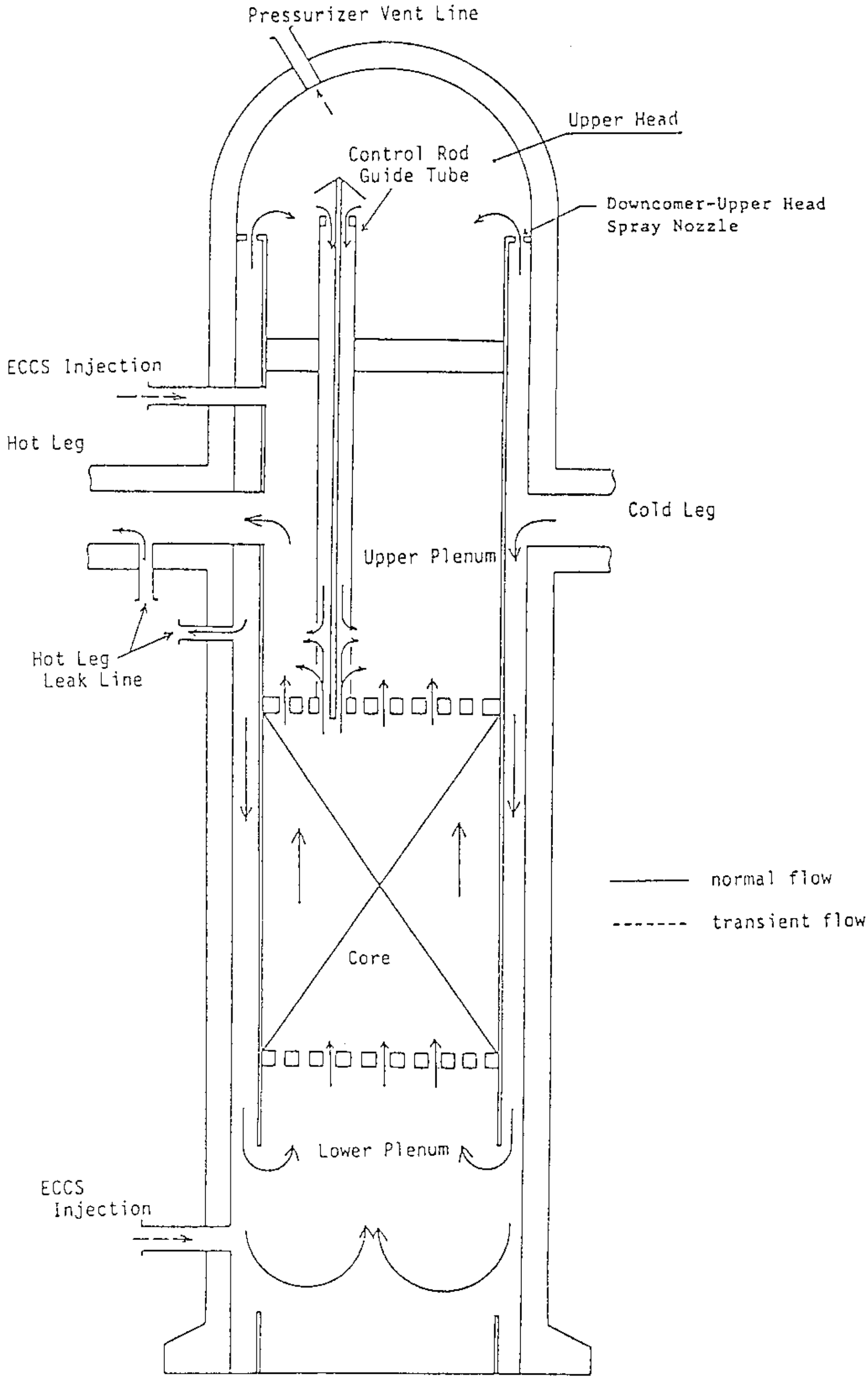


Fig. 5.2.4 Coolant Flow Path in Pressure Vessel

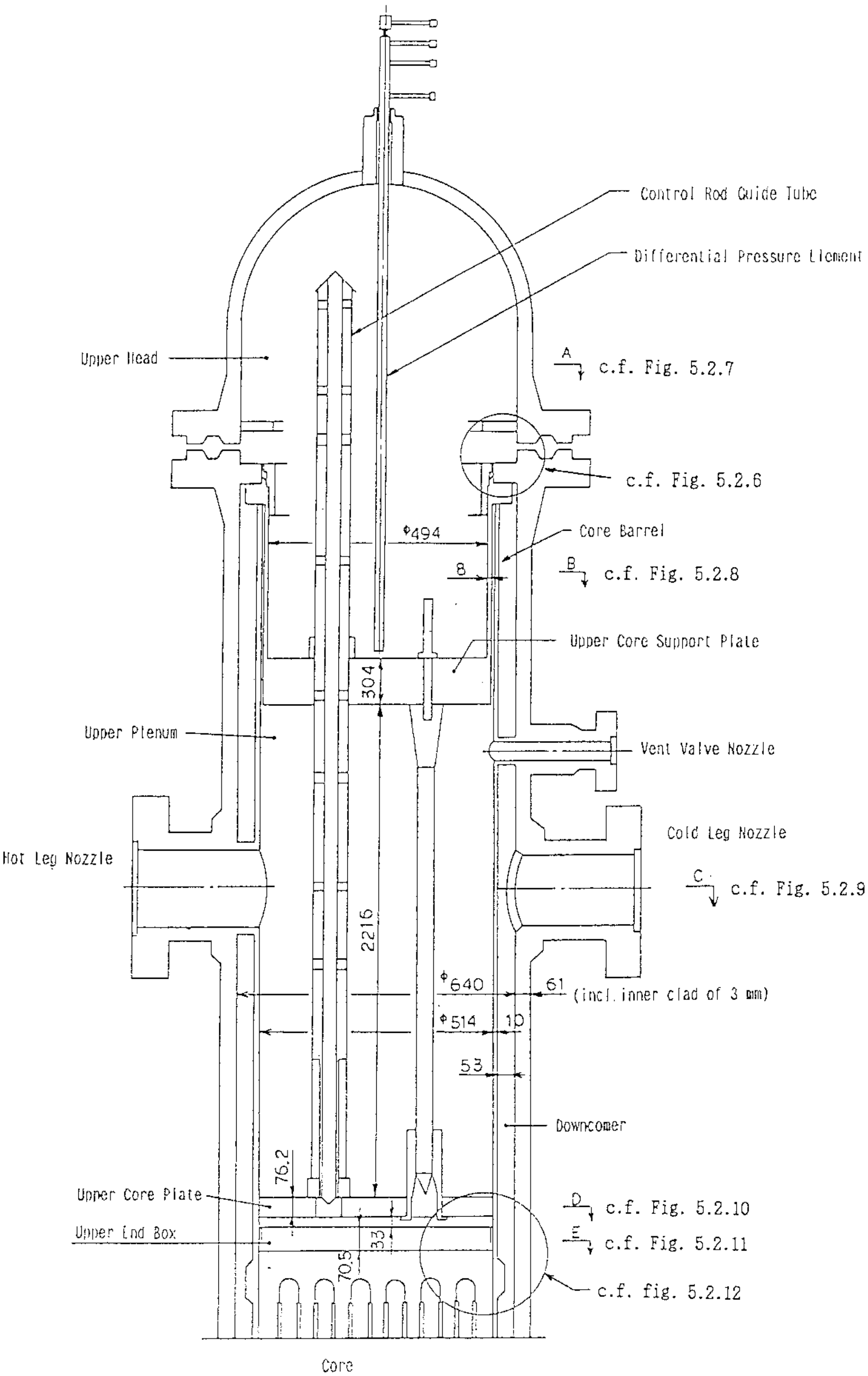


Fig. 5.2.5 Pressure Vessel Internals (Upper Plenum)

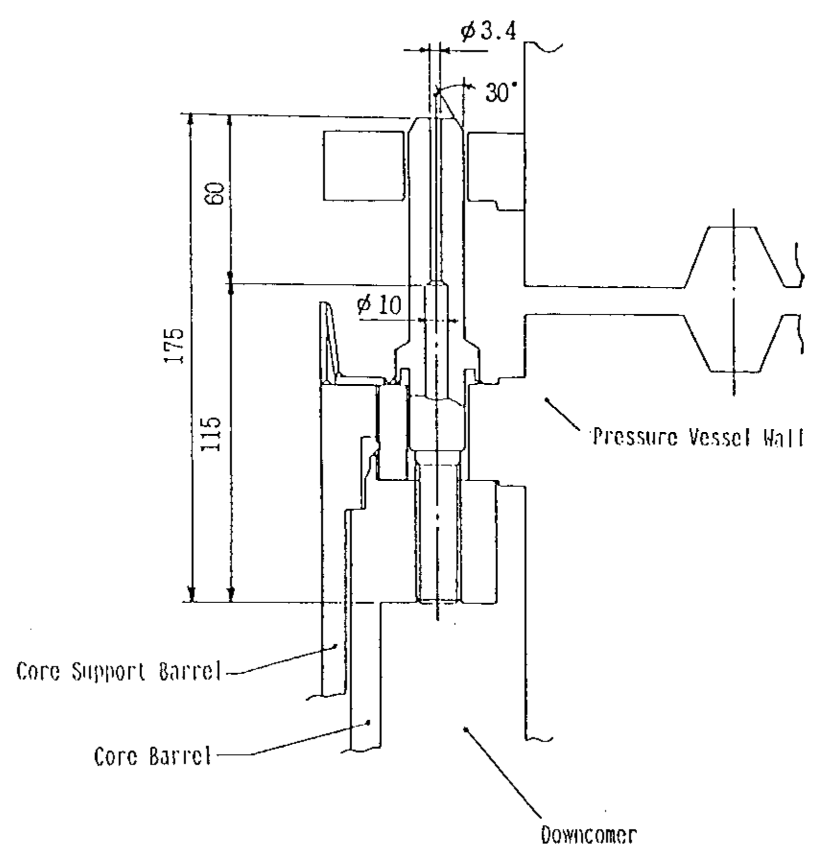


Fig. 5.2.6 **Downcomer-Upper head Spray Nozzle Details**

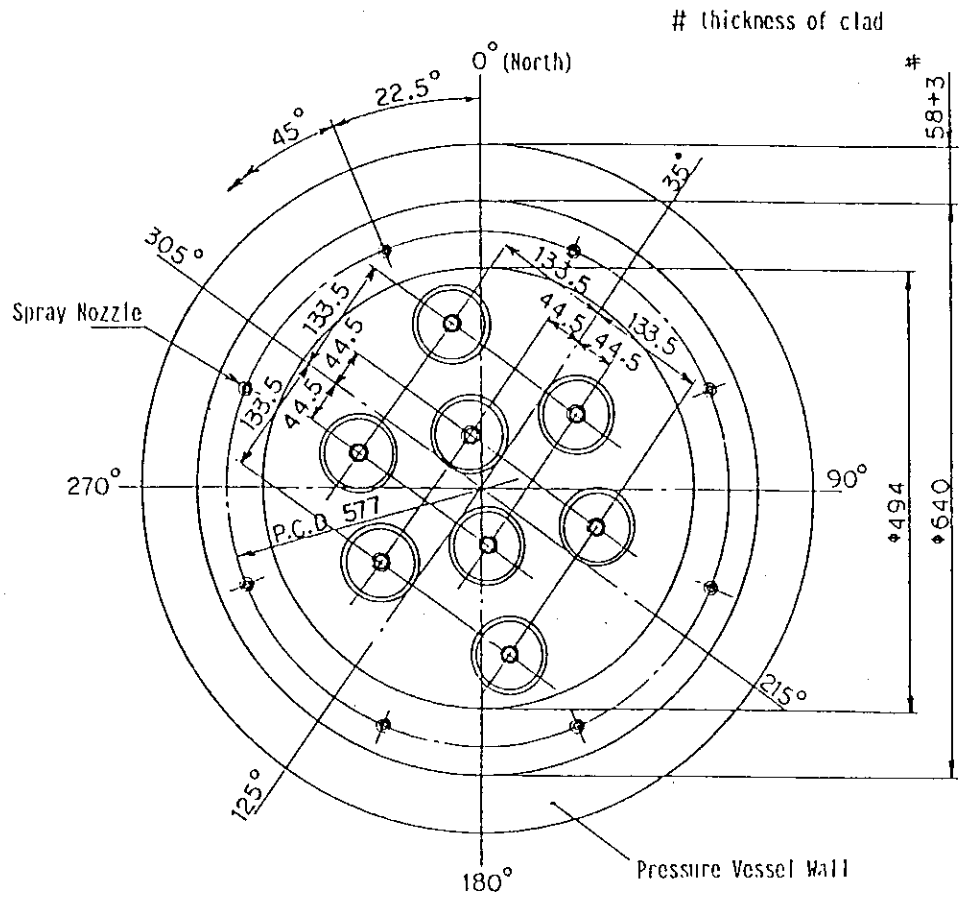


Fig. 5.2.7 **Upper Head Cross Section (Cross Section A in Fig. 5.2.5)**

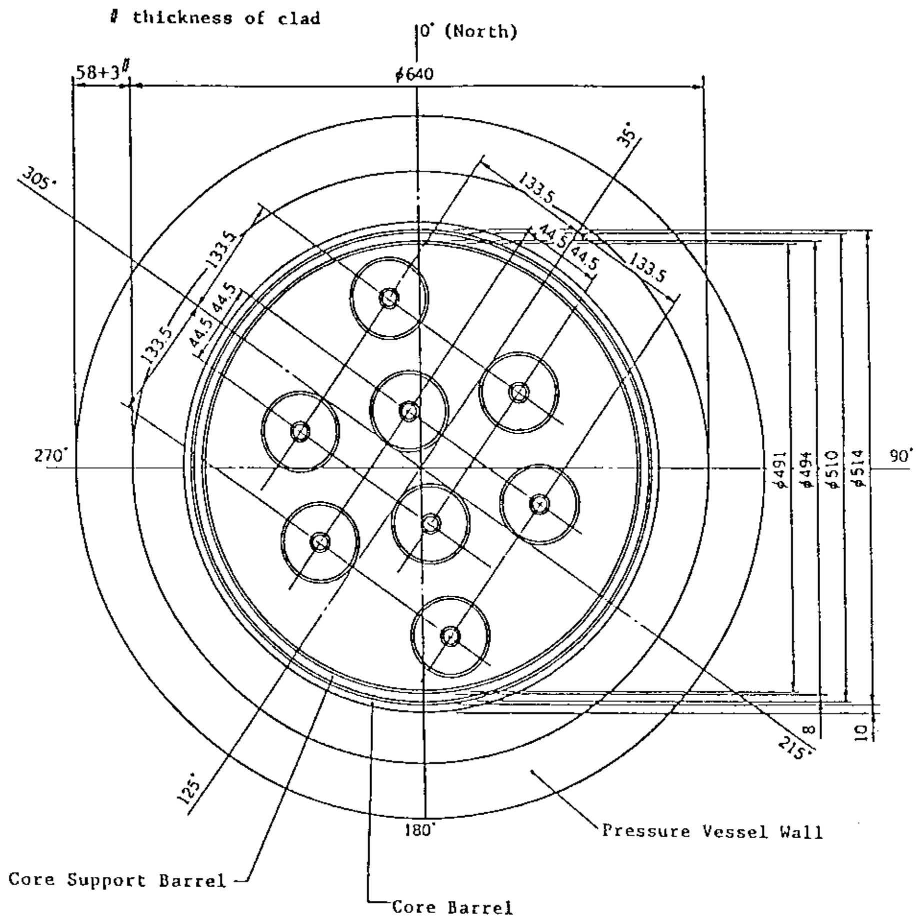


Fig. 5.2.8 Upper Head Cross Section
(Cross Section B in Fig. 5.2.5)

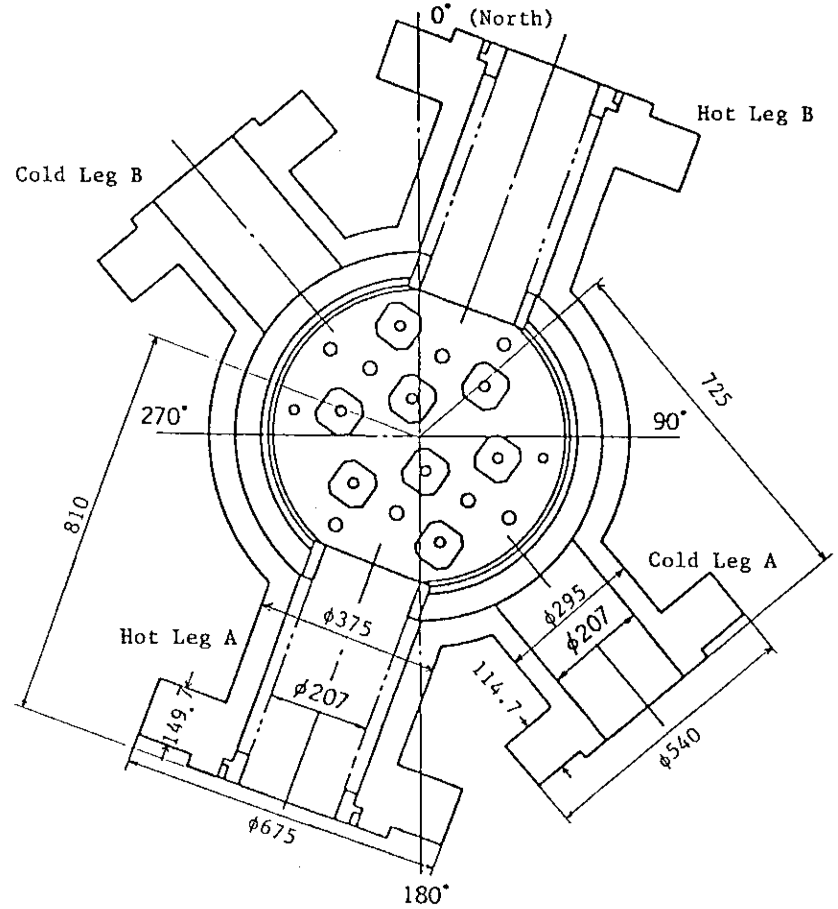
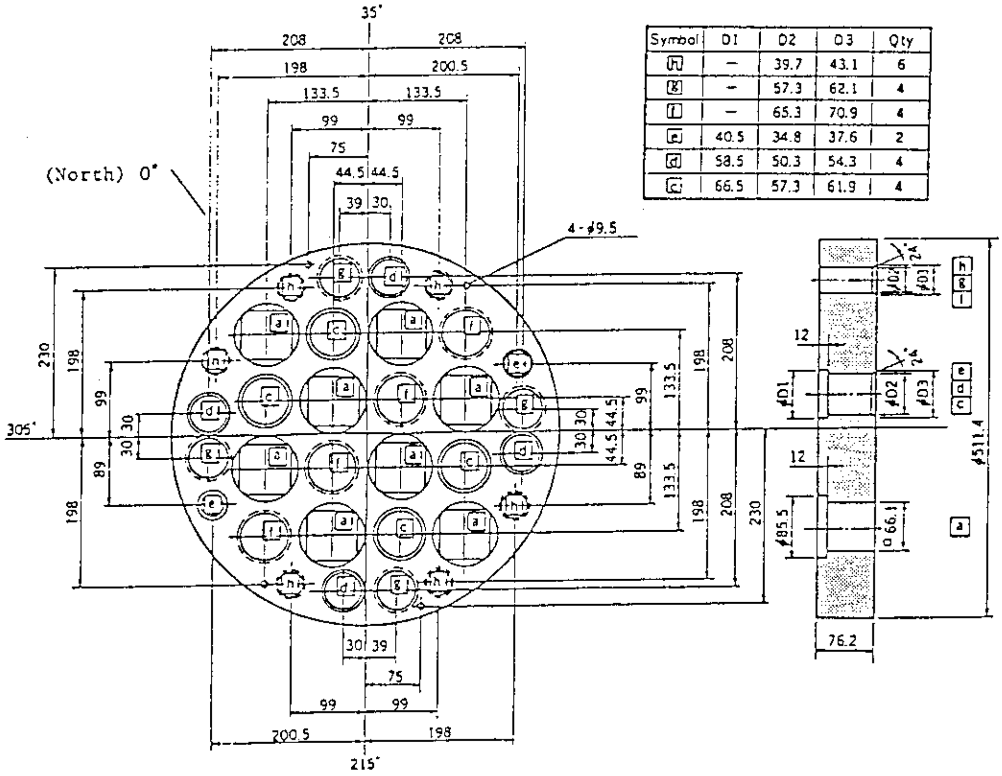
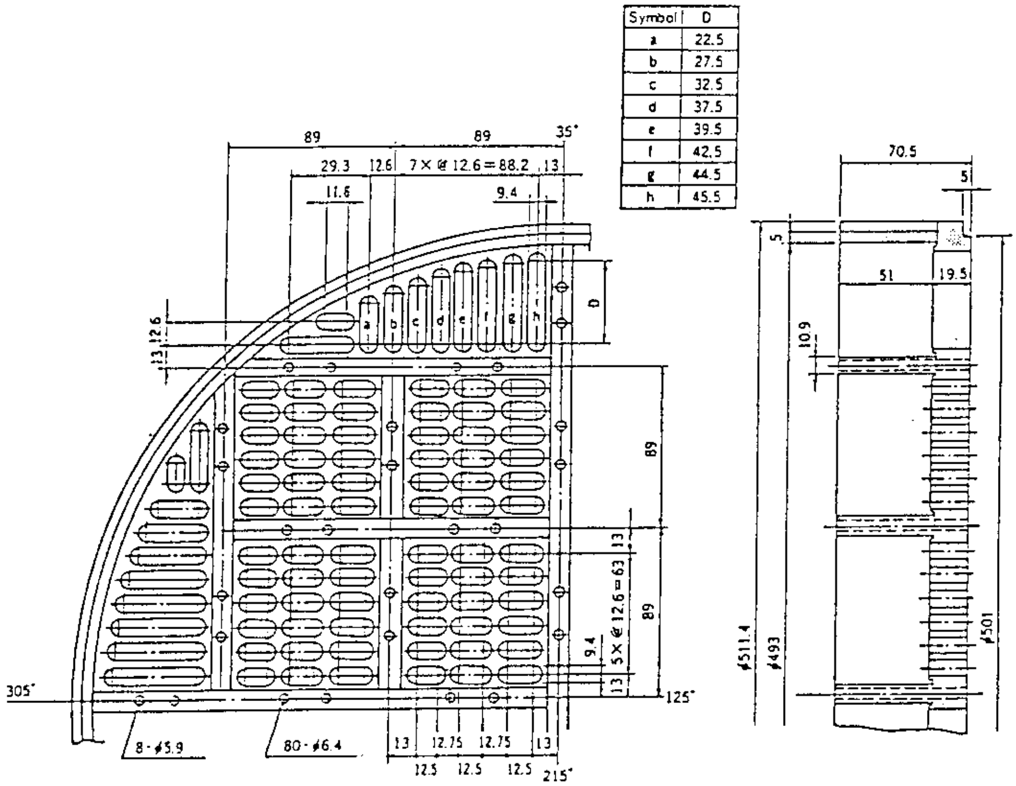


Fig. 5.2.9 Upper Plenum Cross Section
(Cross Section C in Fig. 5.2.5)



Symbol	D1	D2	D3	Qty
h	–	39.7	43.1	6
g	–	57.3	62.1	4
f	–	65.3	70.9	4
e	40.5	34.8	37.6	2
d	58.5	50.3	54.3	4
c	66.5	57.3	61.9	4

Fig. 5.2.10 Upper Core Plate (Cross Section D in Fig. 5.2.5)



Symbol	D
a	22.5
b	27.5
c	32.5
d	37.5
e	39.5
f	42.5
g	44.5
h	45.5

Fig. 5.2.11 End Box Details (Cross Section E in Fig. 5.2.5)

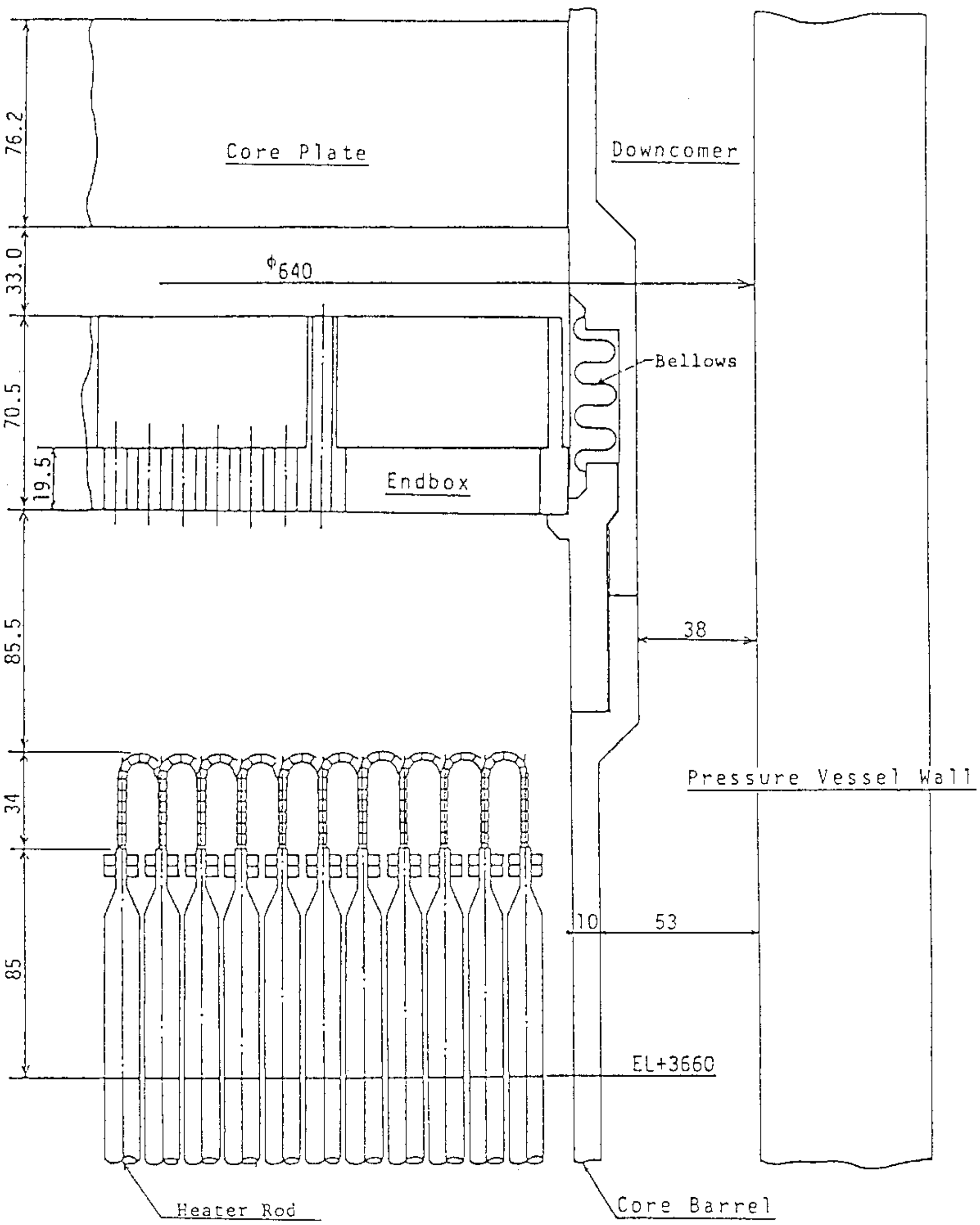


Fig. 5.2.12 Details of Top of Core

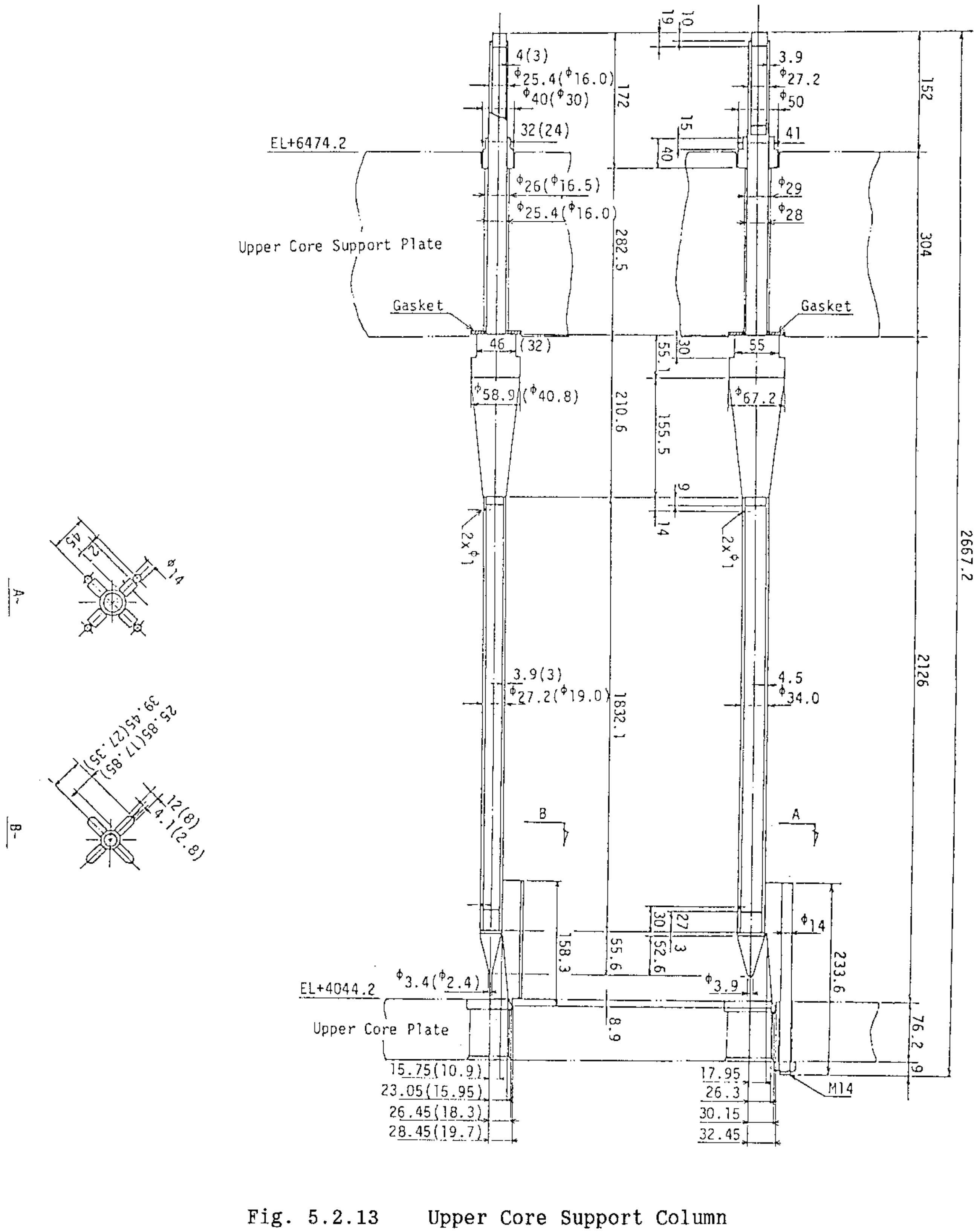


Fig. 5.2.13 Upper Core Support Column

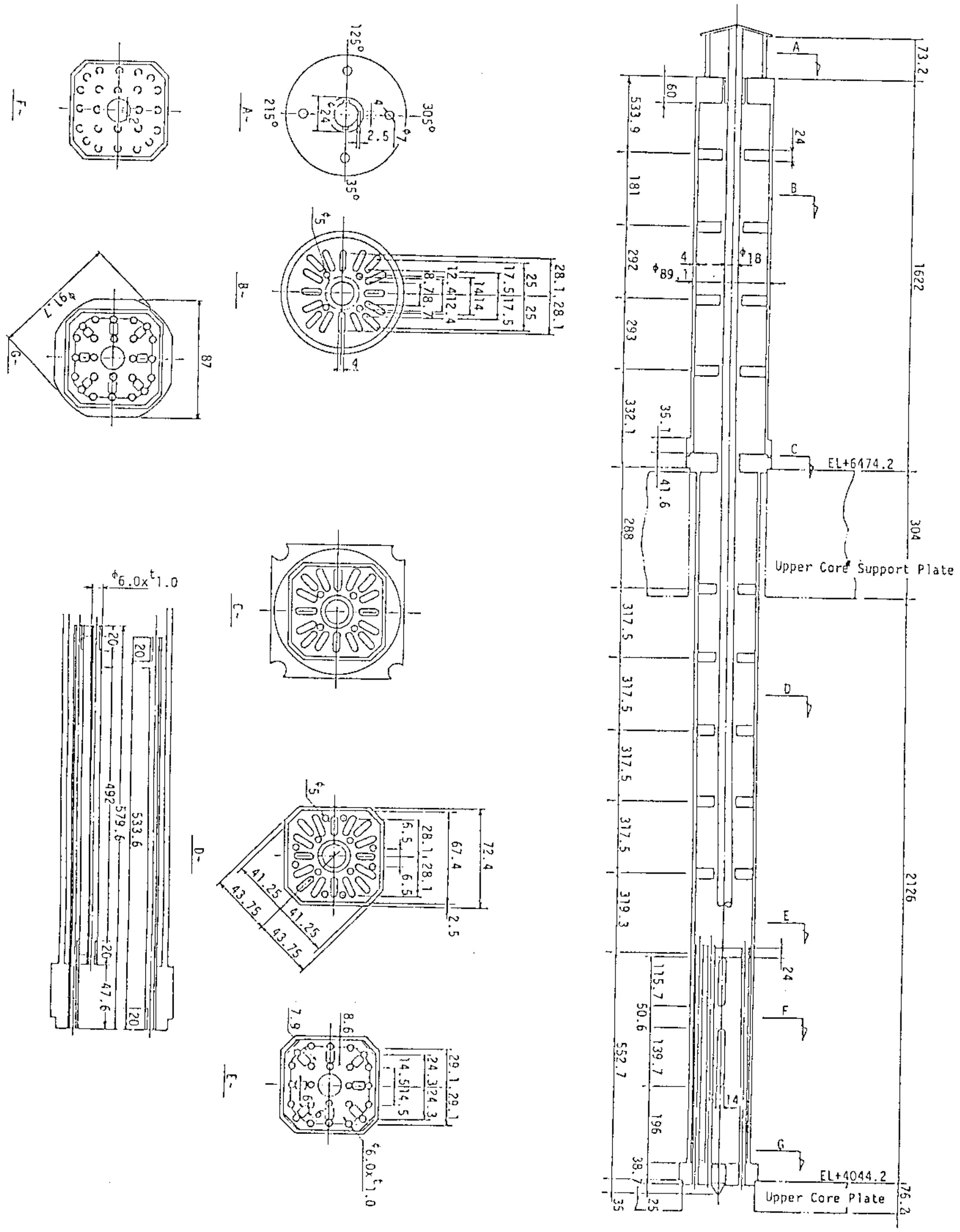


Fig. 5.2.14 Control Rod Guide Tube

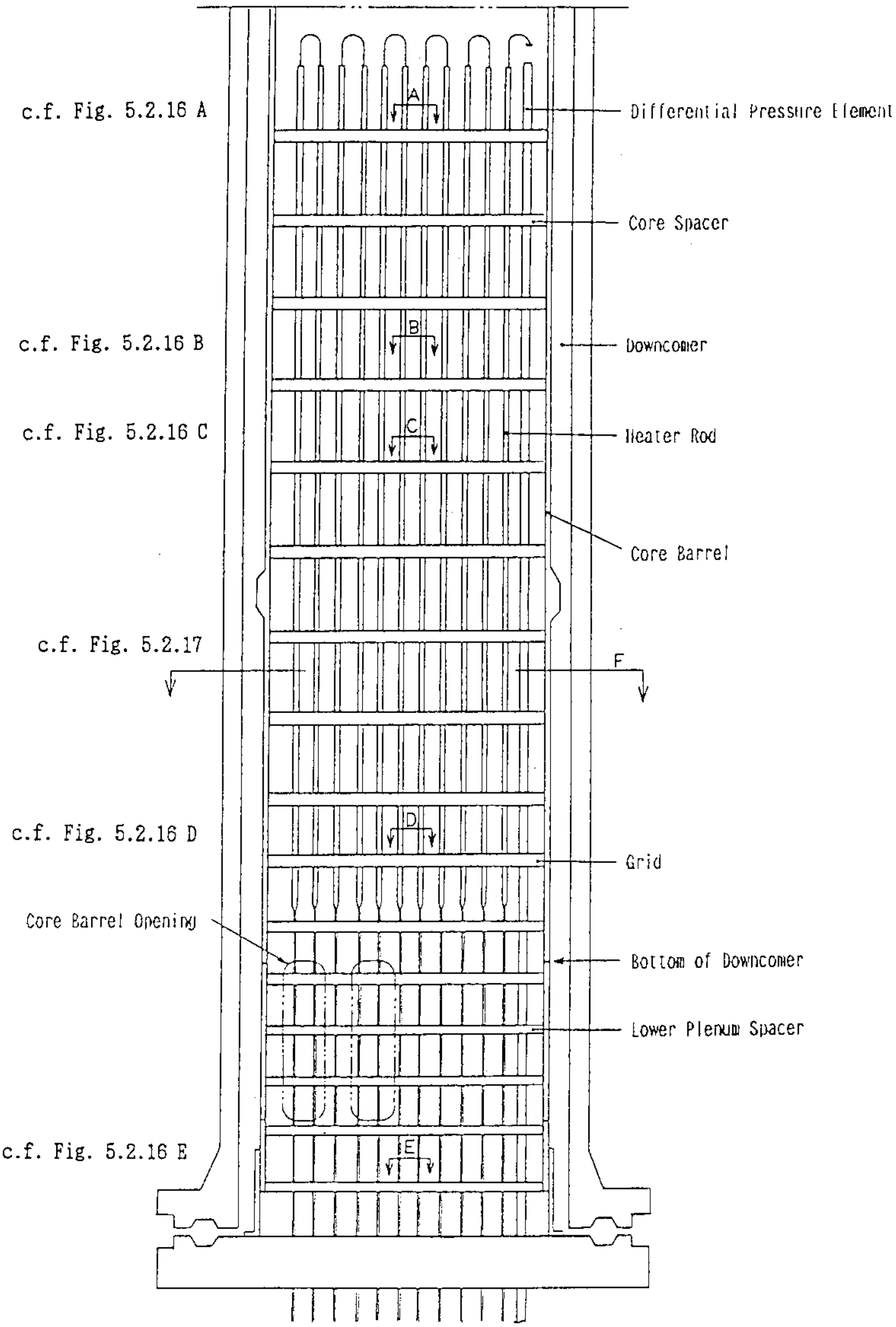


Fig. 5.2.15　Core and Lower Plenum

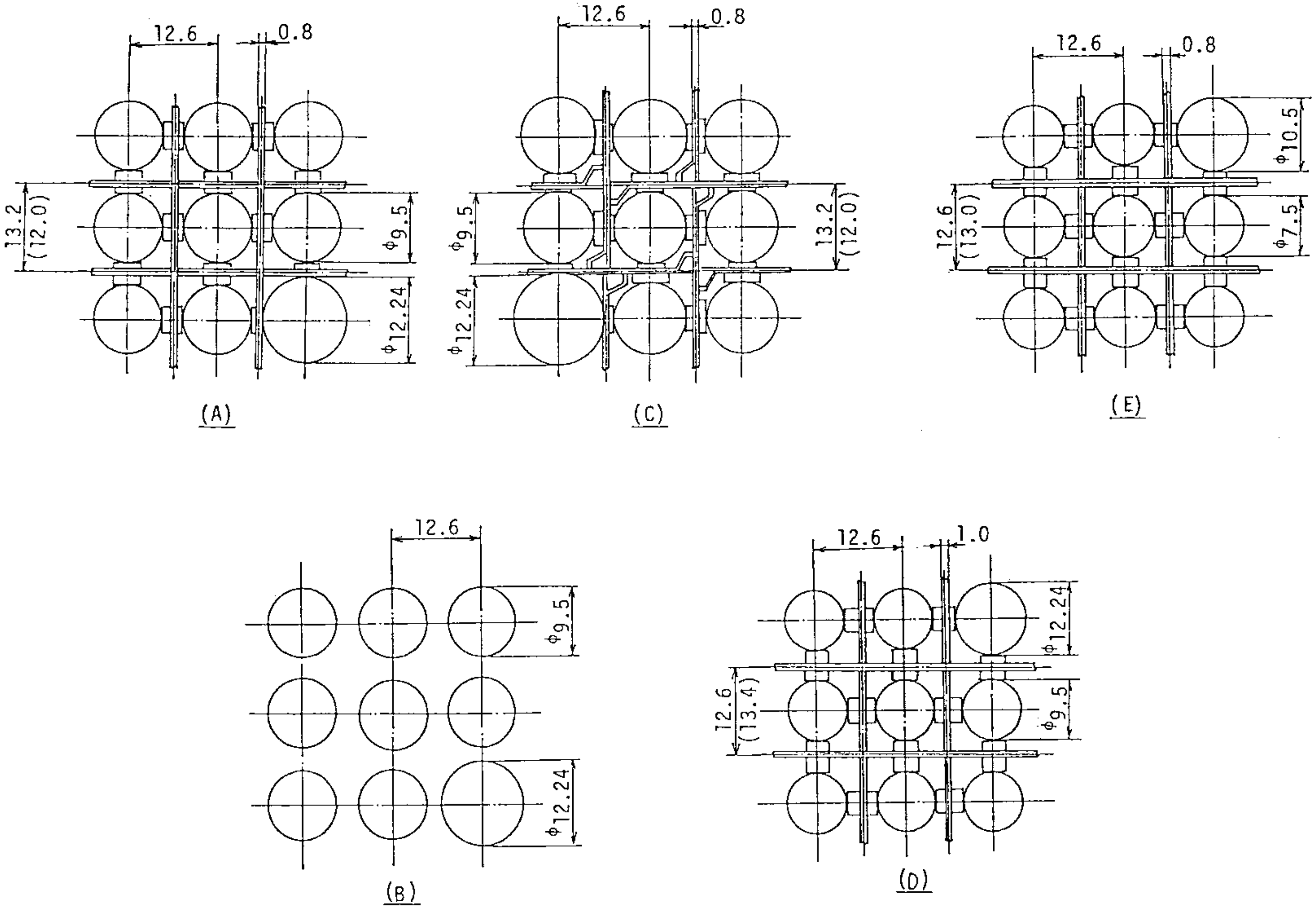


Fig. 5.2.16 Partial Core Cross Sections (Cross Section Locations Shown in Fig. 5.2.15)

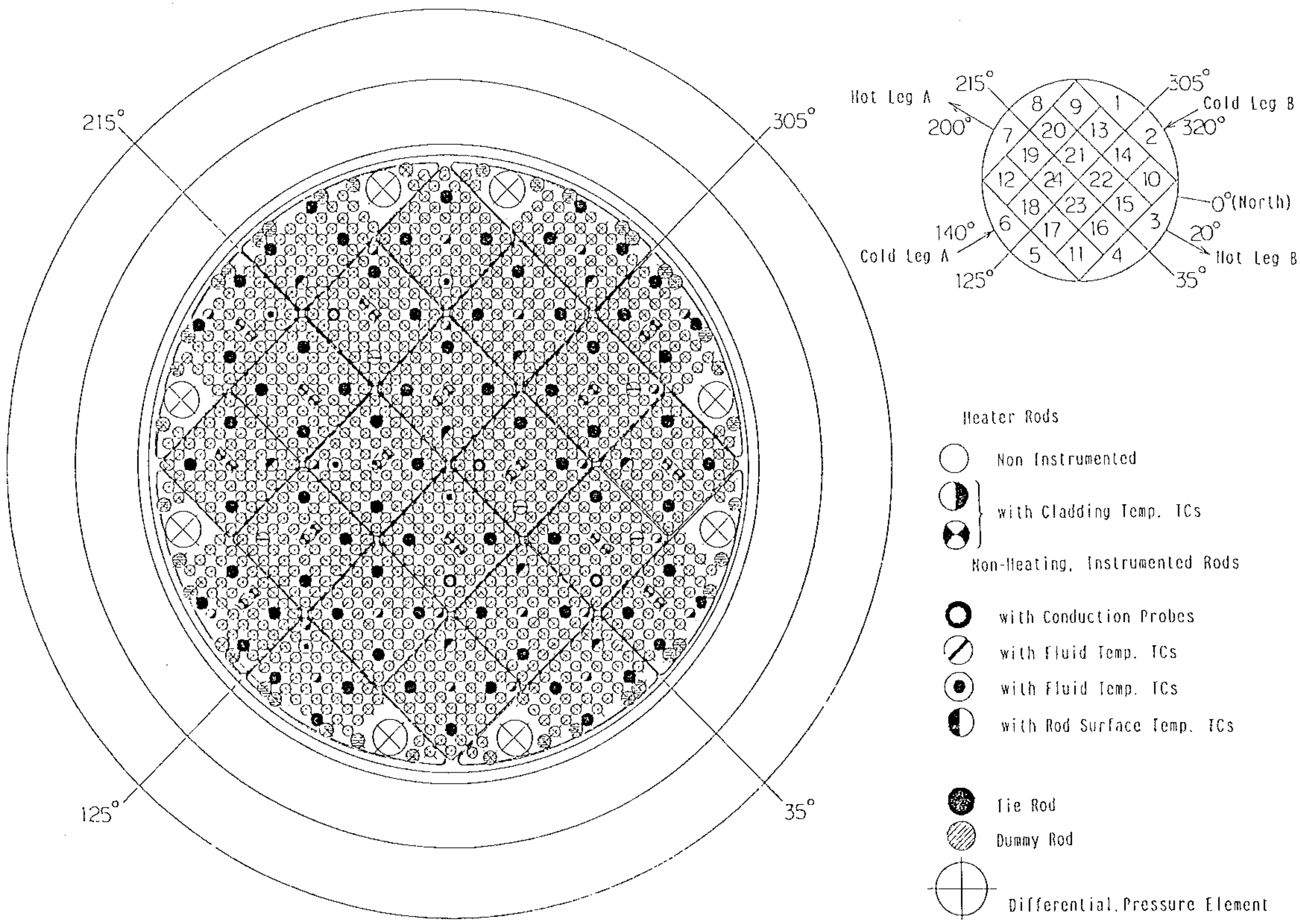
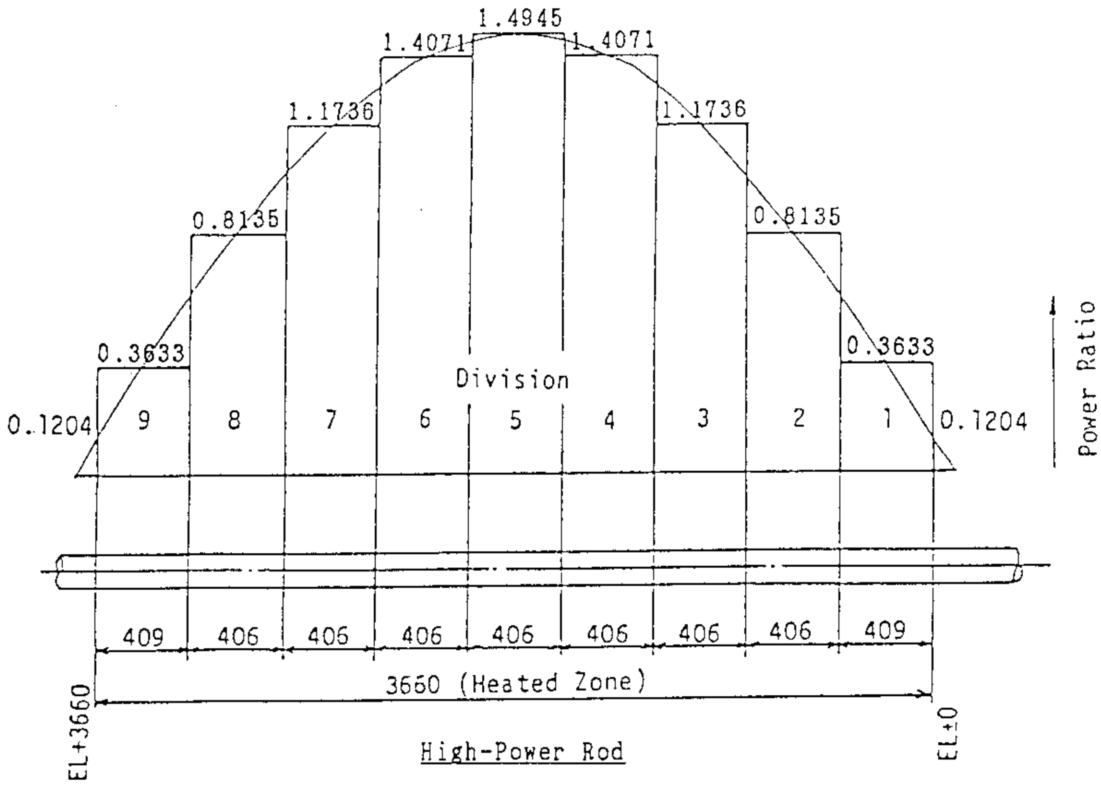


Fig. 5.2.17 Core Cross Section and Heater Rod Arrangement (Cross Section F in Fig. 5.2.15)



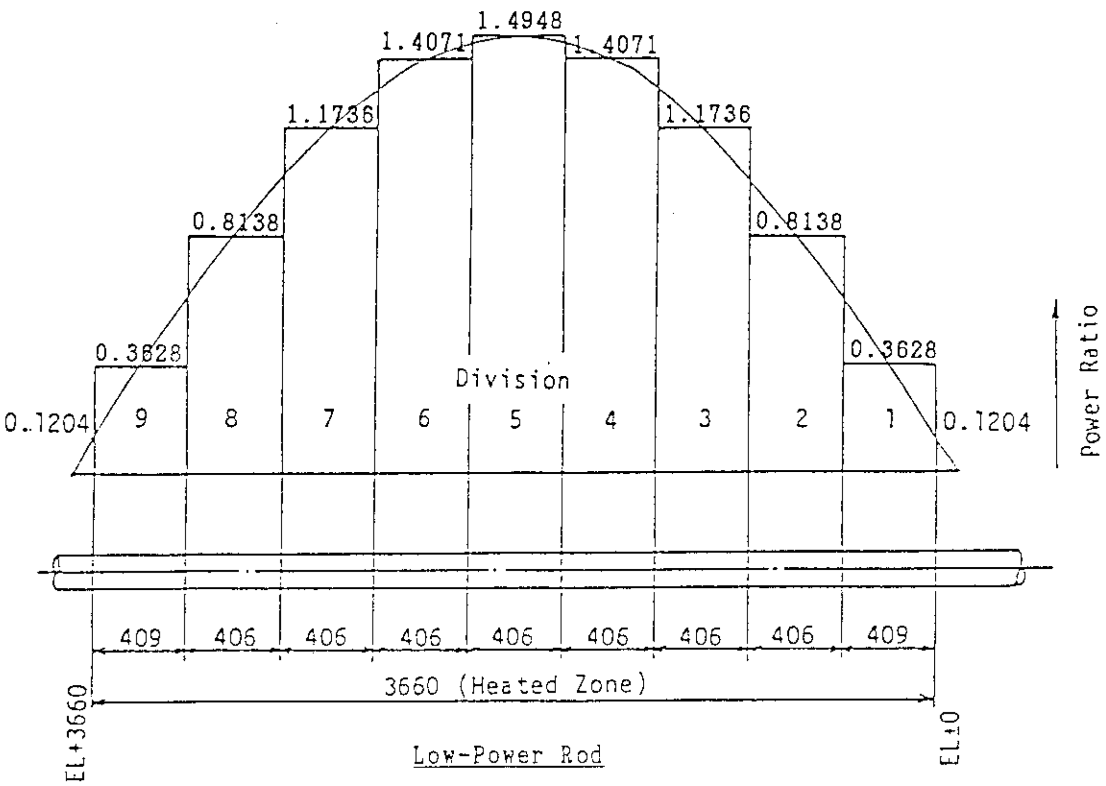
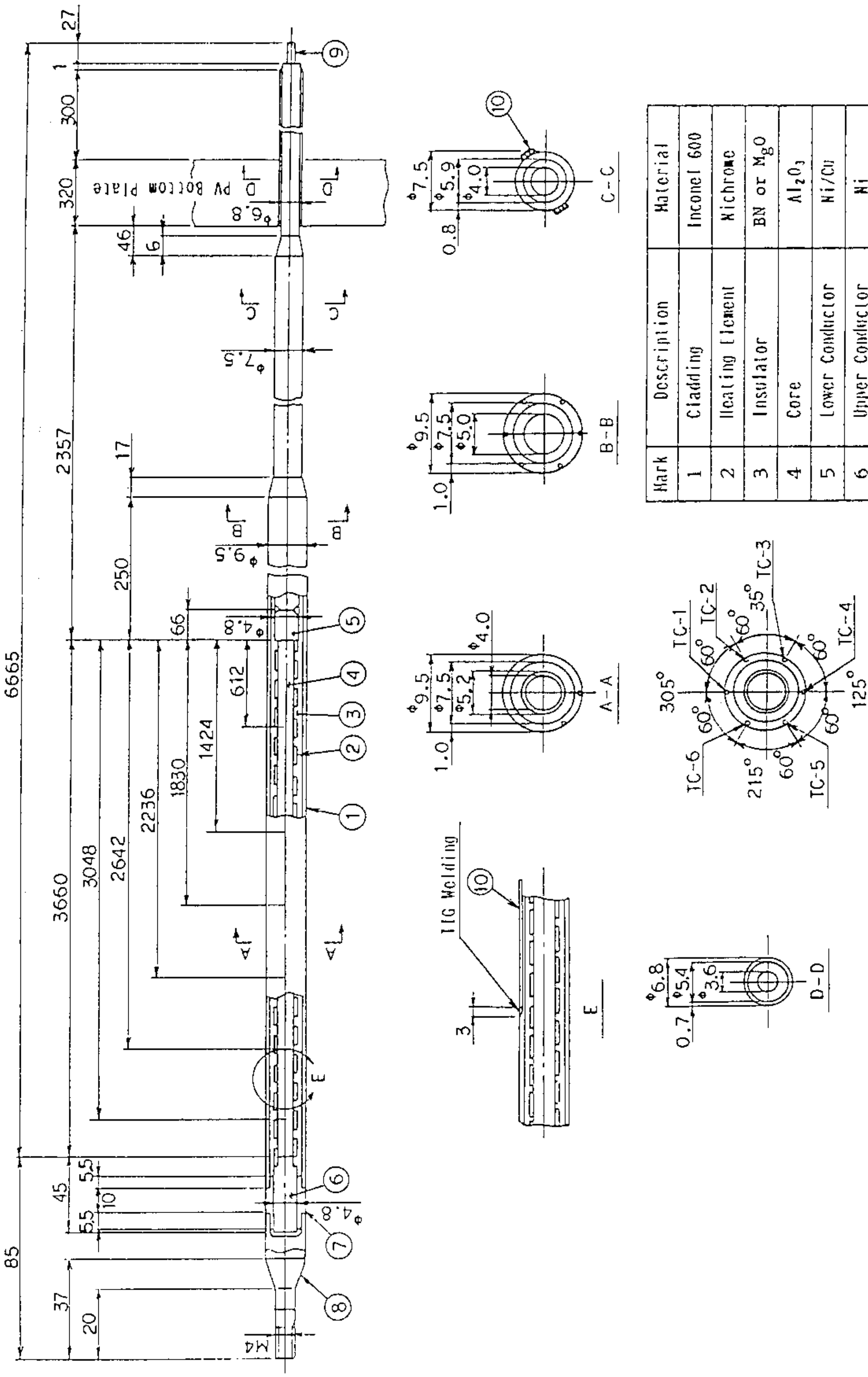
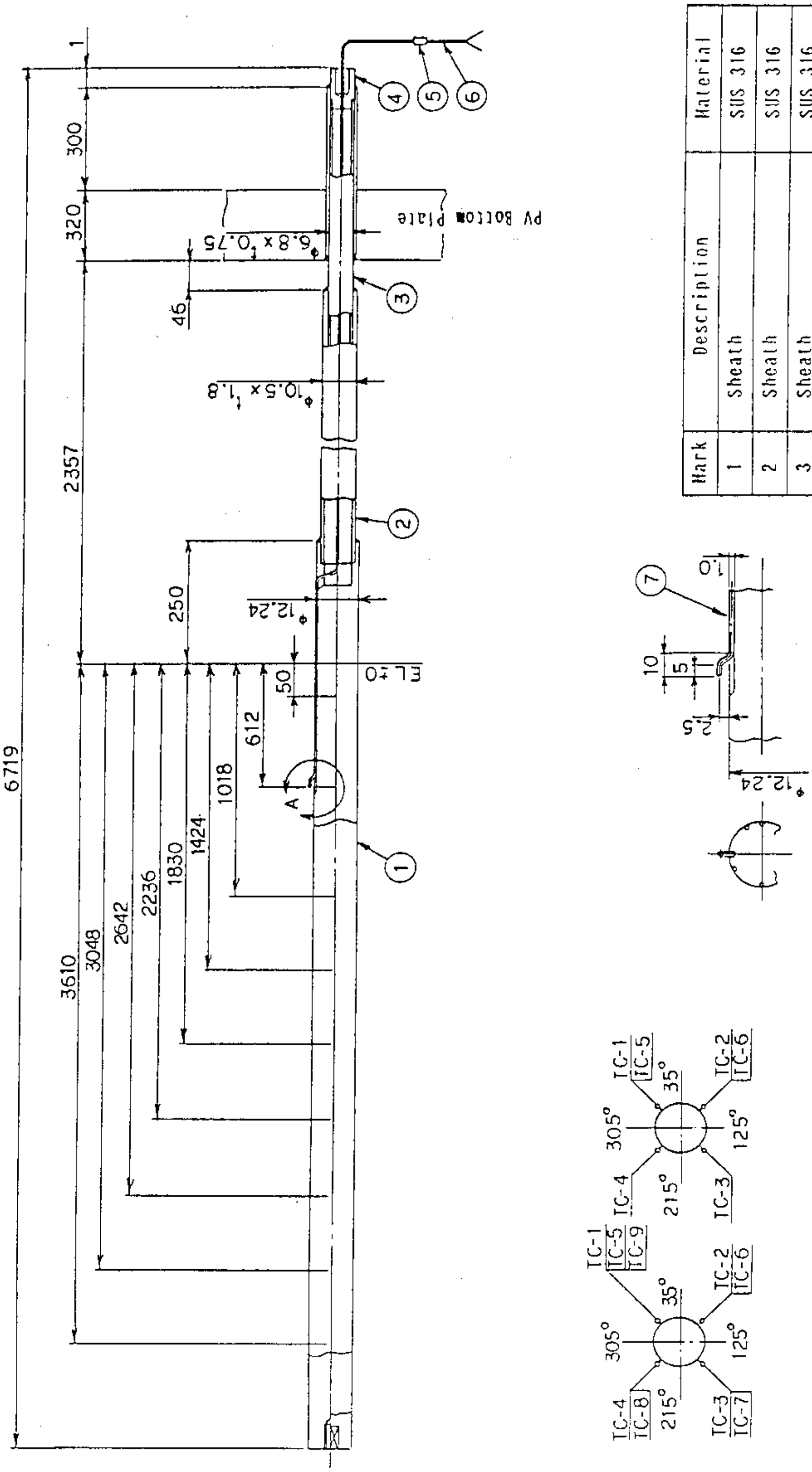


Fig. 5.2.18 Axial Core Power Profile



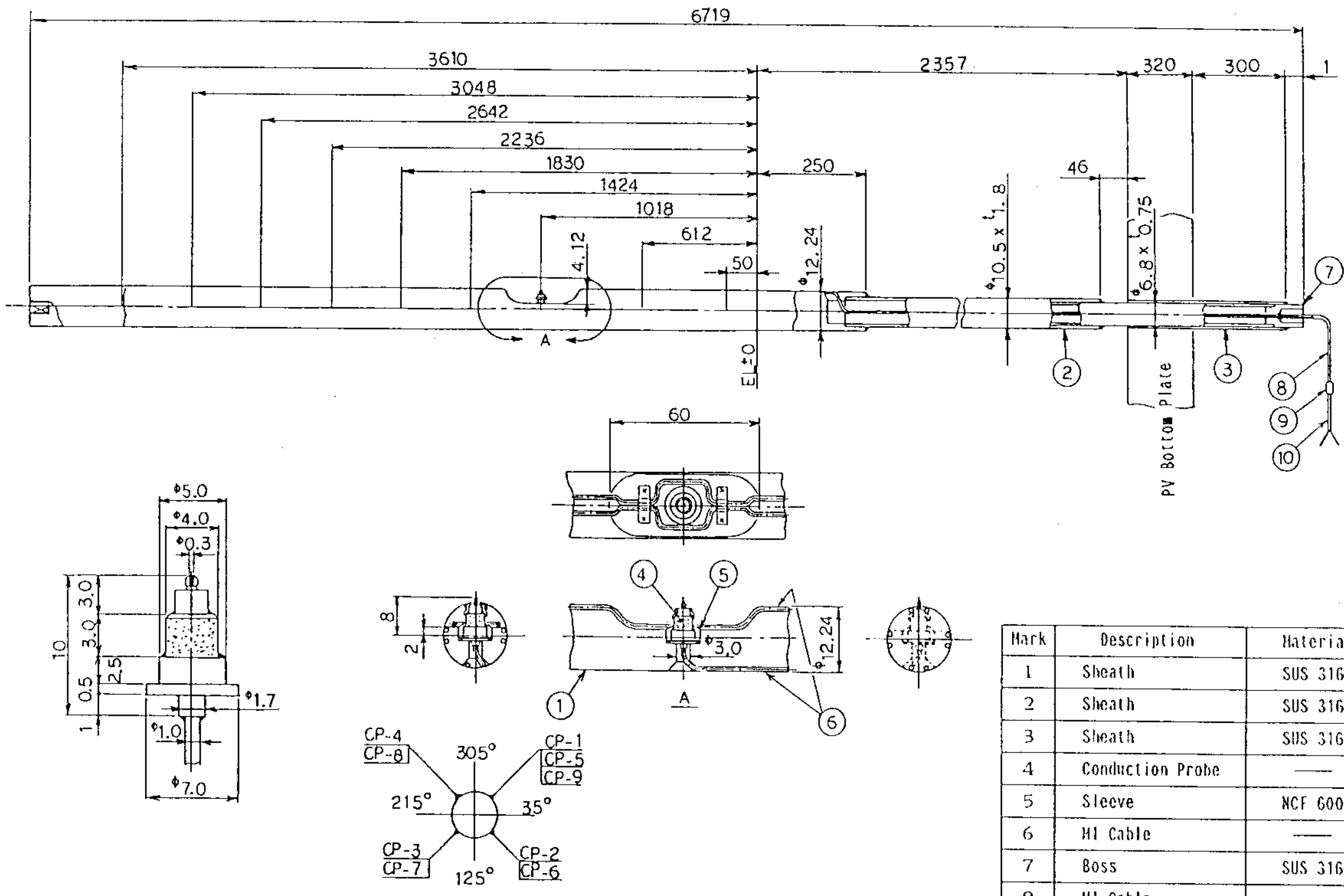
Mark	Description	Material
1	Cladding	Inconel 600
2	Heating Element	Nichrome
3	Insulator	BN or M_gO
4	Core	Al_2O_3
5	Lower Conductor	Ni/Cu
6	Upper Conductor	Ni
7	End Cap	SUS 316
8	Connector	Ni
9	Plug	Cu
10	Thermocouple	C/A

Fig. 5.2.19 Heater Rod



Mark	Description	Material
1	Sheath	SUS 316
2	Sheath	SUS 316
3	Sheath	SUS 316
4	Boss	SUS 316
5	Adapter	SUS 304
6	Lead wire	——
7	Sherthed Thermocouple	C/A

Fig. 5.2.20 Non-Heating Instrumented ROd (Thermocouple)



Mark	Description	Material
1	Sheath	SUS 316
2	Sheath	SUS 316
3	Sheath	SUS 316
4	Conduction Probe	——
5	Sleeve	NCF 600
6	MI Cable	——
7	Boss	SUS 316
8	MI Cable	——
9	Adapter	SUS 304
10	Lead Wire	RG-58

Fig. 5.2.21 Non-Heating Instrumented Rod (Conduction Probe)

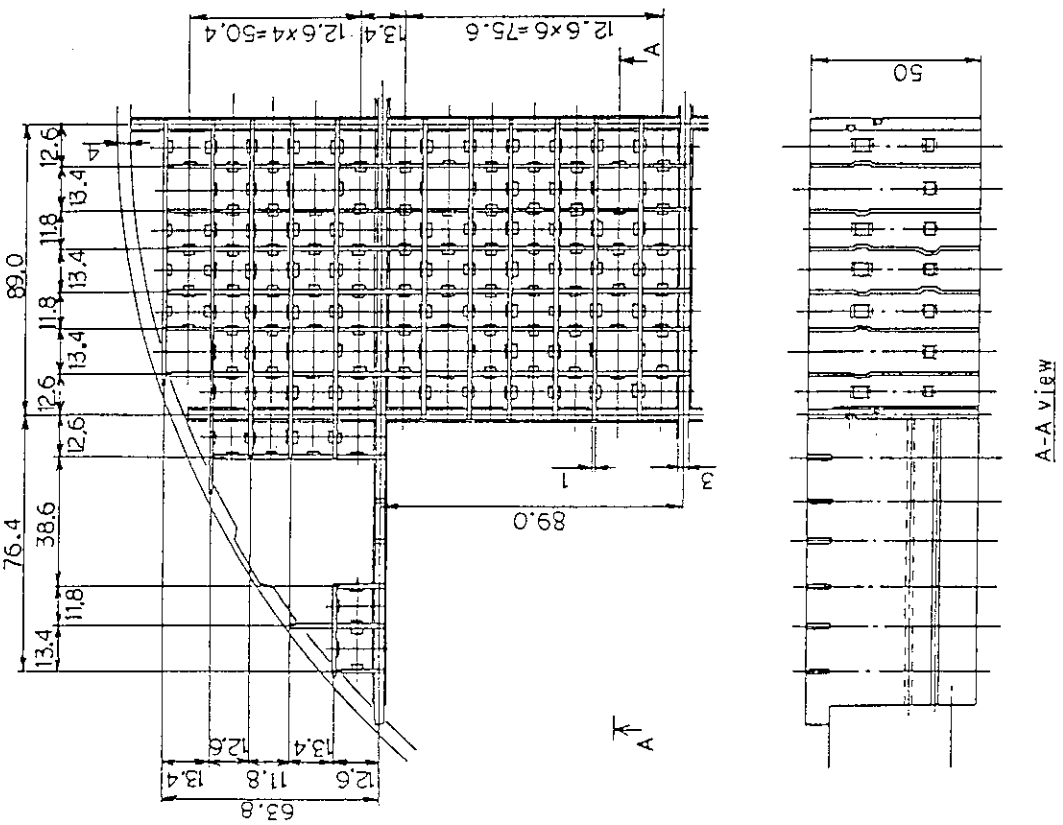


Fig. 5.2.22 Core Grid

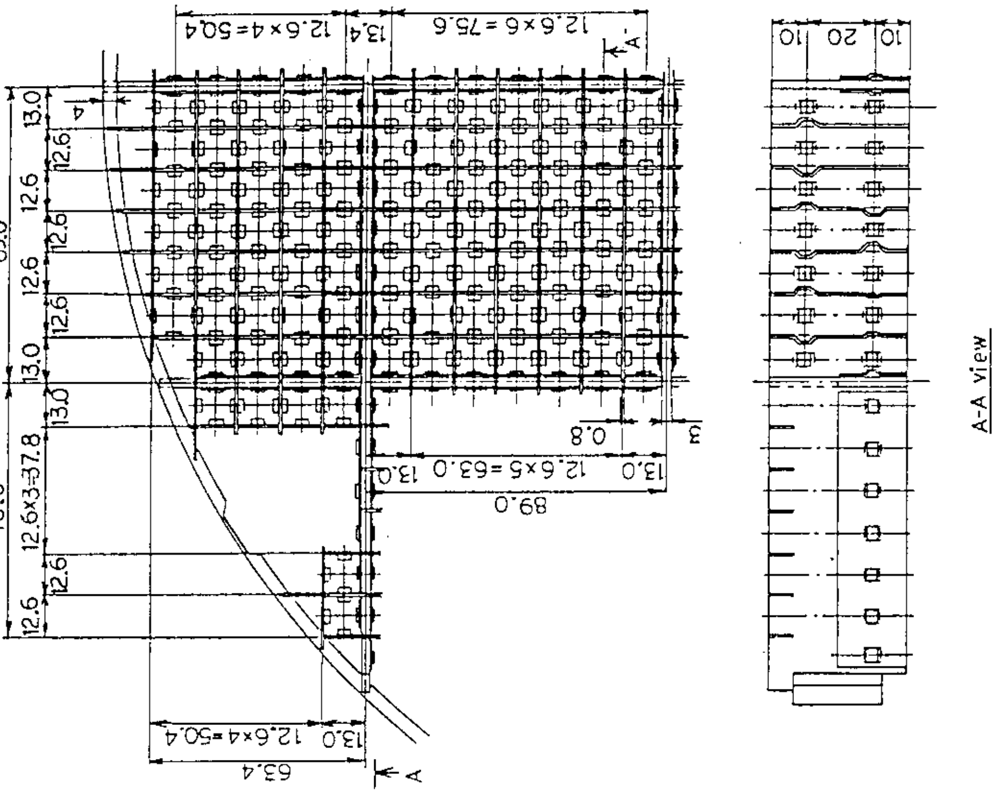


Fig. 5.2.23 Lower Plenum Spacer Details

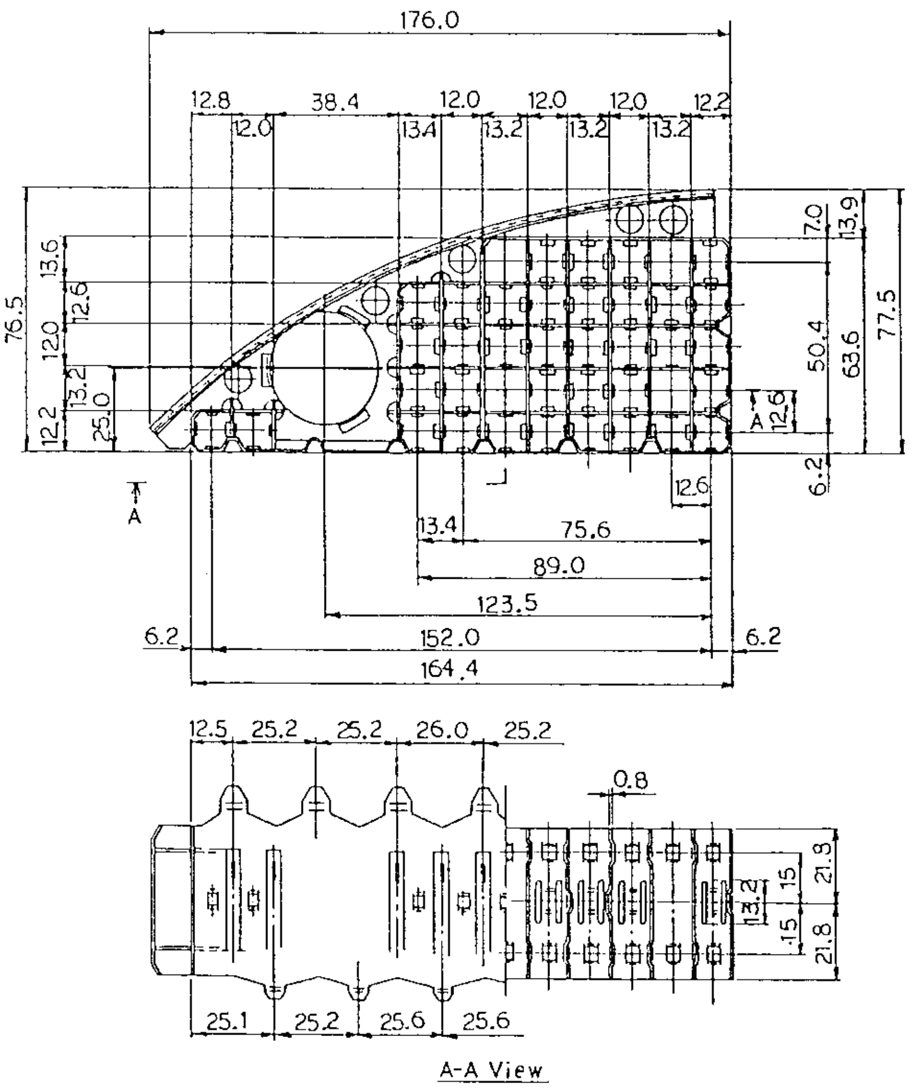


Fig. 5.2.24 Spacer I without Mixing Vanes

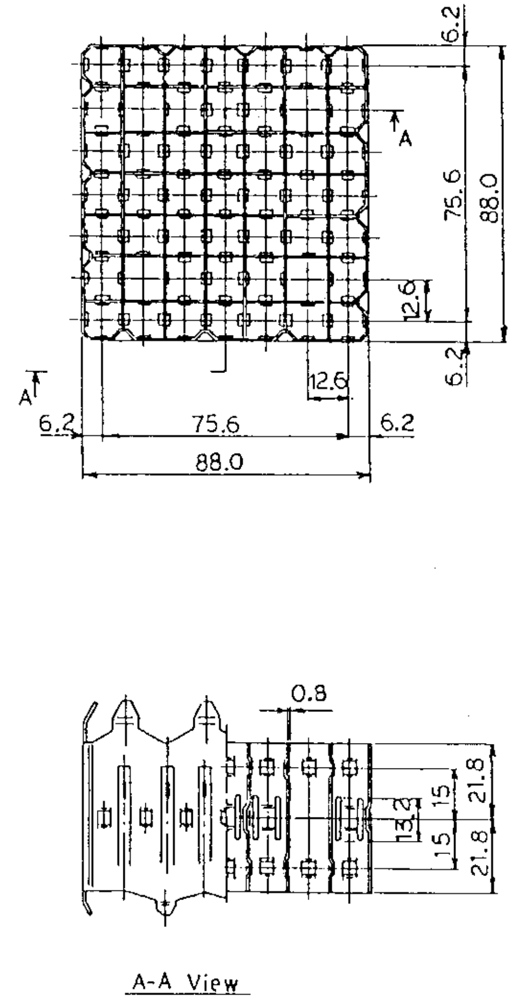


Fig. 5.2.25 Spacer II without Mixing Vanes

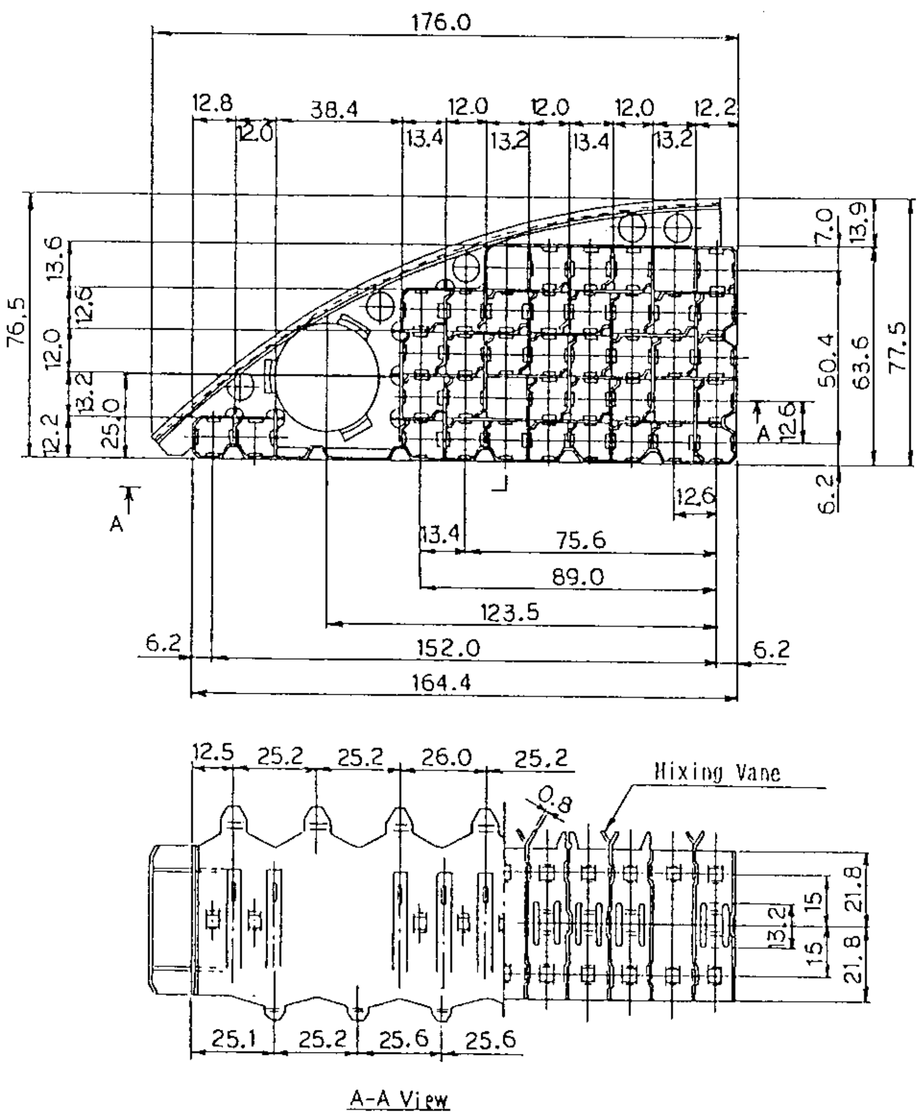


Fig. 5.2.26 Spacer III with Mixing Vanes

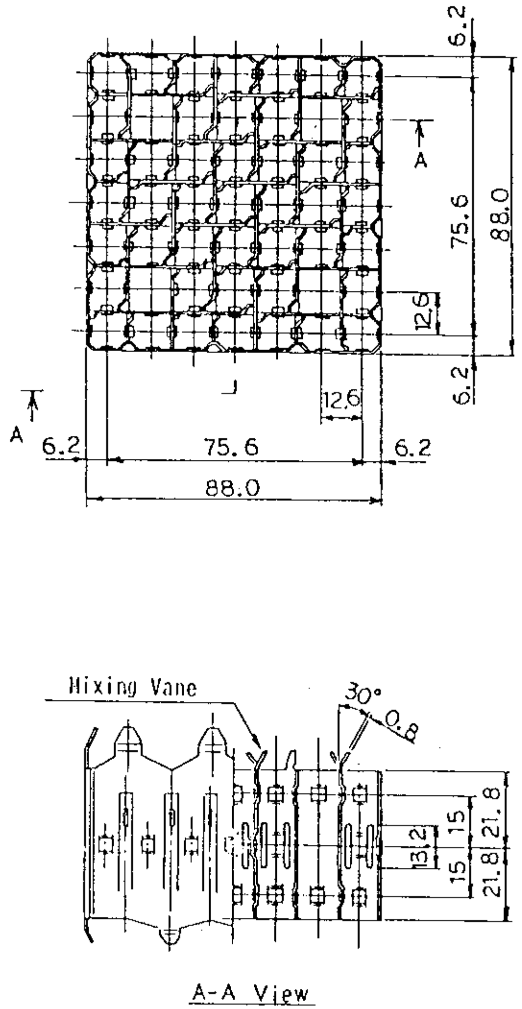


Fig. 5.2.27 Spacer IV with Mixing Vanes

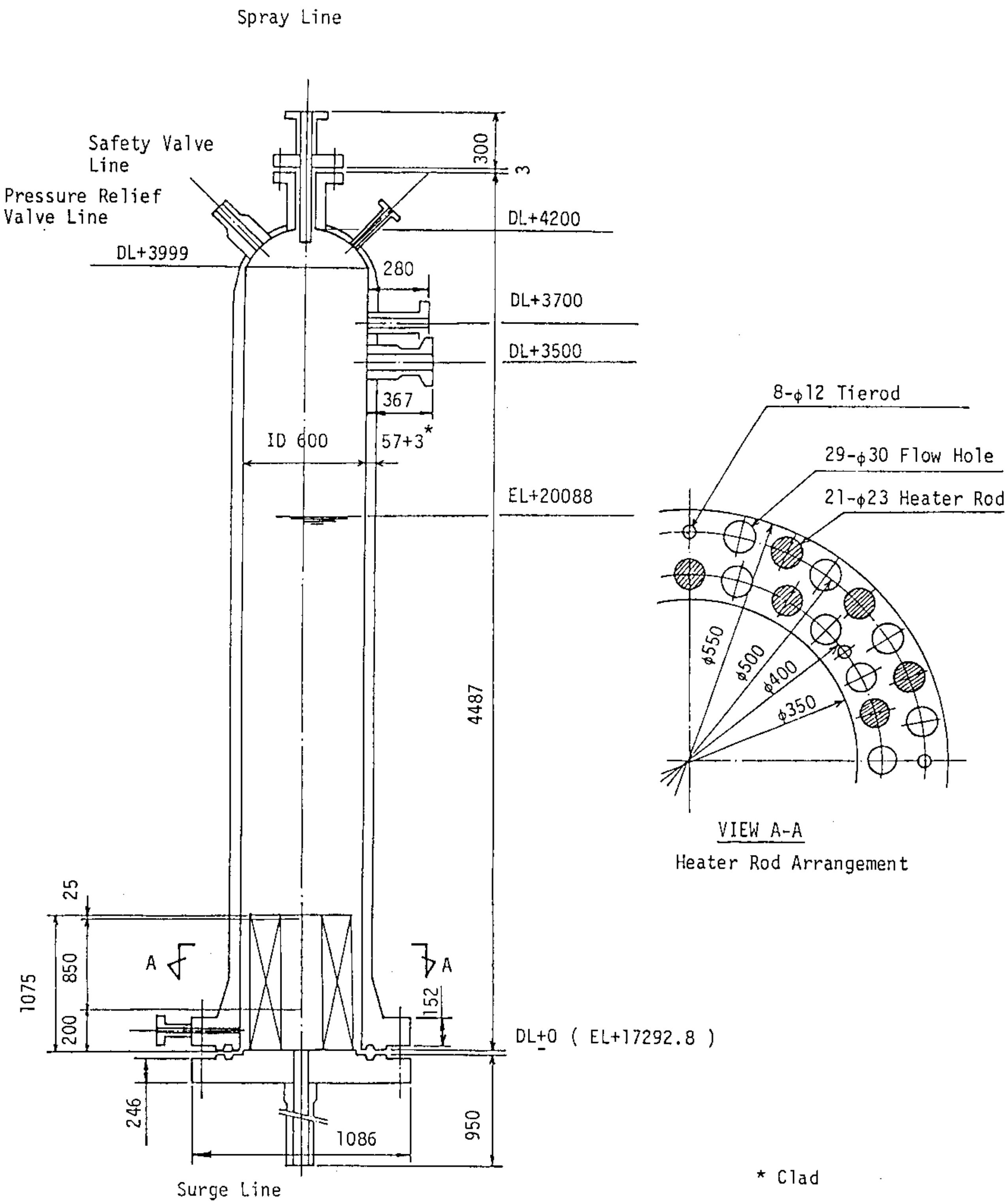


Fig. 5.2.28 Pressurizer

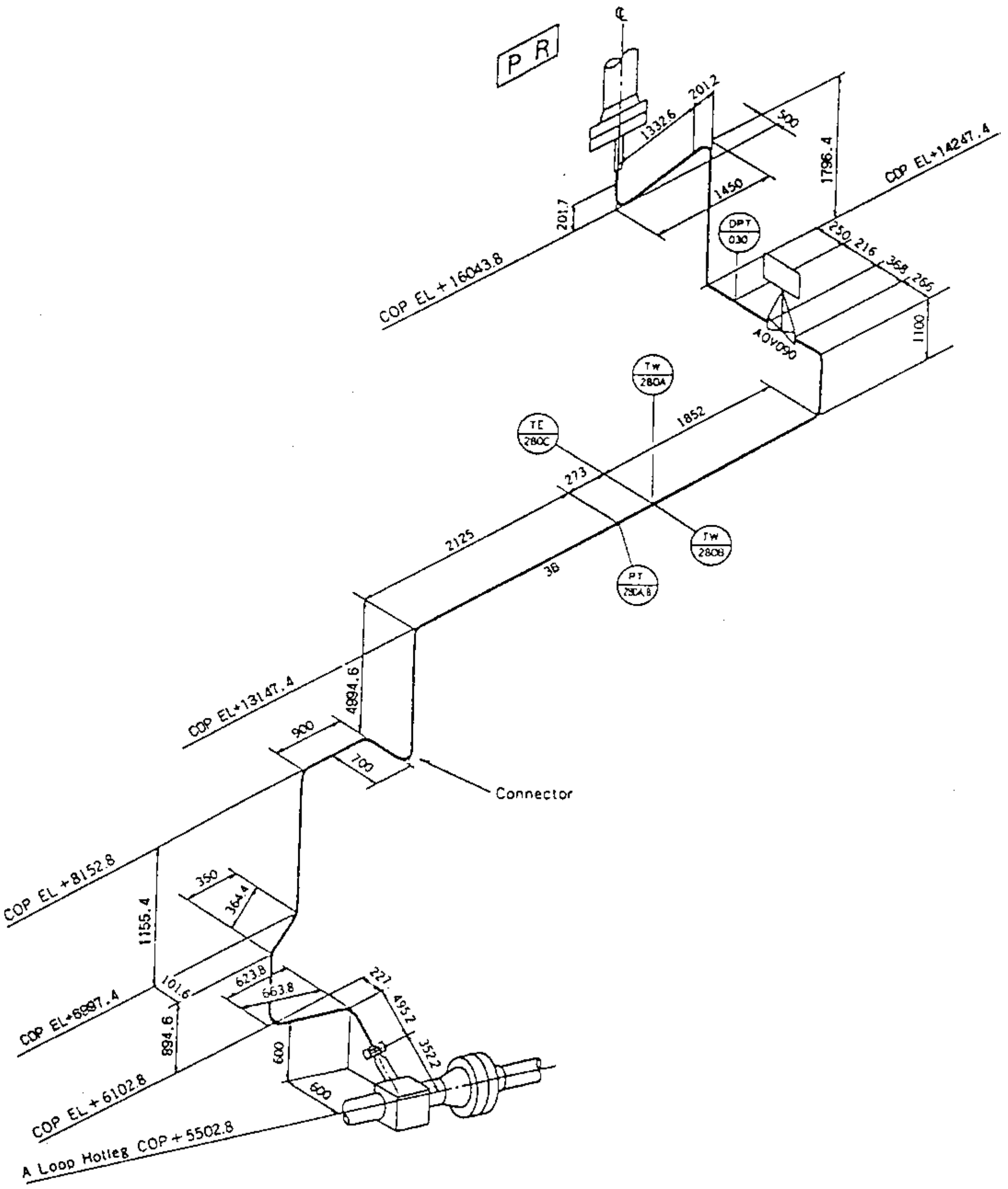


Fig. 5.2.29　　Piping Schematic for Surge Line

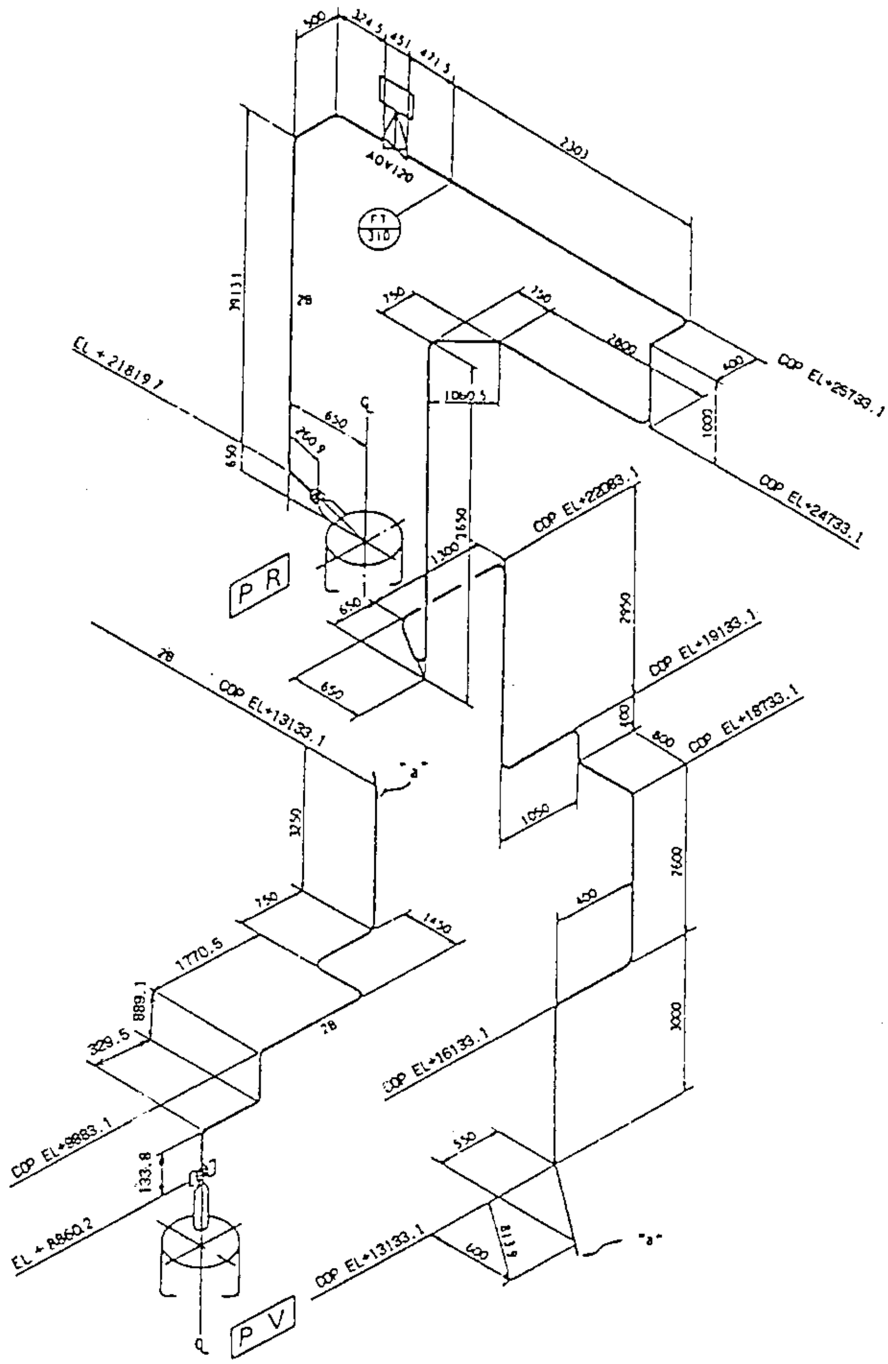


Fig. 5.2.30 Piping Schematic for Vent Line

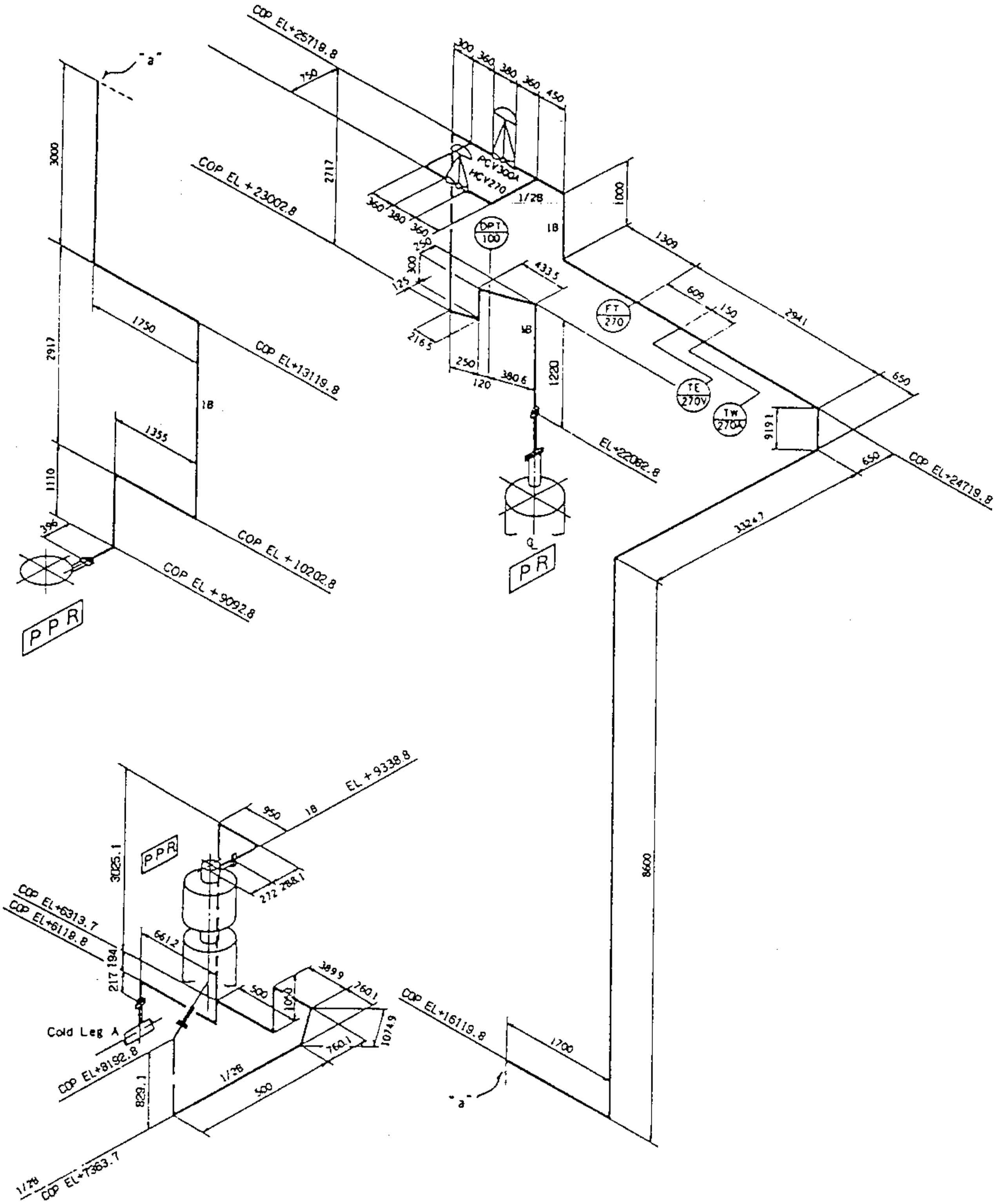


Fig. 5.2.31 Piping Schematic for Spray Line

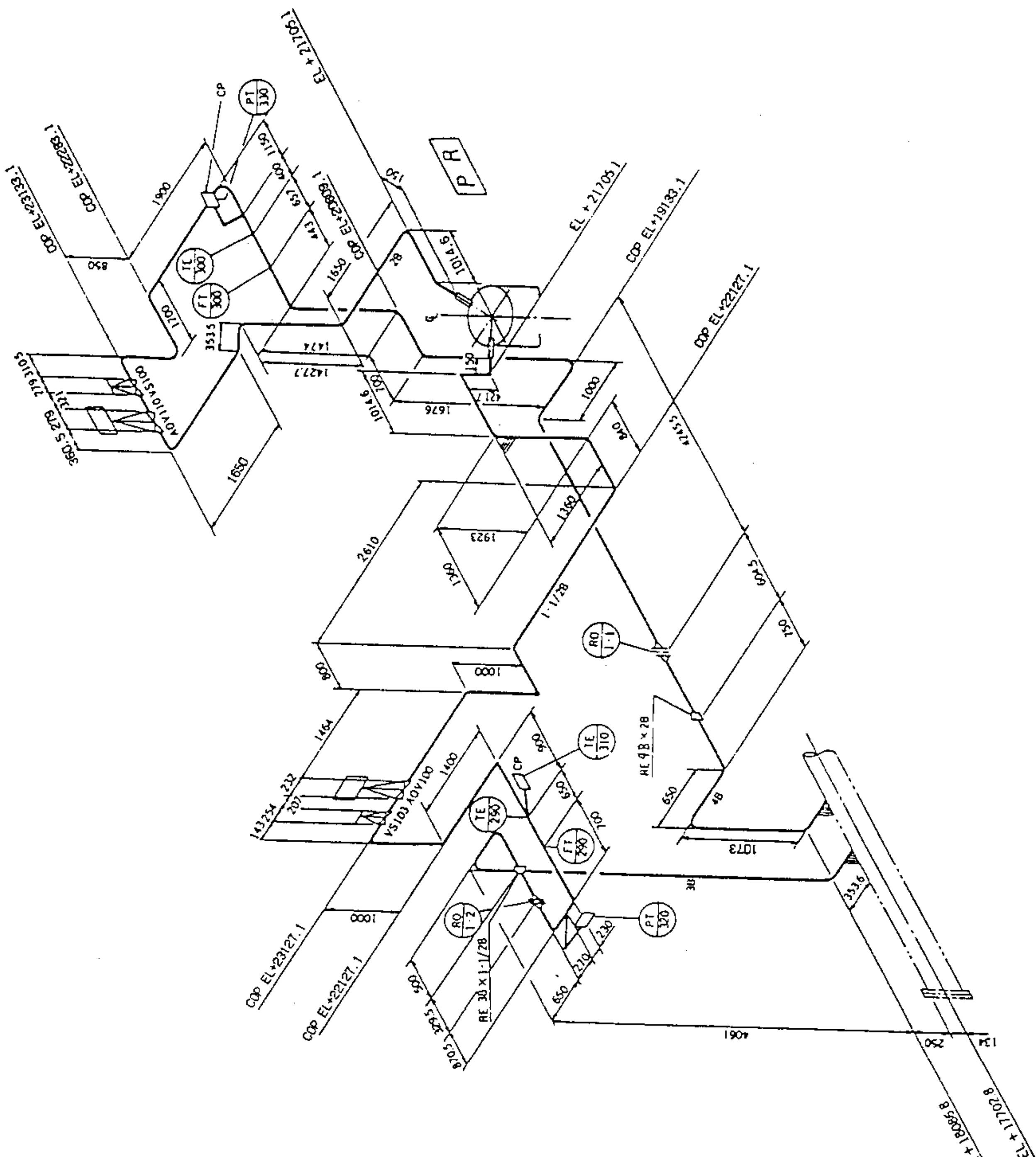


Fig. 5.2.32 Piping Schematic for Pressure Relief Valve and Safety Valve Lines

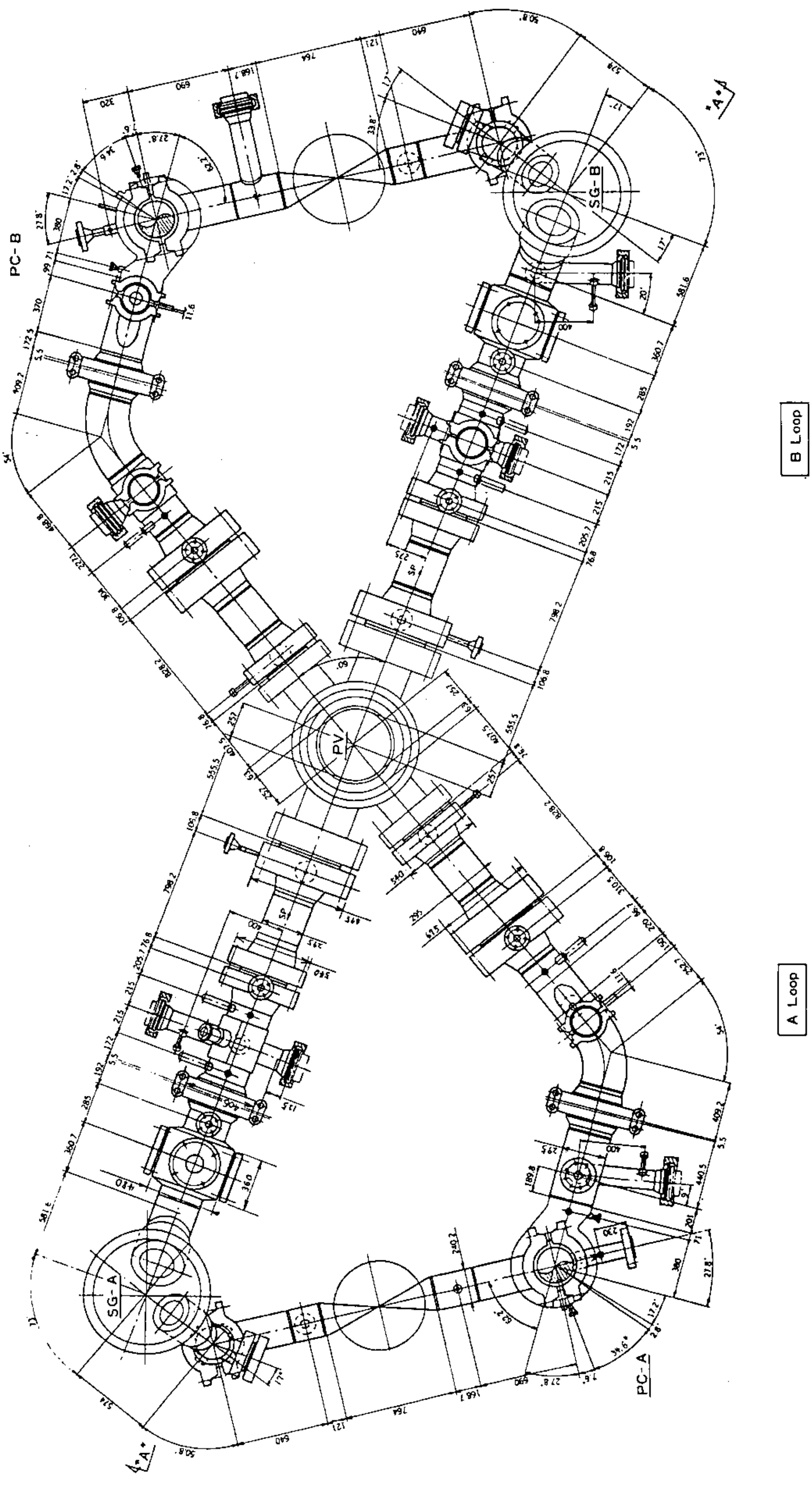


Fig. 5.2.33 Primary Loop Dimensions (Plan View)

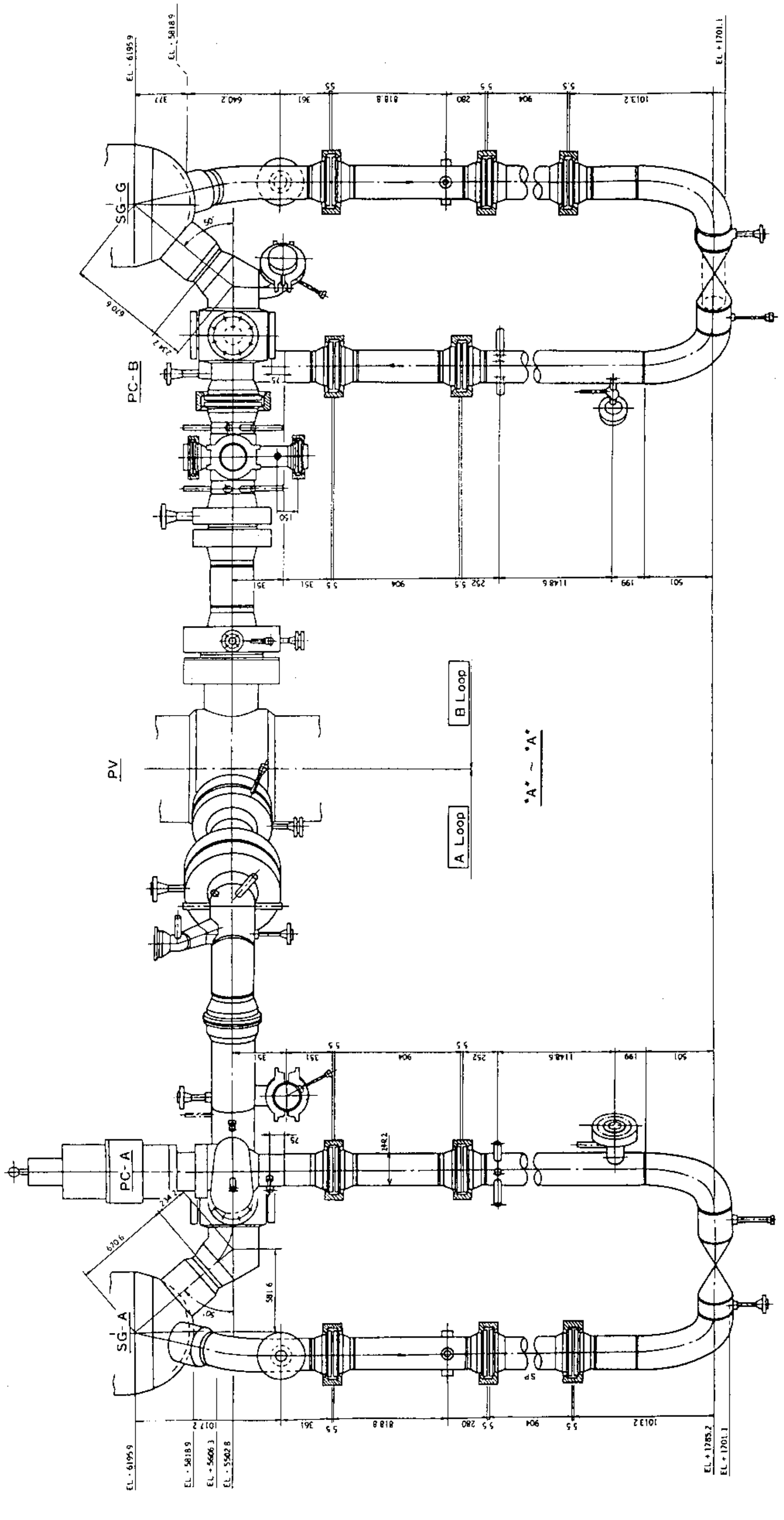


Fig. 5.2.34 Primary Loop Dimensions (Elevation View)

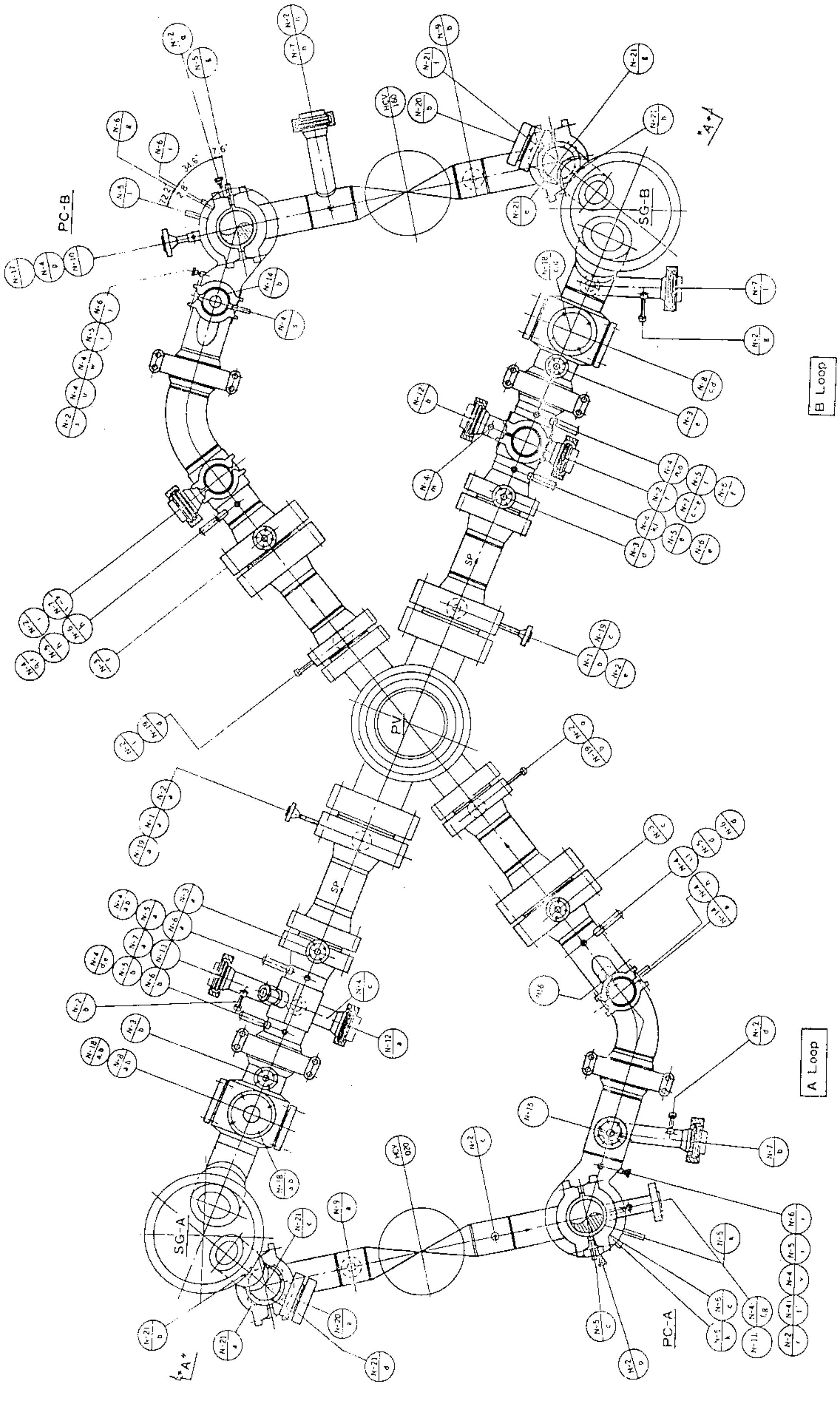


Fig. 5.2.35 Primary Loop Nozzle Locations (Plan View)

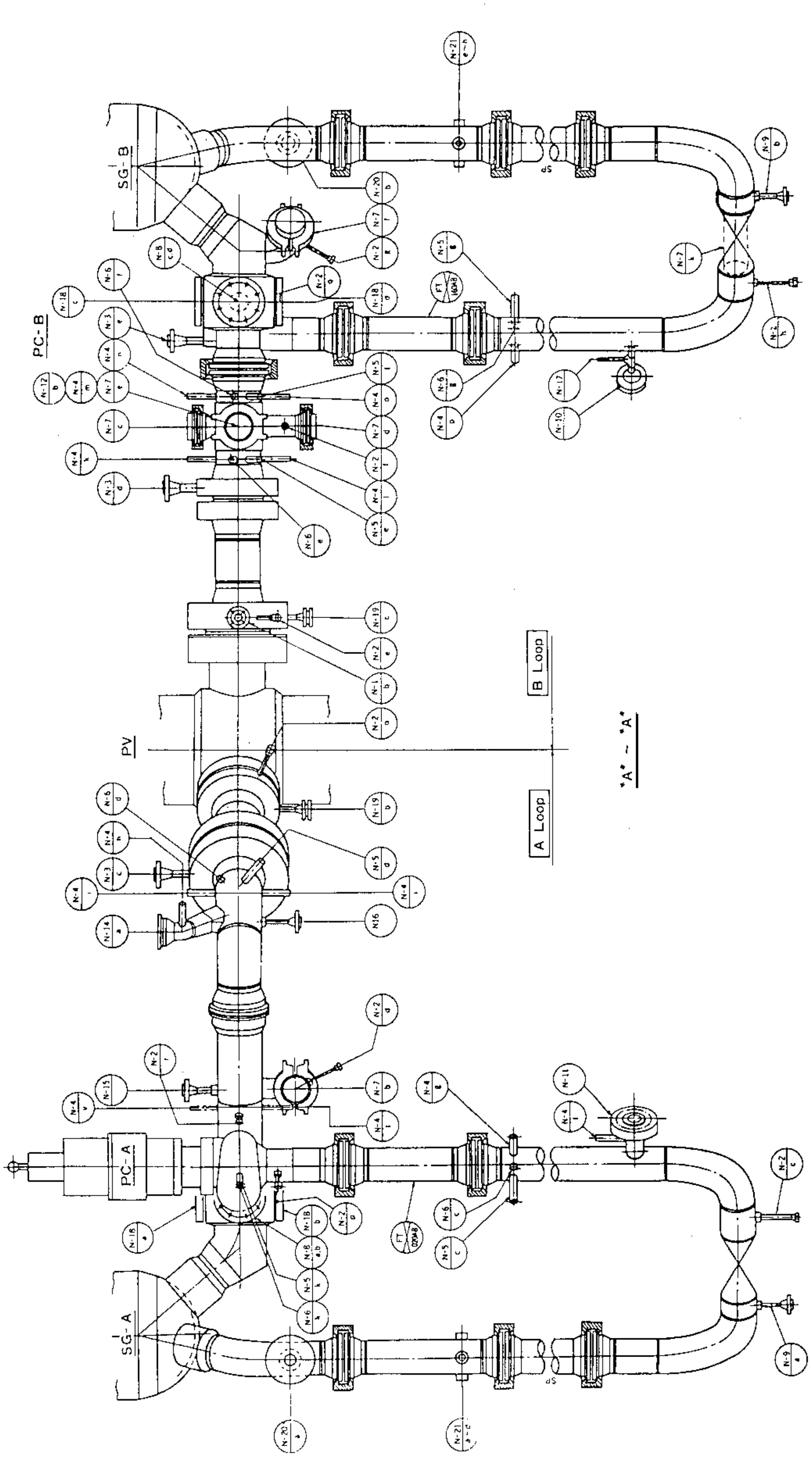


Fig. 5.2.36　Primary Loop Nozzle Locations (Elevation View)

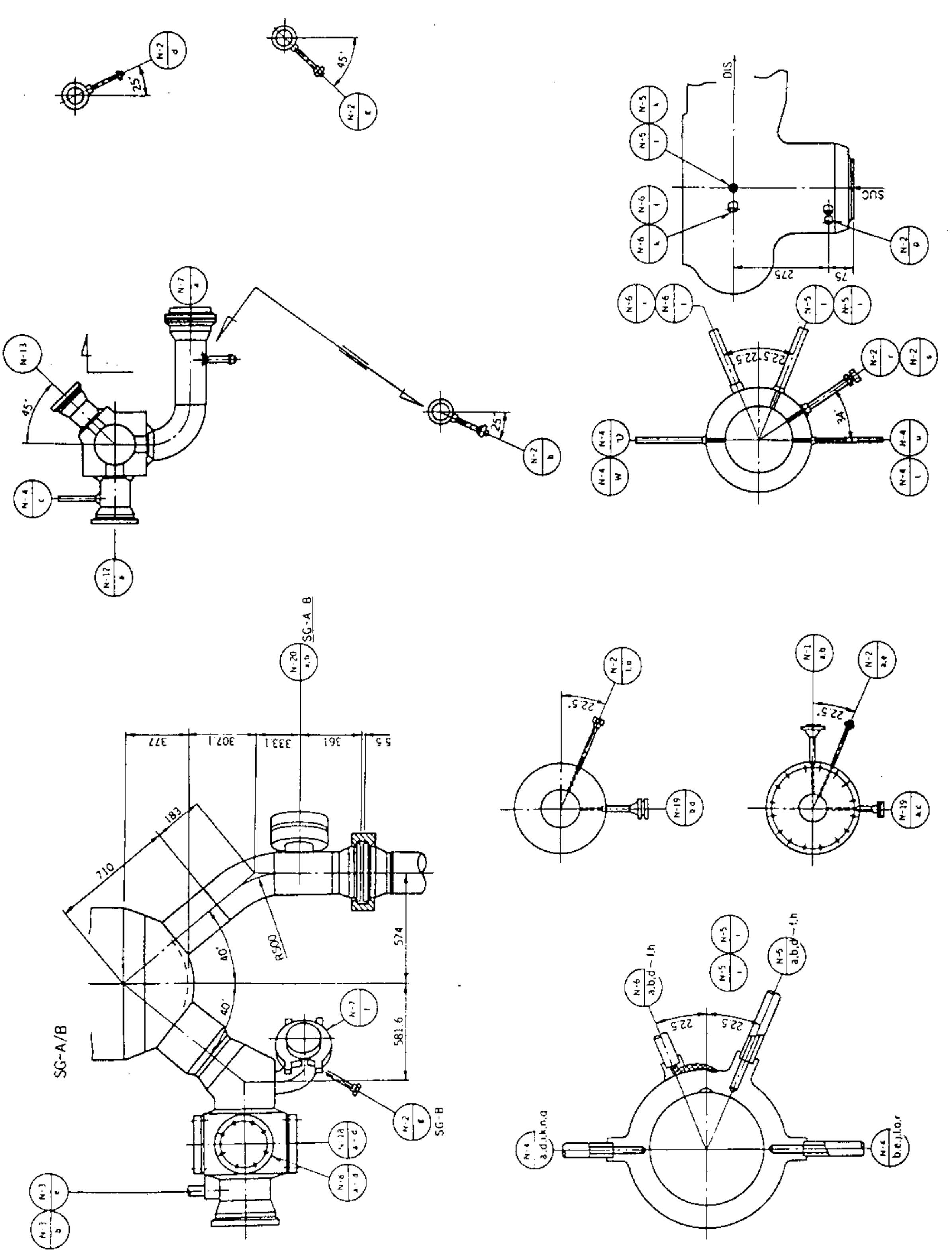


Fig. 5.2.37 Primary Loop Nozzle Details

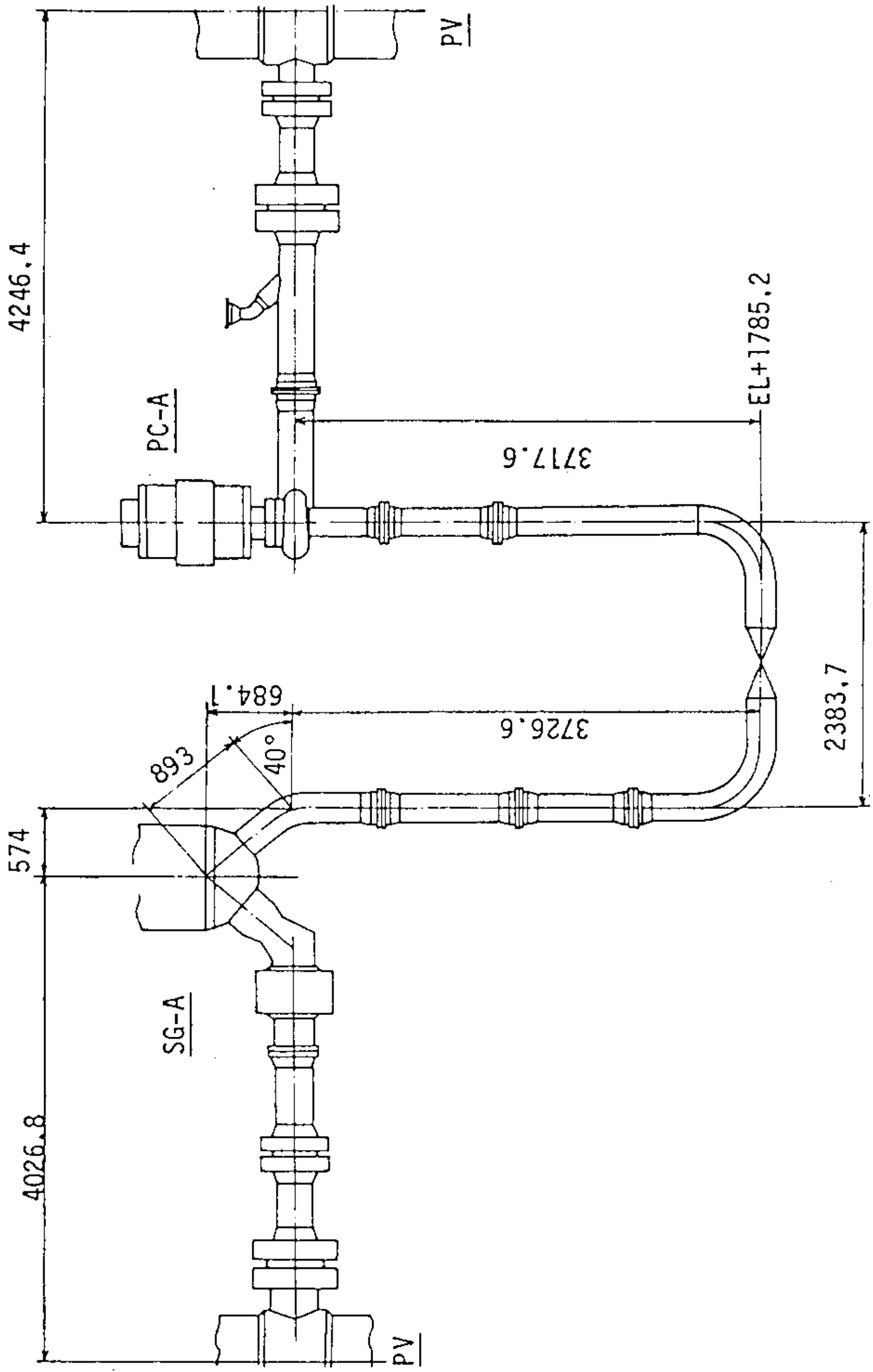
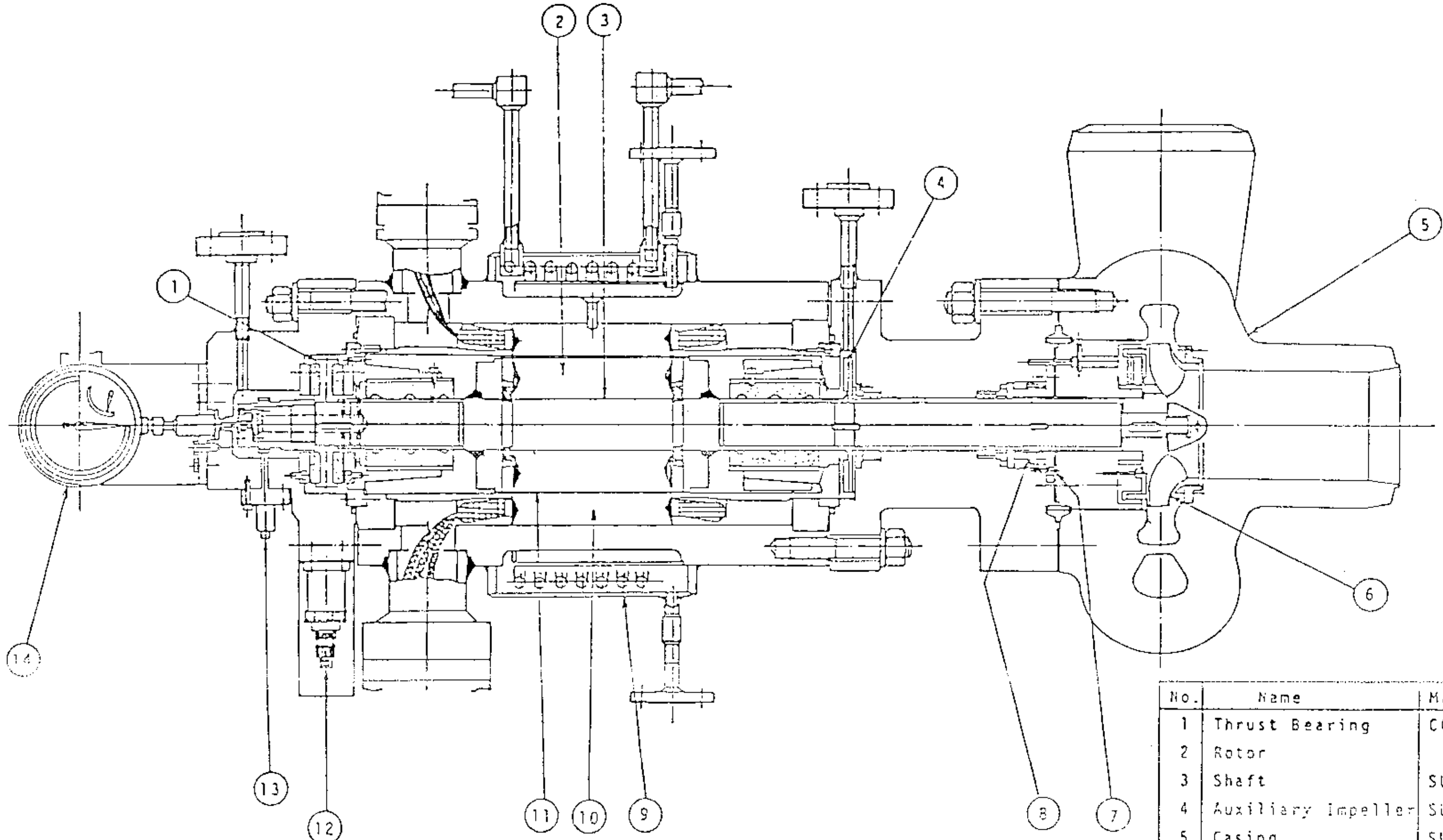


Fig. 5.2.38 Geometry of Primary Loop A



No.	Name	Material	Number
1	Thrust Bearing	CG21/SUS304	1
2	Rotor		1
3	Shaft	SUS304	1
4	Auxiliary Impeller	SUS14	1
5	Casing	SUS13A	1
6	Impeller	SUS13	1
7	Ratchet	SUS304	1
8	Stopper	SUS304	3
9	Heat Exchanger	[illegible]	1
10	Stator		1
11	Stator Liner	Hastelloy-C276	1
12	Vibration Sensor		1
13	Speed Meter		2
14	Bearing Monitor	SUS304/316	1

Fig. 5.2.39 Cross-section of primary coolant pump PC-A

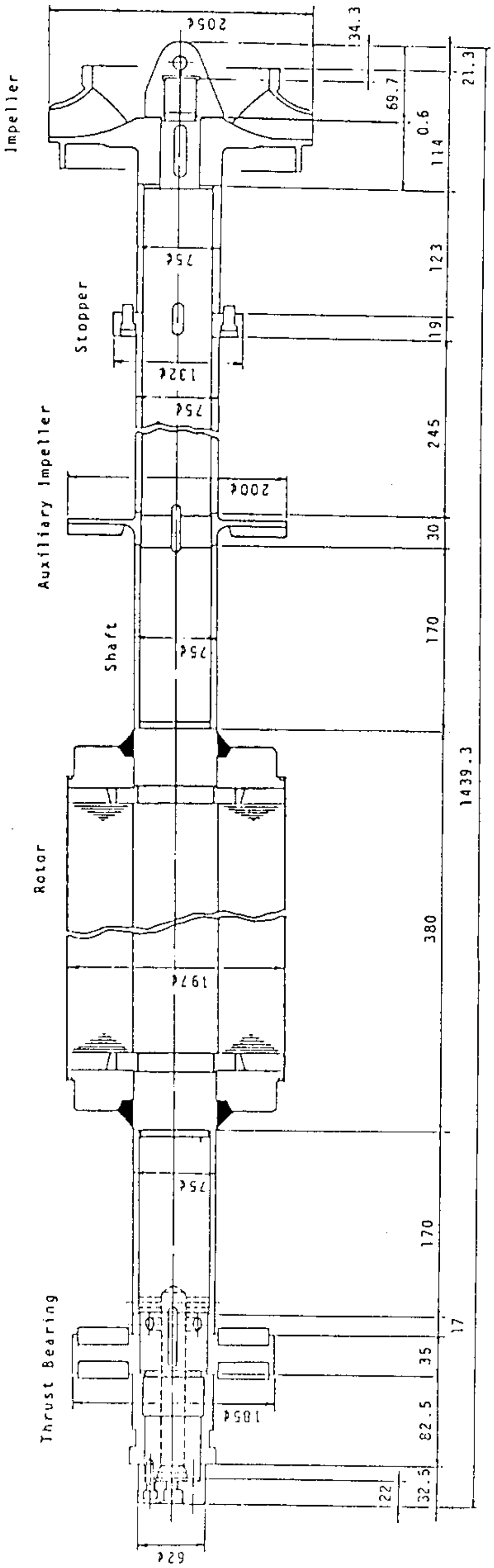
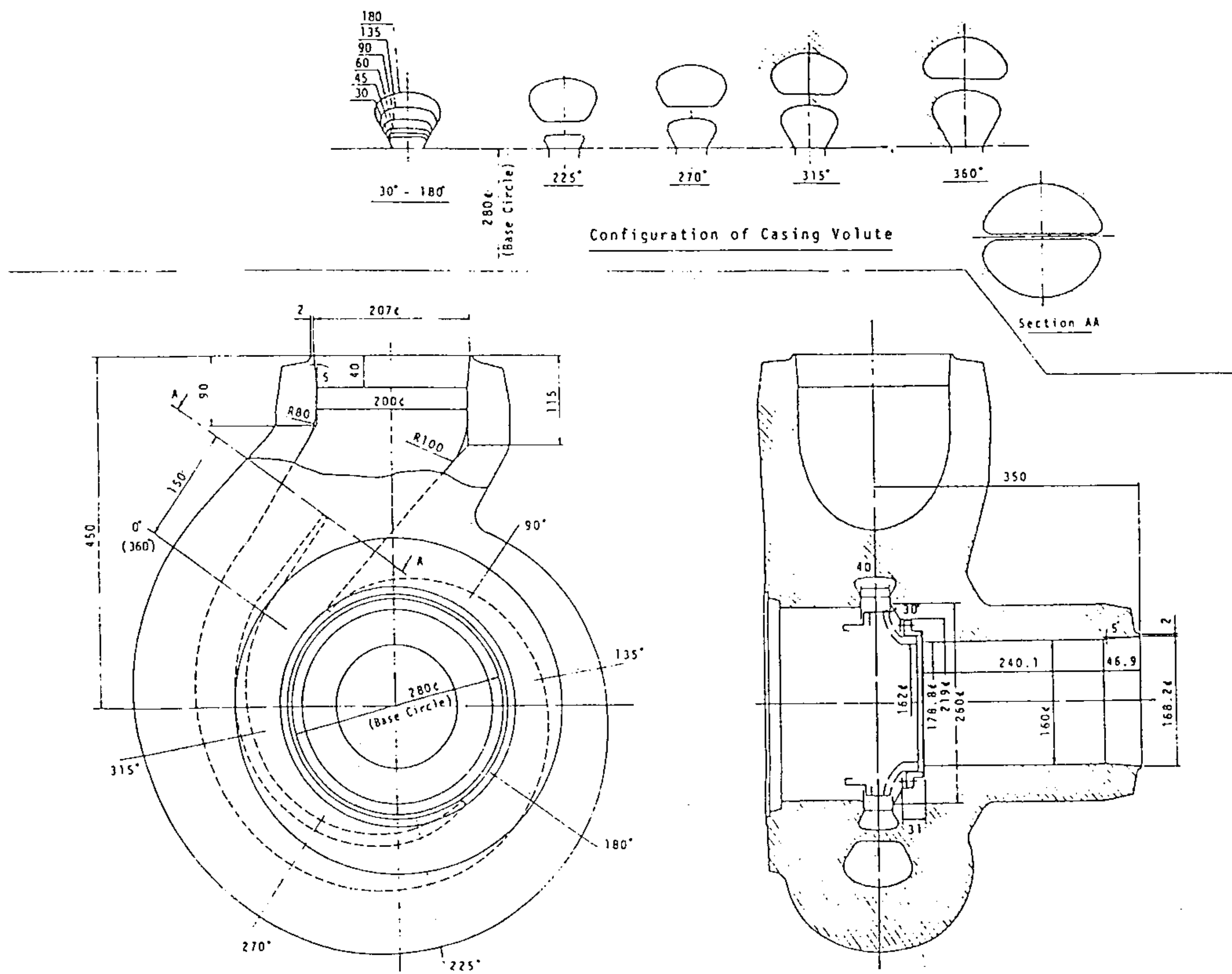


Fig. 5.2.40 Rotating Part of PC-A



Design Data

Angle	Area (x10⁻³m²)
10°	0.170
20°	0.352
30°	0.540
45°	0.833
60°	1.138
90°	1.775
135°	2.791
180°	3.869
225°	5.001
270°	6.184
315°	7.413
360°	9.000

Fig. 5.2.41 Cross-section of PC Discharge Flow Path

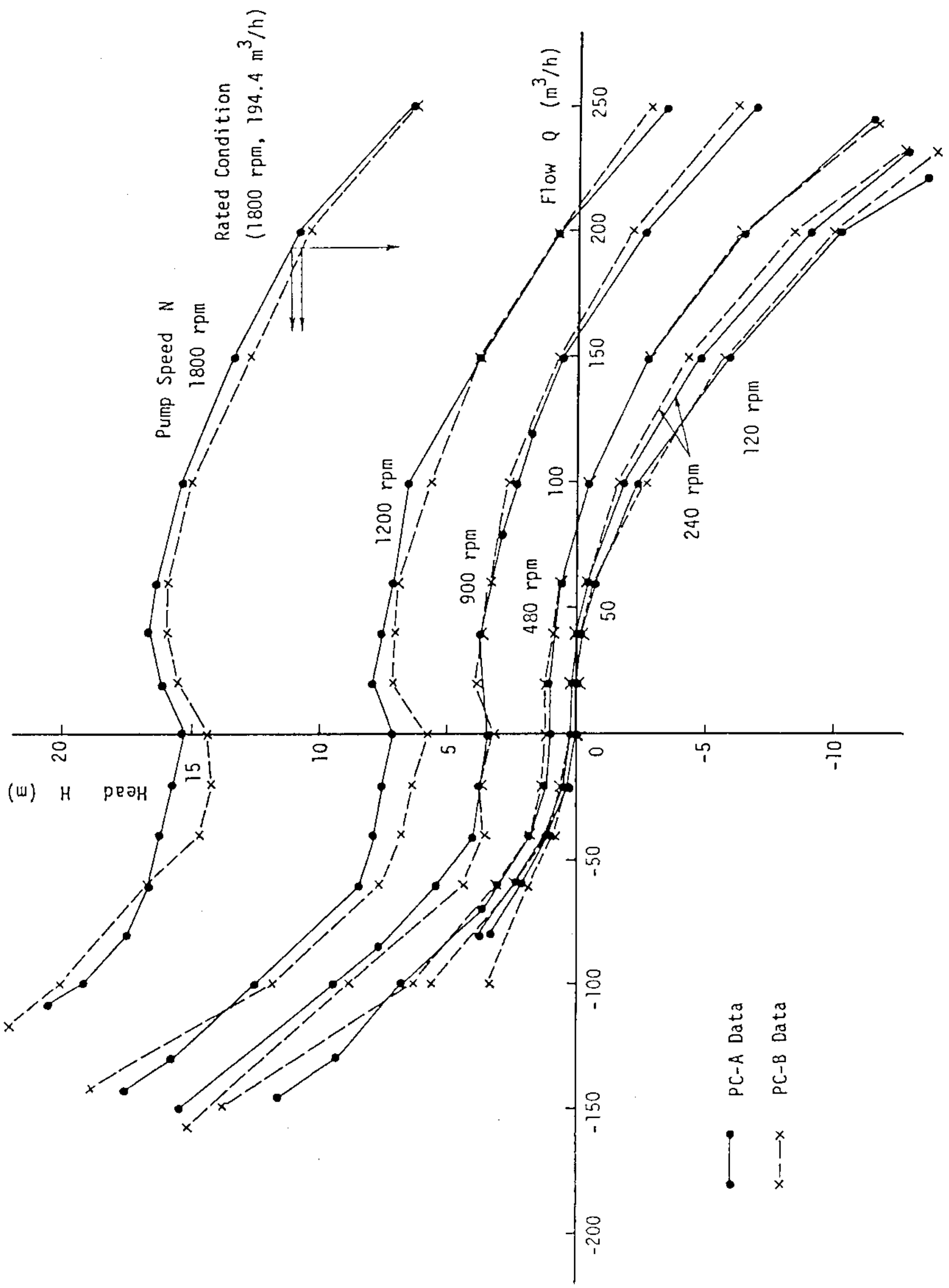


Fig. 5.2.42 Head - Flow Curves for PC-A and PC-B

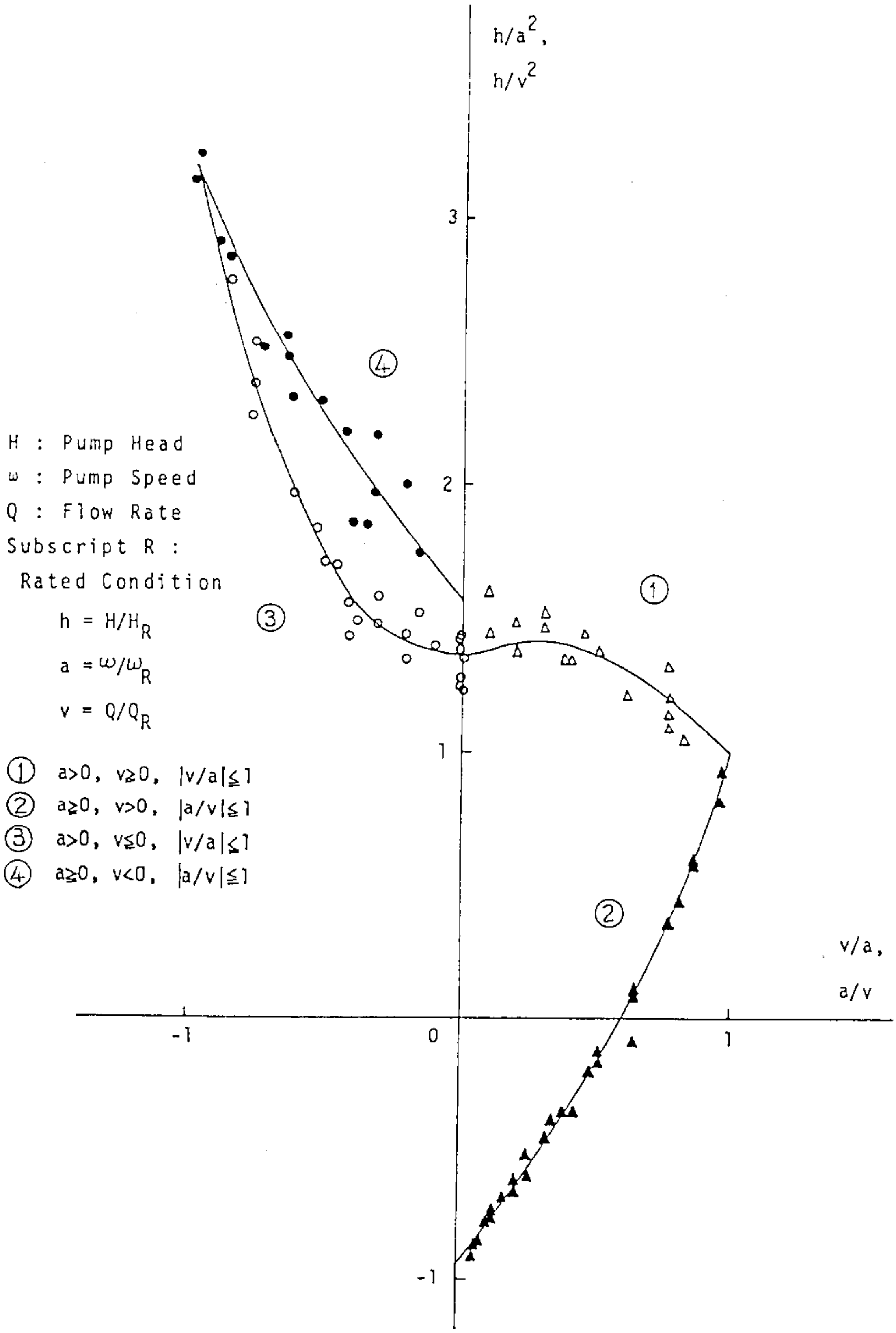


Fig. 5.2.43 Single-phase Head Homologous Curves for PC-A (a>0)

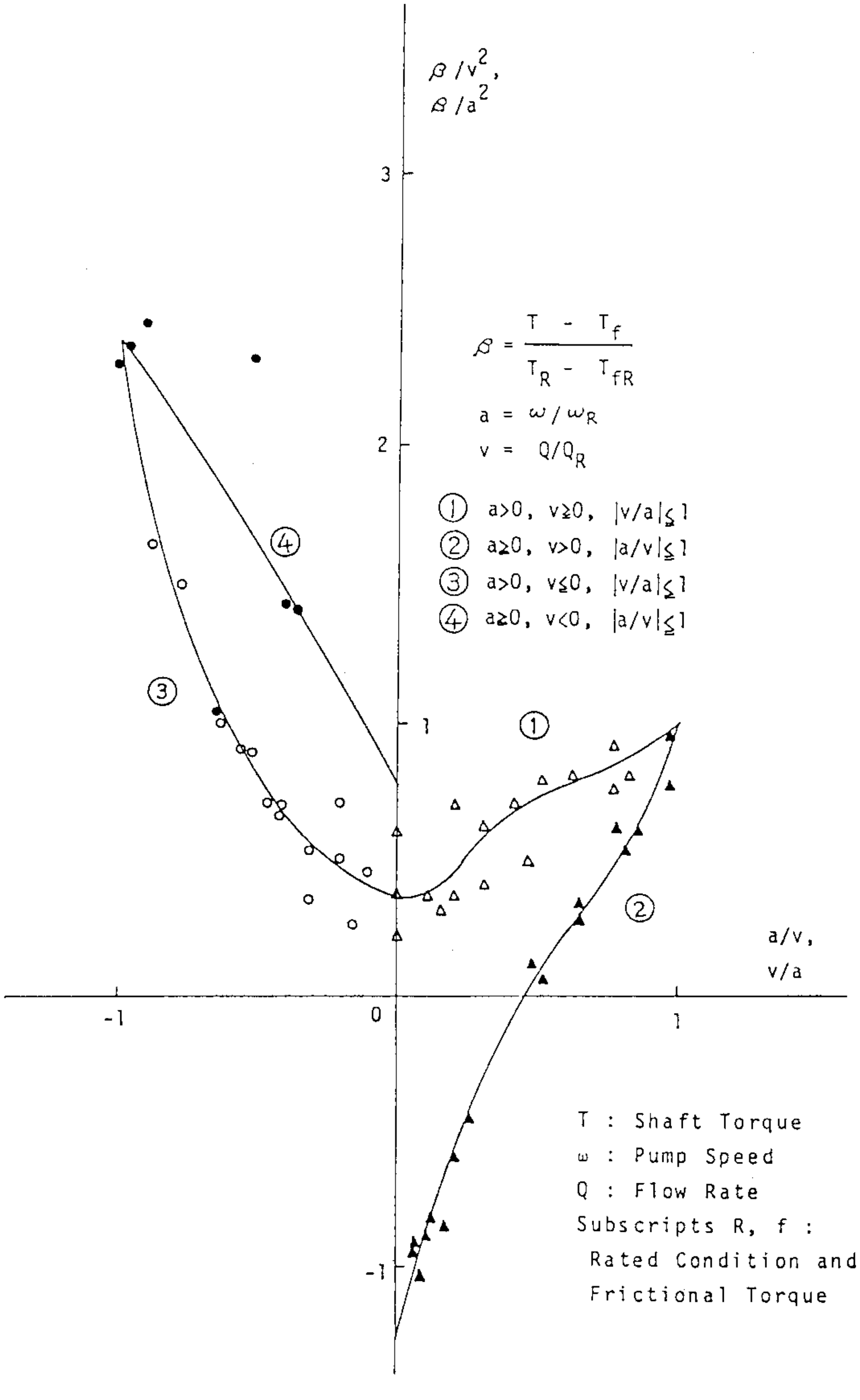


Fig. 5.2.44 Single-phase Torque Homologous Curves for PC-A (a>0)

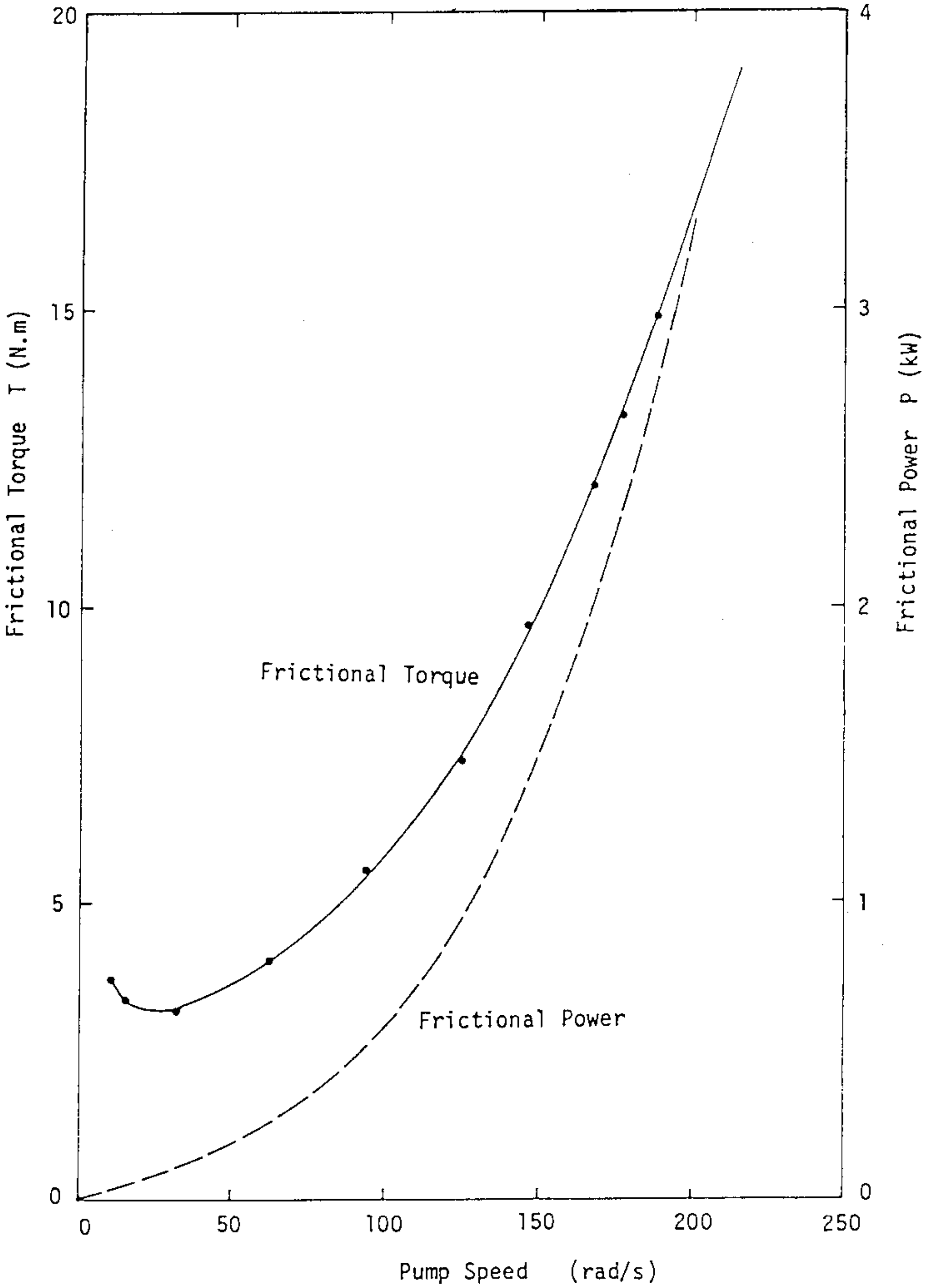


Fig. 5.2.45 Frictional Torque Characteristics for PC-A

5.3 Steam Generator and Secondary System

The steam generators (SGs) and secondary coolant system in the LSTF are designed to simulate both steady state and transient responses of the 2/48 scaled steam and feedwater flows as well as the scaled primary-to-secondary heat transfer in the reference PWR. Specifically, the LSTF secondary system is capable of simulating (1) asymmetrically thermal-hydraulic responses of two identical SGs, (2) feed and bleed in the secondary system, (3) the turbine bypass flow transients and (4) the pipe ruptures at the steam line, feedwater line and U-tubes. The maximum heat transfer rate is designed as 35 MW per one SG (2/48 scaled value of one PWR SG). The SGs and other major components in the secondary system are listed in Table 5.3.1 and shown in Fig. 5.3.1. The configuration and characteristics of the SGs, steam condensation system, feedwater system and connecting pipings are described below.

5.3.1 Steam Generator

The two steam generators, SG-A and SG-B, have the same designed specifications. Each consists of the inlet and outlet plena for the primary side, U-tubes, boiler section, primary and secondary steam separators, steam dome, and other internals as shown in Figs. 5.3.2 (a) through (c).

(1) Inlet and Outlet Plena of SG

The inlet and outlet plena of each SG have been modified from the original design. The semi-cylindrical filler blocks which existed in the original facility design were removed before the initiation of the official experiments with the first core assembly as shown in Ref. 3. Later, the SG outlet plenum was modified to fix unexpected leakage between the inlet and outlet plena (as shown in Fig. 5.3.3 (a)).

The detailed configuration of the SG outlet plenum is shown in Figs. 5.3.3 (b) through (d). The SG outlet plenum is a semi-cylindrical compartment with 0.32 m inner radius and 1.350 m height (1.330 m for SG-B). The volume of the vertical part of the connecting sleeve (165.2 mm O.D. and 2.8 mmt) beneath this compartment is considered to be part of the outlet plenum in the definition of system volume distribution. The volume of the inclined part of the sleeve is included in the cross-over leg volume and its lower end is welded to the inner surface of the cross-over leg piping. The compartment is thermally insulated from the surrounding hot fluid in the inlet plenum by using the punched plates and net made of stainless steel (Fig. 5.3.3 (c)). Three kinds of insulators (TYPE I through TYPE III) are used. In order to decrease the free volume in the inlet plenum, sixty-one filler pipes (Fig. 5.3.3. (d)) were installed at the bottom of the compartment.

The fluid volume of the SG-A outlet plenum has been measured to be 0.2025 m^3 (0.1990 m^3 for SG-B) in the compartment and estimated to be 0.0090 m^3 (0.0099 m^3 for SG-B) in the vertical region of the connecting sleeve. The total volume in the inclined sleeve region and the cross-over leg above EL 4.818 m is calculated to be 0.0283 m^3. On the other hand, the SG-A inlet plenum fluid volume is calculated to be 0.4351 m^3 (0.4371 m^3 for SG-B inlet plenum) from the engineering drawings. The inlet plenum fluid volume for the LSTF, however, does not simulate the 2/48 scaled volume of the PWR SG inlet plenum.

(2) SG Vessel

The SG vessel forming the secondary system pressure boundary consists of the tube sheet (see Fig. 5.3.3 (a)), the vessel middle part (Fig. 5.3.4 (a)) and the top part (Fig. 5.3.5.). There are 141 U-tubes made of stainless steel (SUS316) in the middle part of the SG vessel (boiler region) as shown in Fig. 5.3.4 (a). The guide bars for the U-tube assembly are shown in Fig. 5.3.4 (b). The design of two SGs (SG-A and SG-B) is identical except for the break unit which is provided to SG-B for simulation of U-tube rupture. The vessel height (approximately 18.3 m) and elevation of each internal component are similar to those of the reference PWR SG. The major design parameters of SG-A and SG-B are compared with those of the PWR in Tables 5.3.2 (a) through (d). The measured fluid volume distribution in the secondary sides of the SG-A and SG-B is listed in Tables 5.3.3 and 5.3.4, respectively.

The vessel wall and nozzles are made of stainless-steel-clad carbon steel. The main steam line nozzle is located at the top of the SG vessel. The feedwater inlet nozzle is located at the middle of the vessel. The downcomer consists of an upper annulus region and lower region comprising of the four pipings with 97.1 mm I.D. (see Fig. 5.3.6) located outside the SG vessel. The external downcomer configuration facilitates measurement of the circulation flow rate. The feedwater ring with 17 J-spargers shown in Fig. 5.3.7 (a) is located in the upper downcomer annulus. The outer surfaces of the SG vessel and flanges are covered by thermal insulation layers made of rock wool. Sheathed electric heaters with maximum capacity of 12 kW for the SG vessel and 6 kW for the four downcomer pipings per one SG are welded on the vessel outer surface for heat tracing.

(3) U-Tubes

The 141 U-tubes are arranged in a square array in each SG as shown in Fig. 5.3.7 (b). The inner diameter and wall thickness of the U-tubes are 19.6 mm and 2.9 mm, respectively. The U-tubes consist of nine groups with different heights (see Fig. 5.3.4 (a)). The U-tubes are fixed to the tube sheet and supported by seven support plates. The flow distributor shown in Fig. 5.3.7 (c) is fixed at the lower part of U-tubes. The flow area at each elevation in SG secondary side is shown in Tables 5.3.2 (c) and (d).

U-tube rupture is simulated by a line connecting the SG-B inlet plenum and lower part of the SG-B secondary-side (see Section 5.2.4).

(4) Primary and Secondary Steam Separators

Figures 5.3.8 and 5.3.9 (a) show geometry of the primary and secondary steam separators, respectively. The primary steam separator is designed to simulate the configuration of that of the reference PWR. The secondary separator forms steam paths between the corrugated plates. The flow characteristics of the secondary steam separator shown in Fig. 5.3.9 (b) are designed to simulate that of the reference PWR. The separation efficiency is given by a ratio of separated water flow rate (Mass In - Mass Out) devided by inlet water flow rate (Mass In).

(5) Steady State Characteristics

The SG secondary water circulates through the boiler section, primary steam separator and downcomer. The recirculation ratio (R) of the SG secondary fluid is given as,

$$R = (W_r + W_f) / W_s = W_D / W_s,$$

where W_r, W_f, W_s and W_D are a returning water flow from the separators, feedwater flow rate, steam line flow rate and downcomer water flow rate, respectively.

Shown in Fig. 5.3.10 is the recirculation ratio measured for SG-B as a function of the secondary water level under the steady state condition with 10 MW core power.

The relation between water level and mass inventory in the SG secondary system was experimentally obtained by isolating one of the two

SGs after a steady state was obtained for a core power of 10 MW, the main steam line, main feedwater line and the primary coolant valve in the B-loop were quickly closed. Then, the primary system was cooled down by using the SG-A so that the SG-B secondary side was cooled by reverse heat transfer to the primary system. After the SG-B secondary side level became steady, with the secondary side voids collapsed, the water level was measured and the mass inventory was determined from the volume-height relation (see Tables 5.3.3 and 5.3.4) and the fluid density. Shown in Table 5.3.5 are the level during the initial steady state compred to that during the isolated state of the SG-B secondary side. The secondary side mass was related to the water levels of the wide and narrow range level meters as shown in Figs. 5.3.11 (a) and (b).

5.3.2 Steam Condensation System

Steam generated in the steam generators flows into the steam condensation system and is condensed rapidly by a spray system. The steam condensation system consists of the jet condenser (JC), spray system, autobleed and vent-condenser.

(1) Jet Condenser (JC)

Figure 5.3.12 shows the vessel of JC made of carbon steel with stainless steel lining. The design specification of JC is shown in Table 5.3.6.

The pipings for the spray line, the vent-condenser line and the autobleed are connected to the vessel of JC. The outer surface of the JC vessel is covered by a thermal insulation layer made of rock wool.

(2) Supplement Components

The spray system, autobleed and vent-condenser are used for controlling the pressure and fluid mass in the secondary system. The spray water line from the cooling tower CT-2 is connected to JC at the nozzle. The spray header has four nozzles as shown in Fig. 5.3.12. The steam condensing performance in the jet condenser is controlled by water flow rate and temperature difference between the steam and spray water.

The autobleed system connected to the lower part of JC vessel functions to control the water level in JC by discharging the water.

The vent-condenser system connected to the steam region of JC serves to control the pressure in the secondary system by discharging the steam from the JC.

A low pressure water supply system which fills up the secondary system by water prior to the test initiation is connected to a nozzle near the bottom of JC vessel. The water supply pump (PS), check valve and air operated valve are also provided in the system.

A high pressure charging system is provided in the secondary coolant system. A charging pump is used for water charging under high pressure condition. The charging line is connected to the nozzle of JC vessel wall. The water stored in RWST is supplied to the JC by both water supply system and high pressure charging system.

5.3.3 Feedwater System

The feedwater system supplies feedwater to the secondary-side of SGs. When the main feedwater is tripped off, the auxiliary feedwater system is in turn initiated. The feedwater flow rate and fluid temperature are test parameters of LSTF. Major components in the feedwater system are two cooling towers of CT-1 and CT-2, a main feedwater pump (PF) and two auxiliary feedwater pumps. The total cooling capacity of CT-1 and CT-2 can be controlled from 10% to 100% of 10 MW.

(1) Cooling Towers

The CT-1 is used to cool the hot condensed water from the JC down to a desired feedwater temperature and has a cooling capacity of 8 MW. The CT-2 has a cooling capacity of 2 MW and serves to control the sub-cooling of the spray water. Table 5.3.7 shows major design parameters of CT-1 and CT-2.

Figures 5.3.13 (a) and (b) show the configuration and designed cooling performance of CT-1. The feedwater temperature is mainly controlled by changing the bypass feedwater flow rate and the wind flow rate at CT-1. Figures 5.3.14 (a) and (b) show the configuration and designed cooling performance of CT-2.

(2) Main Feedwater Pump

The main feedwater pump (PF) is a canned type centrifugal pump with design specification shown in Table 5.3.8. The main feedwater pump drives the feedwater from the CT-1 to SG secondary-sides. The feedwater flow rate to each SG is controlled separately by a control valve located in each feedwater line. The PF pump characteristics are compared to those of the main feedwater pump of PWR which is shown in Fig. 5.3.15.

(3) Auxiliary Feedwater Pumps

The auxiliary feedwater pumps (PA-A and PA-B) are plunger type pumps with the same design specification shown in Table 5.3.8. They deliver cold water from the simulated refueling water storage tank (RWST) to the SG secondary regions when the main feedwater flow is tripped off. Each pump is connected to one of the two steam generators. The auxiliary feedwater line is connected to the piping of main feedwater line between the PF and steam generators as shown in Fig. 5.3.1. Designed maximum flow rate of each PA is 3% of the maximum flow rate of PF. This capacity of PA is enough to simulate the 1/48 scaled auxiliary feedwater flow rate of the reference PWR. Figure 5.3.16 shows scaled Q-H characteristics of the auxiliary feedwater pumps of the PWR. The control and trip logics for PA simulate those of the reference PWR.

5.3.4 Pipings in the Secondary System

Main Pipings in the secondary coolant system (see Fig. 5.3.1) consist of three groups, i.e., main steam line, main feedwater line including pipings around the jet condenser, and auxiliary feedwater line. The other related components including various types of valves, orifices, and flow meters are also shown in Fig. 5.3.1. The design specifications of the main pipings are shown in Tables 5.3.9 (a) through (c). All the main pipings are covered by a layer of thermal insulator.

The steam lines were modified in Nov. 1985 to add capability of simulating the turbine bypass flow transient. The valve AOV-151 or 181 is used for relief valve of the SG-A or SG-B, respectively. The AOV-150 and FCV-441 are used for the turbine bypass flow control in the SG-A steam line, and the AOV-180 and FCV-442 are used for the same purpose in the SG-B steam line.

(1) Main Steam Line

The main steam lines connect the two SGs to the jet condenser (JC) through a steam header. The safety and relief valves, main steam isolation valve, turbine steam flow control valve and check valve are furnished in the main steam line in order to simulate the various system responses during the transients of the reference PWR.

The configuration of the main steam line pipings is shown in Figs. 5.3.17 and 5.3.18. The main steam line flow restrictors are simulated by the orifices, RO 2-3A and RO 2-3B. The main steam line break is simulated by opening the steam discharge line connected to each main steam line. The relief and safety valves of SG-A are simulated by the air-operated valves and the orifices of RO 2-1A and RO 2-2A. Those of SG-B are similarly simulated by the air-operated valves and the orifices of RO 2-1B and RO 2-2B.

(2) Main Feedwater Line

The main feedwater lines connect the JC, CT-1, CT-2, PF to the secondary-sides of SG-A and SG-B. The main feedwater line from JC to PF including the CT-1 bypass line, spray line from CT-2 to JC and steam header are shown in Fig. 5.3.19. Figure 5.3.20 shows main feedwater line around CT-1 and spray line from PF toward JC. Figure 5.3.21 shows spray line around CT-2. Figure 5.3.22 shows main feedwater lines from PF to secondary sides of SG-A and SG-B.

Flow control valves and air-operated valves furnished in the main feedwater lines serve to control the secondary coolant flow rates. The orifices in the secondary autobleed line (RO 2-4, 3.0 mm I.D.) and vent-condenser line (RO 2-5, 6.0 mm I.D.) limit the discharge flow rates. The orifices in the PF and PA bypass lines (16.0 mm I.D., 4.4 mm I.D., respectively) are installed to limit each flow rate.

(3) Auxiliary Feedwater Line

The auxiliary feedwater lines connect the simulated refueling water storage tank (RWST) and auxiliary feedwater pumps (PA-A and PA-B) to the main feedwater lines as shown in Fig. 5.3.22. Each auxiliary feedwater line has a return flow line which connects the pump discharge side to the RWST. Fluid temperature of the auxiliary feedwater is the same as the RWST temperature, which is normally 313 K.

(4) Other Pipings

There are drain lines in each SG secondary-side, jet condenser, autobleed, CT-1 and CT-2, main feedwater line and auxiliary feedwater lines. The plant safety valve line is furnished at the top of each SG. The water cooling systems for the major components, such as PF, PA-A, PA-B and autobleed, are used to maintain their normal performance. The pipings of the vent-condenser system and the secondary autobleed system are schematically shown in Fig. 5.3.1. All these pipings are opened to atmosphere.

Table 5.3.1 List of Major Components in Secondary Coolant System in LSTF

1	SG-A (Steam Generator in Primary Coolant Loop A)
2	SG-B (Steam Generator in Primary Coolant Loop B)
3	JC (Jet Condenser)
4	CT-1 (Cooling Tower with 8MW Capacity)
5	CT-2 (Cooling Tower for JC Spray System)
6	PF (Main Feedwater Pump)
7	PA-A (Auxiliary Feedwater Pump for SG-A)
8	PA-B (Auxiliary Feedwater Pump for SG-B)
9	Secondary Autobleed
10	Vent-Condenser
11	Break Lines for Steam Line Break, Feedwater Line Break and SGU-Tube Break (Ref.Section 5.5)
12	Pipings of Main Steam Line, Main Feedwater Line and Auxiliary Feedwater Line

Table 5.3.2 Comparison of Major Design Characteristics of LSTF and PWR Steam Generators (1/4)

(a) Thermal-hydraulic Design for Steam Generator

Items	LSTF	PWR	LSTF/PWR
Number of SGs	2	4	1/2
Max. Heat Removal Rate* (MW)	35.7	856	1/24
Number of U-tubes*	141	3382	1/24
Feedwater Flow Rate* (kg/s)	2.76	469	1/170
Steam Flow Rate* (kg/s)	2.76	468	1/170
Pressure in SG Steam Dome (MPa)	7.34	6.13	1.20/1
Temperature in SG Steam Dome (K)	562.2	550.2	1.02/1
Primary Coolant Flow Rate* (kg/s)	24.5	8352	1/341
Pressure in Primary Loop (MPa)	15.61	15.61	1/1
Temperature at SG inlet (K)	598.1	598.1	1/1
Temperature at SG outlet (K)	562.4	562.4	1/1
Temperature Difference between SG Inlet and Outlet (K)	35.7	35.7	1/1
Inner Diameter of U-tube (mm)	19.6	19.6	1/1
Outer Diameter of U-tube (mm)	25.4	22.23	1.14/1
Total Inner S. Area of U-tubes* (m^2)	171	4214	1/25
Total Outer S. Area of U-tubes* (m^2)	222	4780	1/22
Average Length of U-tubes (m)	19.7	20.2	1/1
Wall Thickness of U-tube (mm)	2.9	1.3	2.23/1
Pitch of U-tubes (mm)	32.5	32.5	1/1

* Designed value per one SG

Table 5.3.2 (Cont'd) (2/4)

(b) Height and Elevation of SG

Items	LSTF	PWR	LSTF/PWR
Height			
Inner Height of SG Vessel (m)	19.840	19.972	1 / 1
Inner Height of Plenum (m)	1.813	1.595	1.1 / 1
Inner Height of SG Secondary side (m)	17.695	17.827	1 / 1
Height of U-tube (max.) (m)	10.620	10.620	1 / 1
Height of U-tube (min.) (m)	9.156	9.156	1 / 1
Height of Downcomer (m)	14.101	14.101	1 / 1
Elevation from bottom of active fuel zone (m)			
Bottom of Plenum	EL 5.819	EL 5.819	1 / 1
Bottom of Downcomer	EL 8.164	EL 8.164	1 / 1
Bottom of Secondary-side	EL 7.964	EL 7.964	1 / 1
Bottom of Support Plate (1)	EL 9.228	EL 9.228	1 / 1
Bottom of Support Plare (2)	EL 10.510	EL 10.510	1 / 1
Bottom of Support Plate (3)	EL 11.793	EL 11.793	1 / 1
Bottom of Support Plate (4)	EL 13.076	EL 13.076	1 / 1
Bottom of Support Plate (5)	EL 14.358	EL 14.358	1 / 1
Bottom of Support Plate (6)	EL 15.641	EL 15.641	1 / 1
Bottom of Support Plate (7)	EL 16.924	EL 16.924	1 / 1
Bottom of Downcomer Annulus	EL 19.115	-	-
Feedwater Inlet Nozzle	EL 19.761	EL 19.761	1 / 1
Bottom of Separator Skirt	EL 21.795	EL 21.637	1 / 1
Top of Separator	EL 22.065	EL 22.065	1 / 1
Normal Water Level	EL 18.264	EL 20.792	0.9 / 1
Bottom of Dryer	EL 23.237	EL 22.569	1 / 1
Top of Dryer	EL 24.512	EL 24.839	1 / 1

Table 5.3.2 (Cont'd) (3/4)

(c) Fluid Volume and Flow Area for RUN SB-CL-20

Items	LSTF	PWR	LSTF/PWR
Fluid Volume (m^3)			
SG-A Inlet Plenum	0.1967	4.18	1/21
SG-A Outlet Plenum	0.4382	4.18	1/10
SG-B Inlet Plenum	0.2000	4.18	1/21
SG-B Outlet Plenum	0.4368	4.18	1/10
Inside U-tube	0.8384	20.65	1/25
Inside Tubesheet	0.0282	1.12	1/40
Total Primary Coolant in SG-A	1.5015	30.1	1/20
Total Primary Coolant in SG-B	1.5034	30.1	1/20
Lower Downcomer Pipings	0.349	—	——
Total Secondary Coolant in SG-A	7.003	163.1	1/23
Total Secondary Coolant in SG-B	7.030	163.1	1/23
Flow Area per One SG (m^2)			
Inside U-tube	0.0425	1.02	1/24
Boiler Section	0.2293	5.101	1/22
U-tube support plate	0.0712	2.147	1/30
Flow Distributer	0.0771	1.9	1/25
Separator Vane	0.129	—	——
Downcomer Annulus	0.0743	—	——
Lower Downcomer	0.0296	0.6627	1/22
Main Steam Line	0.02862	0.3249	1/11
Main Feedwater Line	$1.924\ x10^{-3}$	0.0460	2/24
Feedwater Sparger Nozzles	$2.73\ x10^{-3}$	0.0654	1/24

Table 5.3.2 (Cont'd) (4/4)

(d) Fluid volume and flow area for RUNs after SB-CL-20

Items	LSTF	PWR	LSTF/PWR
Fluid Volume (m^3)			
SG-A Inlet Plenum	0.2115	4.18	1/20
SG-A Outlet Plenum	0.4351	4.18	1/10
SG-B Inlet Plenum	0.2089	4.18	1/20
SG-B Outlet Plenum	0.4371	4.18	1/10
Inside U-tube	0.8384	20.65	1/25
Inside Tubesheet	0.0282	1.12	1/40
Total Primary Coolant in SG-A	1.5132	30.1	1/20
Total Primary Coolant in SG-B	1.5126	30.1	1/20
Lower Downcomer Pipings	0.349	—	—
Total Secondary Coolant in SG-A	7.003	163.1	1/23
Total Secondary Coolant in SG-B	7.030	163.1	1/23
Flow Area per One SG (m^2)			
Inside U-tube	0.0425	1.02	1/24
Boiler Section	0.2293	5.101	1/22
U-tube support plate	0.0712	2.147	1/30
Flow Distributer	0.0771	1.9	1/25
Separator Vane	0.129	—	—
Downcomer Annulus	0.0743	—	—
Lower Downcomer	0.0296	0.6627	1/22
Main Steam Line	0.02862	0.3249	1/11
Main Feedwater Line	1.924×10^{-3}	0.0460	2/24
Feedwater Sparger Nozzles	2.73×10^{-3}	0.0654	1/24

Table 5.3.3 Measured Volume Distribution for SG-A Secondary Side

Level (m)	Volume (ℓ)
1.0	365
1.5	504
2.0	624
2.5	752
3.0	876
3.5	1000
4.0	1126
4.5	1251
5.0	1376
5.5	1499
6.0	1626
6.5	1753
7.0	1877
7.5	2003
8.0	2128
8.5	2253
9.0	2381
9.5	2517
10.0	2708
10.5	3006
11.0	3301
11.5	3598
12.0	3890
12.5	4181
13.0	4460
13.5	4751
14.0	5040
14.5	5341
15.0	5631
15.5	5924
16.0	6214
16.5	6496
17.0	6785
17.5	7003

Including downcomer pipings.

Table 5.3.4 Measured Volume Distribution for SG-B Secondary Side

Level (m)	Volume (ℓ)
1.00	365
1.25	447
1.50	499
1.75	563
2.00	624
2.25	688
2.50	748
2.75	811
3.00	874
3.25	937
3.50	1001
3.75	1061
4.00	1125
4.25	1188
4.50	1251
4.75	1315
5.00	1375
5.25	1438
5.50	1502
5.75	1569
6.00	1628
6.25	1689
6.50	1752
6.75	1816
7.00	1880
7.25	1943
7.50	2004
7.75	2068
8.00	2131
8.25	2195
8.50	2258
8.75	2321
9.00	2392
9.25	2463

Level (m)	Volume (ℓ)
9.50	2544
9.75	2630
10.00	2738
10.25	2887
10.50	3043
10.75	3185
11.00	3336
11.25	3487
11.50	3635
11.75	3781
12.00	3926
12.25	4069
12.50	4216
12.75	4352
13.00	4496
13.25	4640
13.50	4786
13.75	4928
14.00	5075
14.25	5225
14.50	5379
14.75	5523
15.00	5672
15.25	5818
15.50	5959
15.75	6101
16.00	6242
16.25	6384
16.50	6520
16.75	6667
17.00	6818
17.25	6961
17.50	7030

Including downcomer pipings.

Table 5.3.5 Test Conditions for SG Mass Inventory Measurement

	Case I		Case II	
	Steady state	Isolated state	Steady state	Isolated state
Secondary side pressure (MPa)	7.44	~ 7.4	7.55	7.4
Main steam line flow rate (kg/s)	2.7	0	2.7	0
Main feed water flow rate (kg/s)	2.7	0	2.7	0
Liquid level (m) (Wide range)	12.54	14.28	10.12	10.7
Liquid level (m) (Narrow range)	4.71	3.09	0.8	0

Table 5.3.6 Major Design Parameters of Jet Condenser

Vessel Height	5.55 m
Inner Diameter	1.50 m
Free Volume	10 m^3
Design Pressure	8.27 MPa
Design Temperature	571.2 K
Vessel Material	Carbon Steel (SB49) with Stainless Steel Clad (SUS316)

Table 5.3.7 Major Design Parameters of Cooling Towers CT-1 and CT-2

Item	CT-1	CT-2
Cooling Method	Air-Cooling by Fin-Tube and Fan	Air-Cooling by Fin-Tube and Fan
Design Pressure	8.27 MPa	9.02 MPa
Design Temperature	571.2 K	576.5 K
Cooling Capacity	8 MW	2 MW
Rated Flow Rate	25.37 kg/s	19.87 kg/s
Rated Inflow Temperature	560.1 K	495.2 K
Rated Outflow Temperature	495.2 K	493.2 K

Table 5.3.8 Major Design Parameters of Main and Auxiliary Feedwater pumps PF, PA-A and PA-B

Item	PF	PA-A	PA-B
Type	Centrifugal Pump	Plunger Pump	Plunger Pump
Max. Flow	0.035 m^3/s	0.0013 m^3/s	0.0013 m^3/s
Max. Head	100 m	950 m	950 m
Fluid Temperature	495.2 K	Room Temperature	Room Temperature
Material	Stainless Steel SUSF316L for Casing and SCS13 for Impeller	Stainless Steel(SUSF304) for Wetted Surface	Stainless Steel(SUSF304) for Wetted Surface

Table 5.3.9 Major Design Parameters of Pipings in Secondary System (1/2)

(a) Configuration of Pipings and Long Elbow (SUS316LTP)

Type	I.D.(mm)	Thickness(mm)	Weight (kg/m)
2B	49.5	5.5	7.46
3B	73.9	7.6	15.3
4B	97.1	8.6	22.4
5B	120.8	9.5	30.5
6B	143.2	11.0	41.8
8B	190.9	12.7	63.8

(b) Configuration of 1500-LB Flanges (SUS316LTP)

Type	Length(mm)	Weight (kg)
2B	108.0	11
3B	123.9	20
4B	130.2	30
6B	177.8	69
8B	219.1	118

Table 5.3.9 (Cont'd) (2/2)

(c) Piping Data for Secondary Coolant System

Piping Line	Length	Volume	No. of Long Elbows						No. of Tees				Ref. Figures and Comments
	(m)	(m^3)	2B	3B	4B	5B	6B	8B	2B	4B	6B	8B	
Main Steam Line (MSL)	87.4	1.23		18	13			13		2			
SG-A to JC	47.2	0.67		9	7			6		1			Fig.5.3.17, 5.3.19
SG-B to JC	37.8	0.54		9	6			7		1			Fig.5.3.18, 5.3.19
Header	2.4	0.02											Fig.5.3.19
Main Feedwater Line (MFL)	152.6	1.923	19	10	4	3	23	15	3		2	3	
JC to CT-1	36.3	0.67			2	3	10	5			1		Fig.5.3.19, 5.3.20
CT-1 to PF	38.6	0.61			2		13					1	Fig.5.3.19, 5.3.20
CT-1 Bypass Line	12.0	0.34						5				2	Fig.5.3.19
PF to MFL Branch	33.2	0.24		10				5			1		Fig.5.3.20, 5.3.22
MFL Branch to SG-A*	18.1	0.035	10						2				Fig.5.3.22 * Overlapps with
MFL Branch to SG-B*	14.4	0.028	9						1				Fig.5.3.22 AFL
JC Spray Line	59.7	0.823	5				27			2	3		
PF Outlet Line to CT-2	22.1	0.34					10				2		Fig.5.3.20, 5.3.21
CT-2 to JC	30.7	0.47					17				1		Fig.5.3.19
PF Bypass Line	6.9	0.013	5							2			Fig.5.3.20
Auxiliary Feedwater Line (AFL)	99.1	0.190	44						5				
PA-A to AOV-270	31.9	0.061	14						1				Fig.5.3.22
PA-B to AOV-280	36.7	0.071	16						1				Fig.5.3.22
AOV-270 to SG-A*	17.9	0.034	8						2				Fig.5.3.22 * Overlapps with
AOV-280 to SG-B*	12.6	0.024	6						1				Fig.5.3.22 MFL

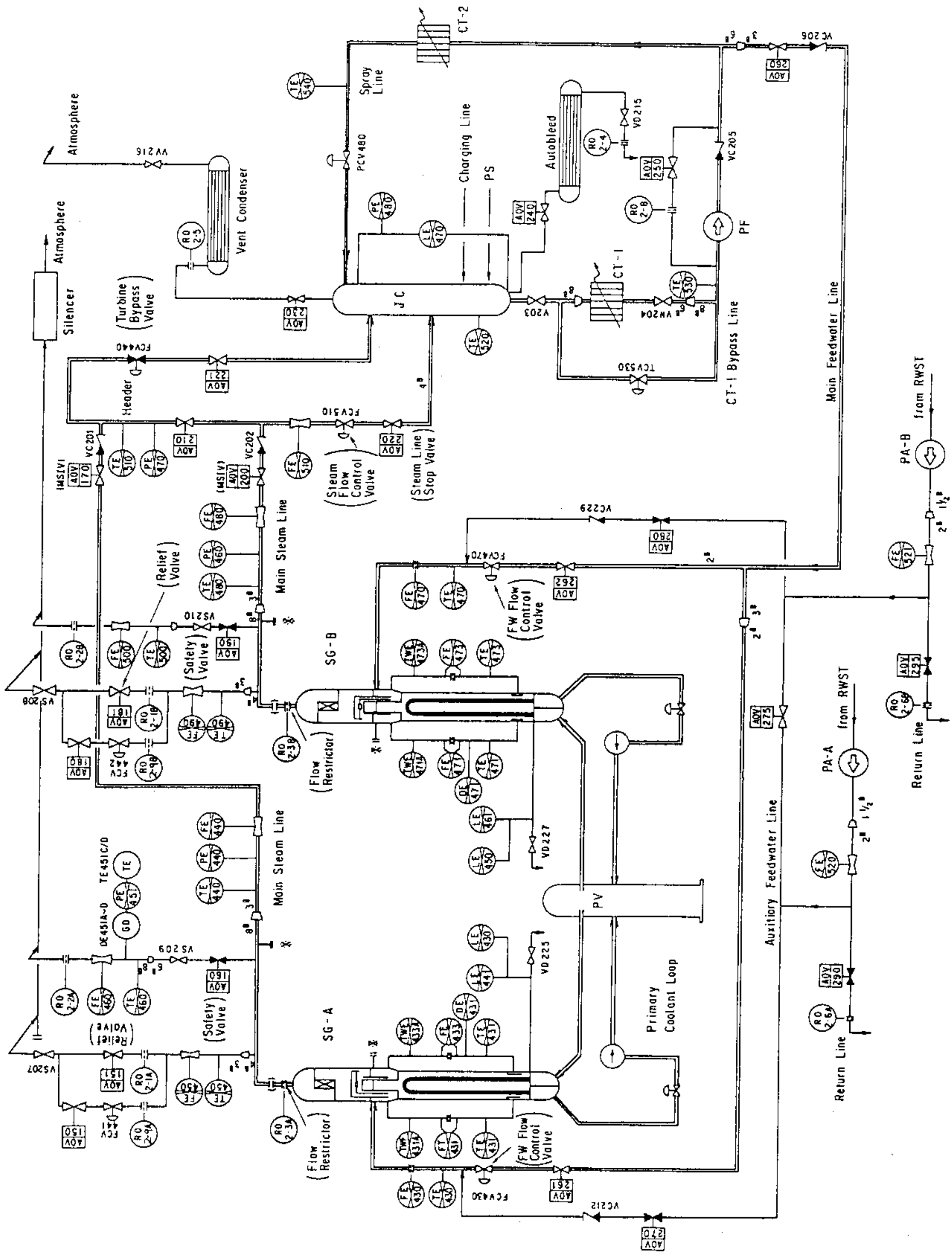


Fig. 5.3.1 Flow Diagram of LSTF Secondary Coolant System

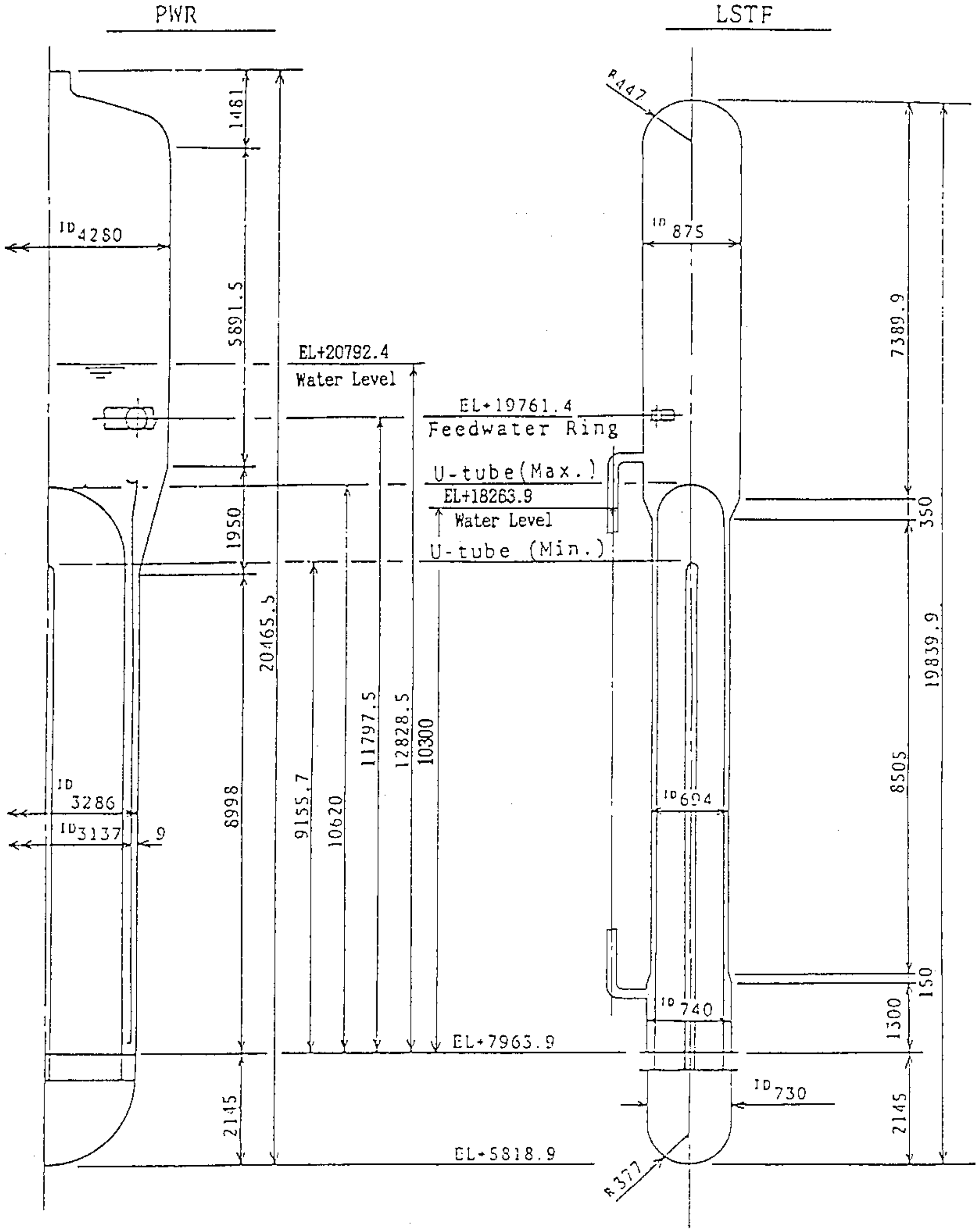
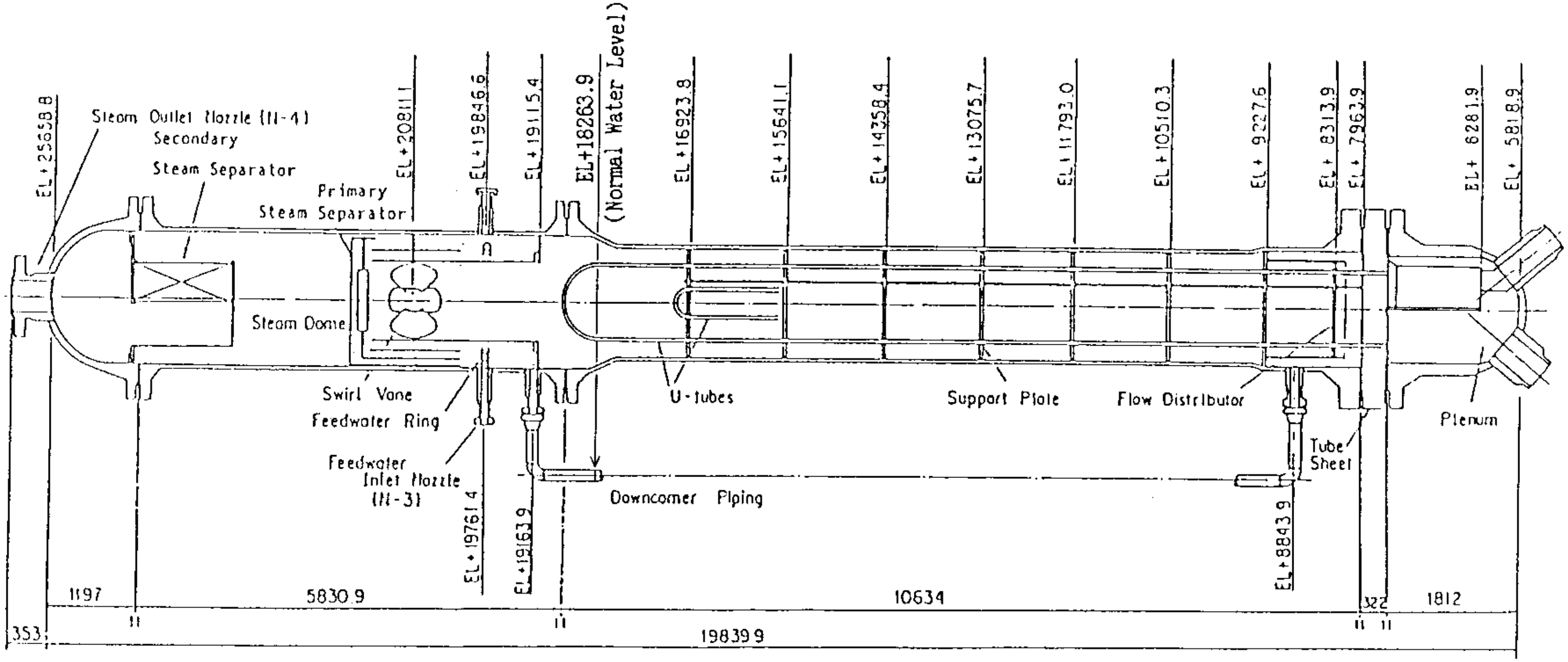


Fig. 5.3.2 (a) Comparison of SG Configuration between LSTF and PWR



List of Nozzles at SG Vessel

Sign.	Size	Nozzle Name	Location
N-1	207 mm ID	P. Coolant Inlet Nozzle	SG Inlet Plenum
N-2	168.2 mm ID	P. Coolant Outlet Nozzle	SG Outlet Plenum
N-3	3B, Sch 80	Feedwater Inlet Nozzle	DL 11797.5 (326.5)
N-4	8B, 〃	Steam Outlet Nozzle	Top of Steam Dome
N-5	2B, 〃	Plant Safety Valve Nozzle	〃
N-6	4B, 〃	FW Break Line	DL 11882.7 (146.5)
N-7 a-d	〃 〃	Downcomer Piping Nozzle	DL 11200 (4,69,184,249)
N-7 e-h	〃 〃	〃 〃	DL 800 (4,69,184,249)

Sign.	Size	Nozzle Name	Location
N-9	1B, Sch 80	Level Instrumentation N.	DL - 120 (160)
N-10	4B, Sch 160	U-Tube Break Line Nozzle	DL -1600 (145)
N-11	1.5B, Sch 80	〃 〃	DL - 120 (270)
N-22 a	PT 1/2	Level Instrumentation N.	Top of SG (106.5)
N-22 b	〃	〃 〃	DL 11197.5 (216.5)
N-23 c,d	6B, Sch 80	〃 〃	DL 9700 (90,270)
N-23 e,f	〃 〃	〃 〃	DL 9048 (90,270)
N-24	1.5B, Sch 160	〃 〃	DL 11423 (216.5)

Fig. 5.3.2 (b) Configuration of SG Internals and Vessel Nozzles

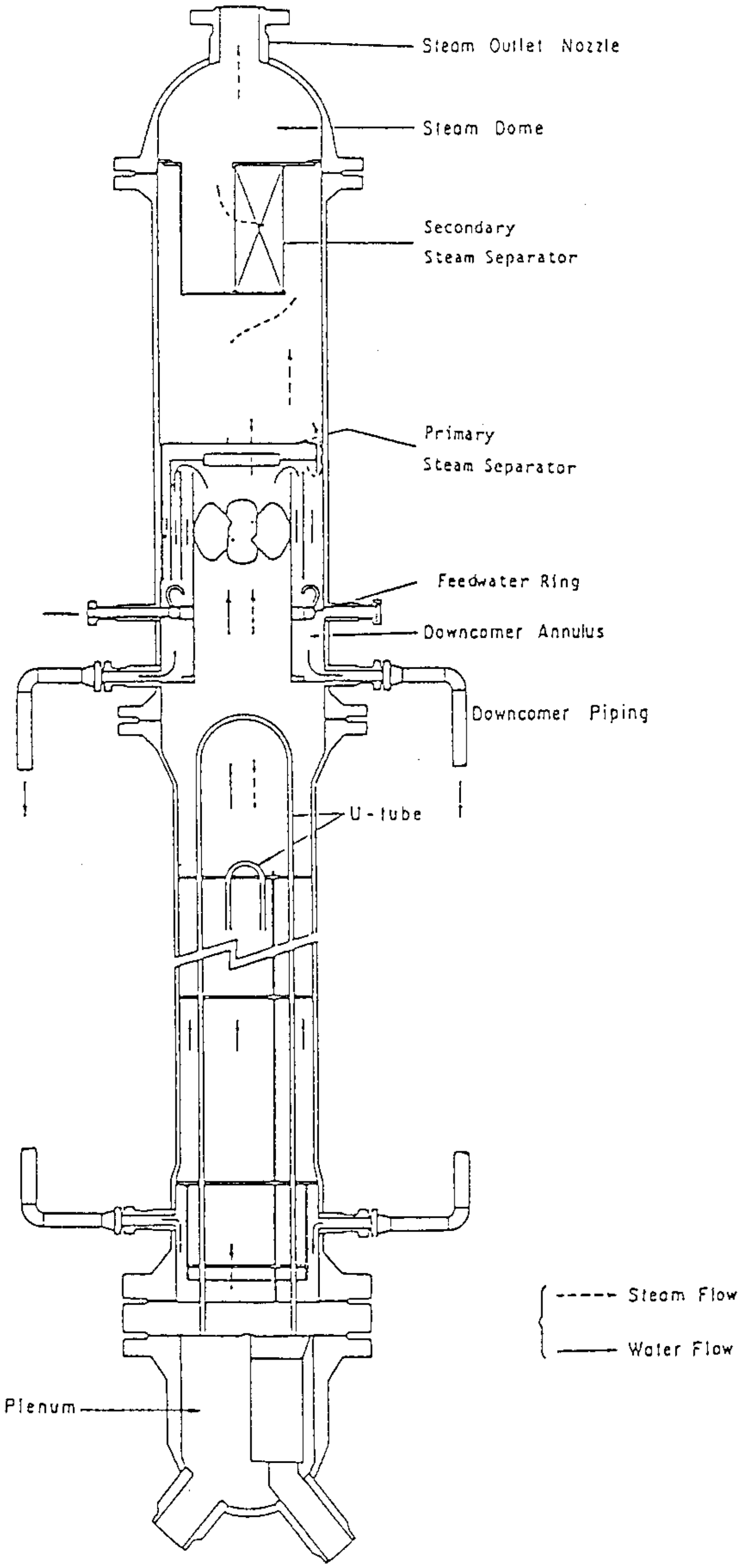


Fig. 5.3.2 (c) Coolant Flow in SG Secondary Side

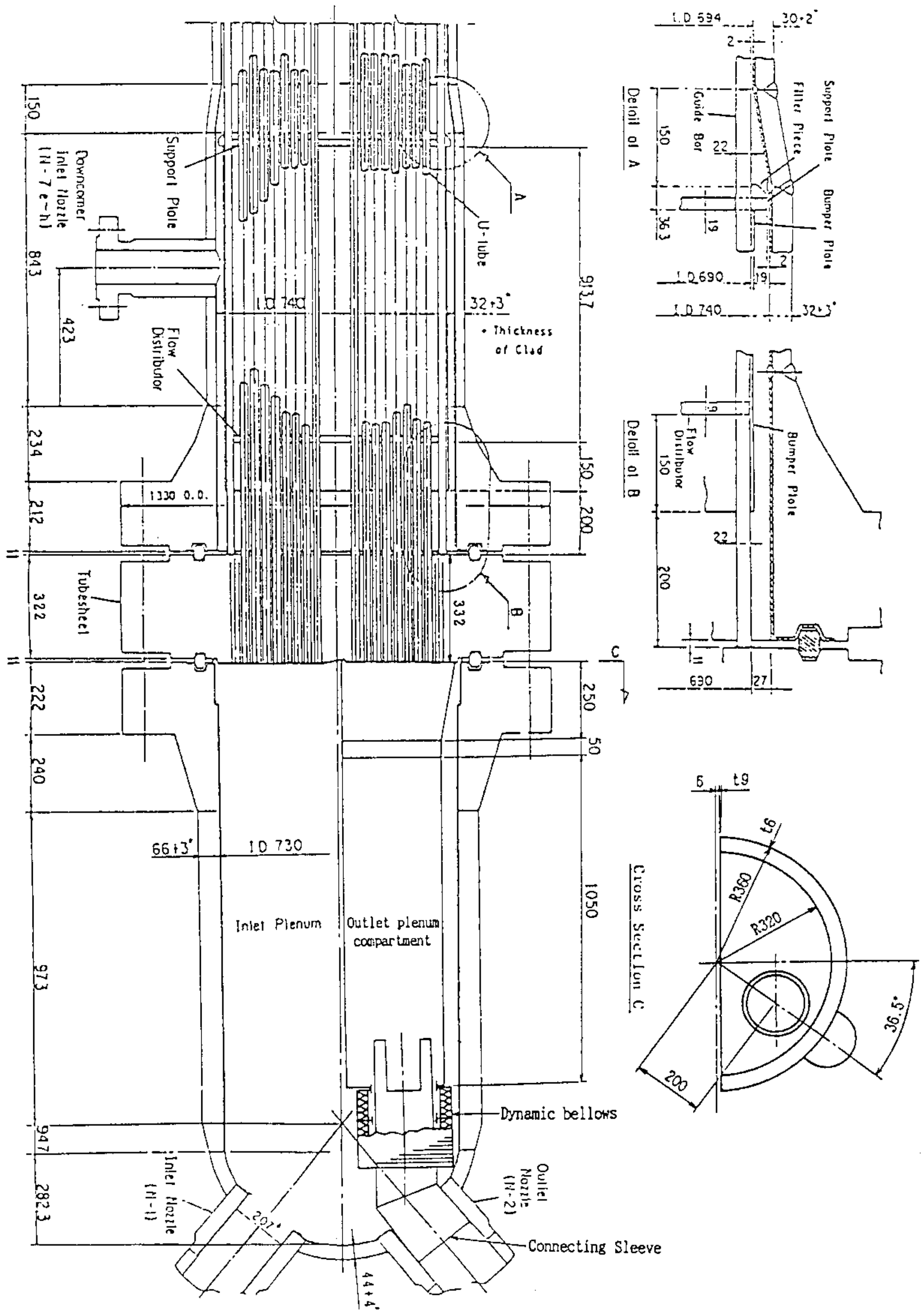


Fig. 5.3.3 (a) Details of SG Plenum and Tube Sheet

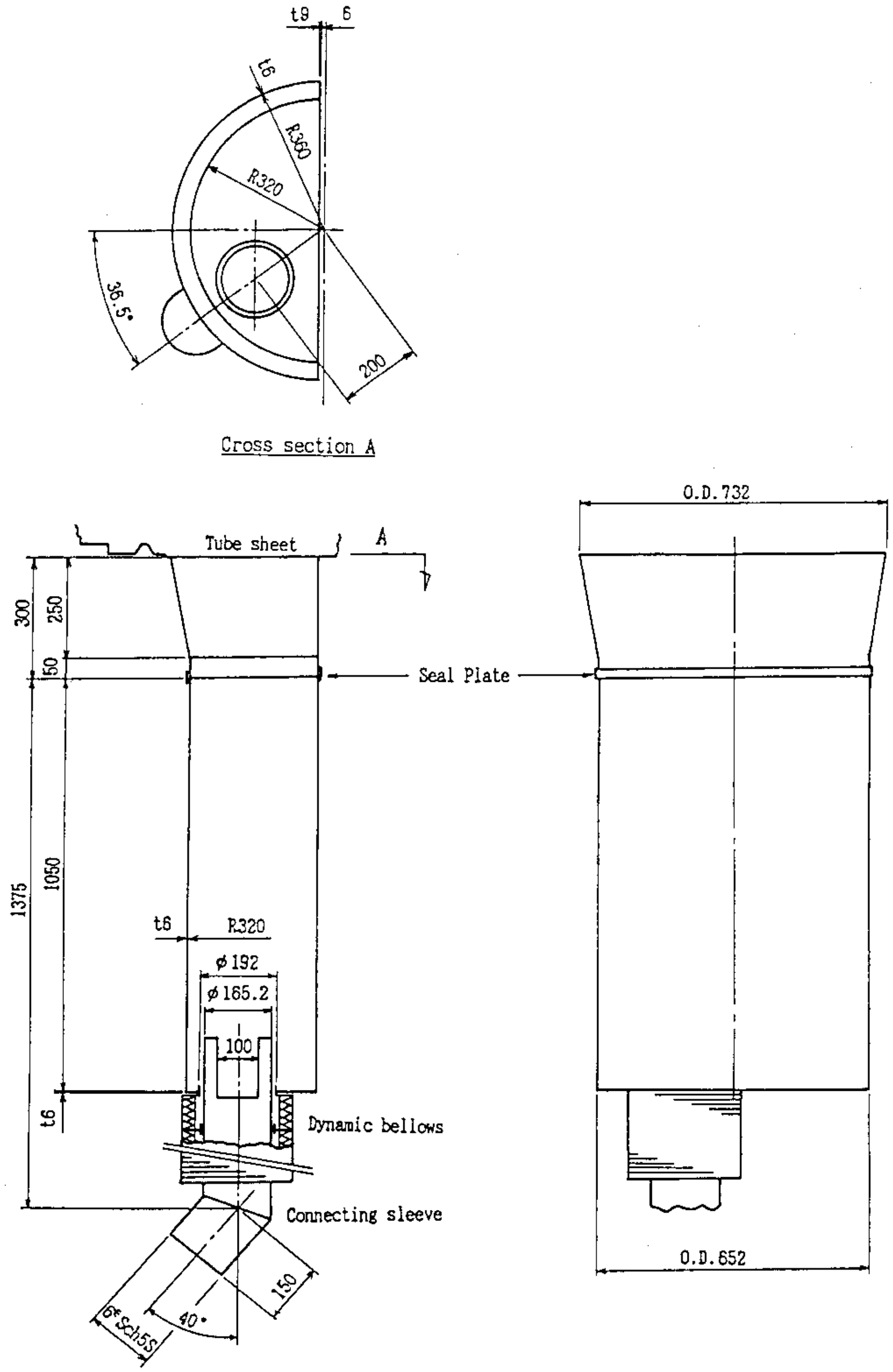


Fig. 5.3.3 (b) Details of Outlet Plenum Compartment

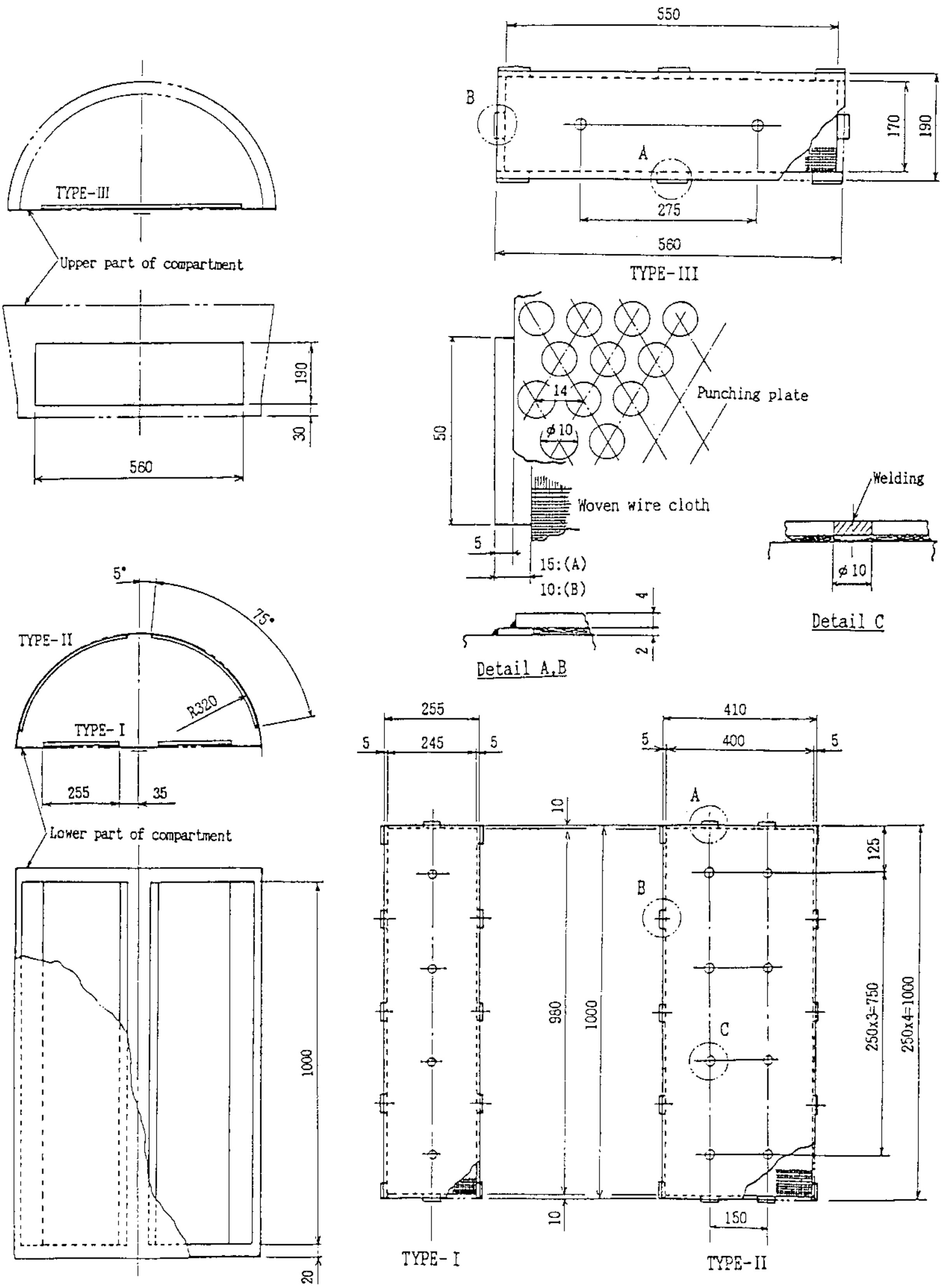
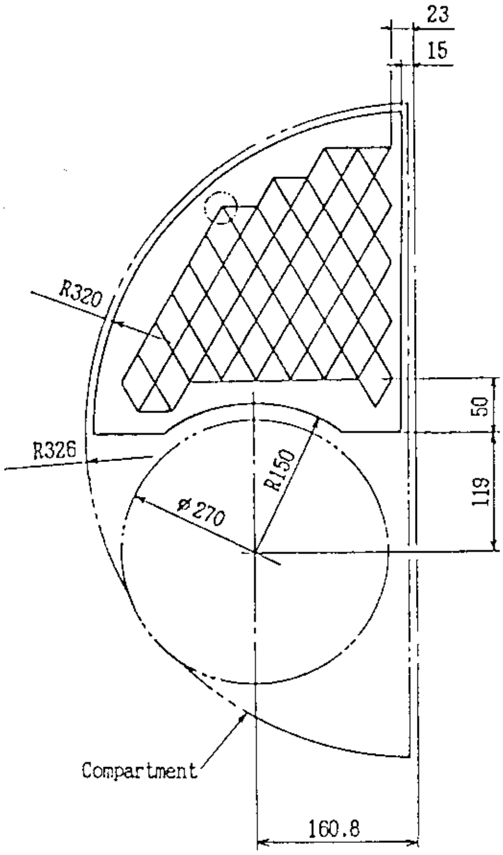
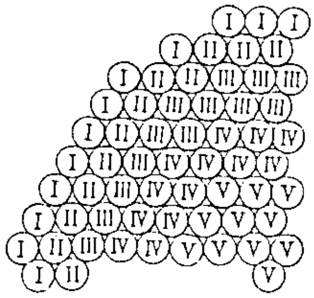
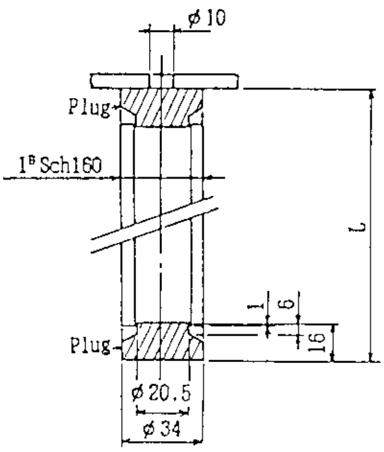


Fig. 5.3.3 (c) Thermal Insulator on Compartment





Arrangement of filler tubes



MARK	L(mm)	NOS.
I	275	12
II	300	12
III	330	13
IV	360	13
V	400	11

Configuration of filler tubes

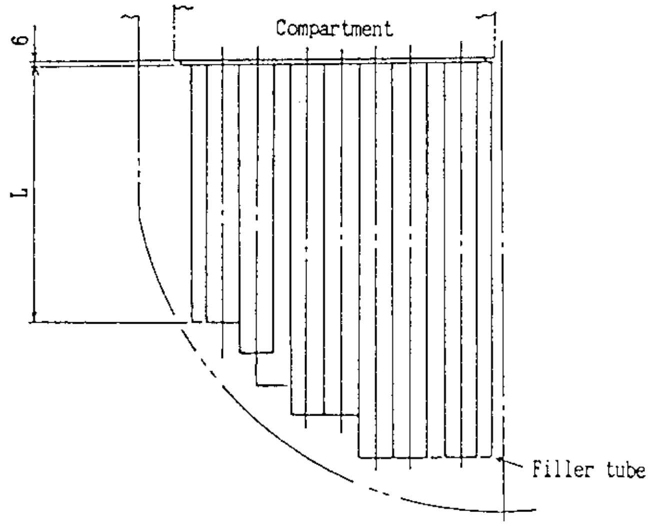
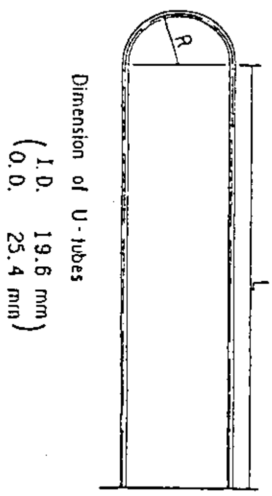


Fig. 5.3.3 (d) Filler Pipes below Outlet Plenum Compartment Tube



Type	R (mm)	L (mm)	Number
1	50.8	9439.9	21
2	83.3	9590.7	19
3	115.8	9741.2	19
4	148.3	9891.7	19
5	180.8	10042.2	17
6	213.3	10192.7	15
7	245.8	10343.2	13
8	278.3	10493.7	11
9	310.8	10644.2	7
		total	141

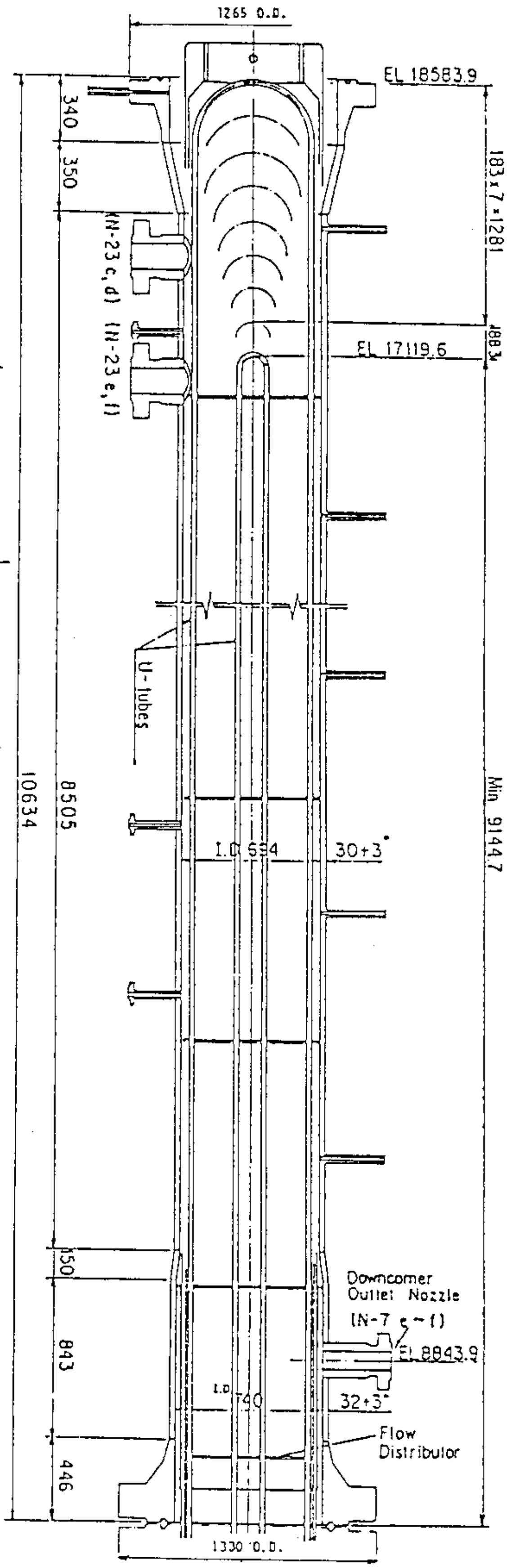


Fig. 5.3.4 (a) Details of Middle Part of SG Vessel and U-tubes

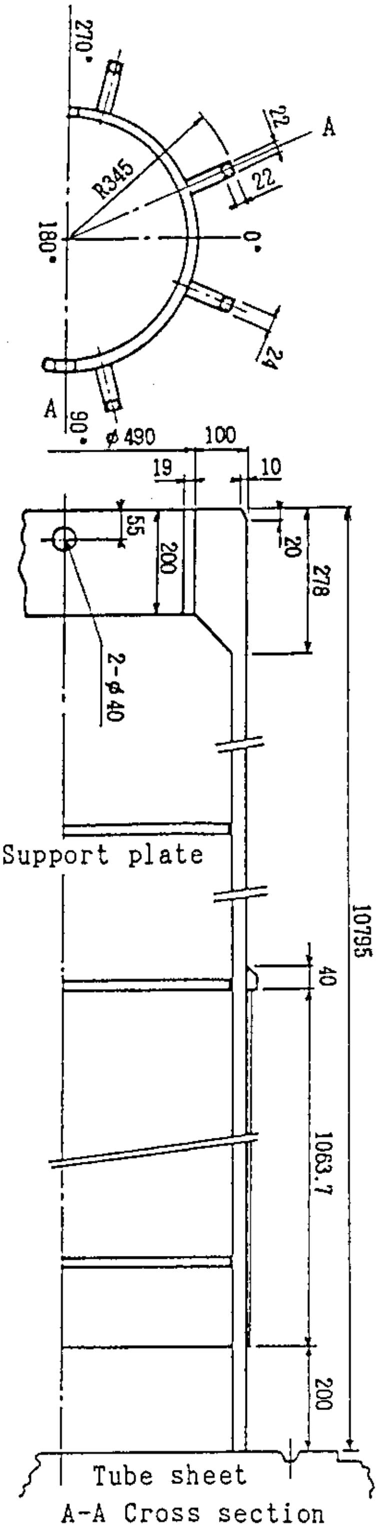


Fig. 5.3.4 (b) Guide Bar Assembly of U-tube Bundle

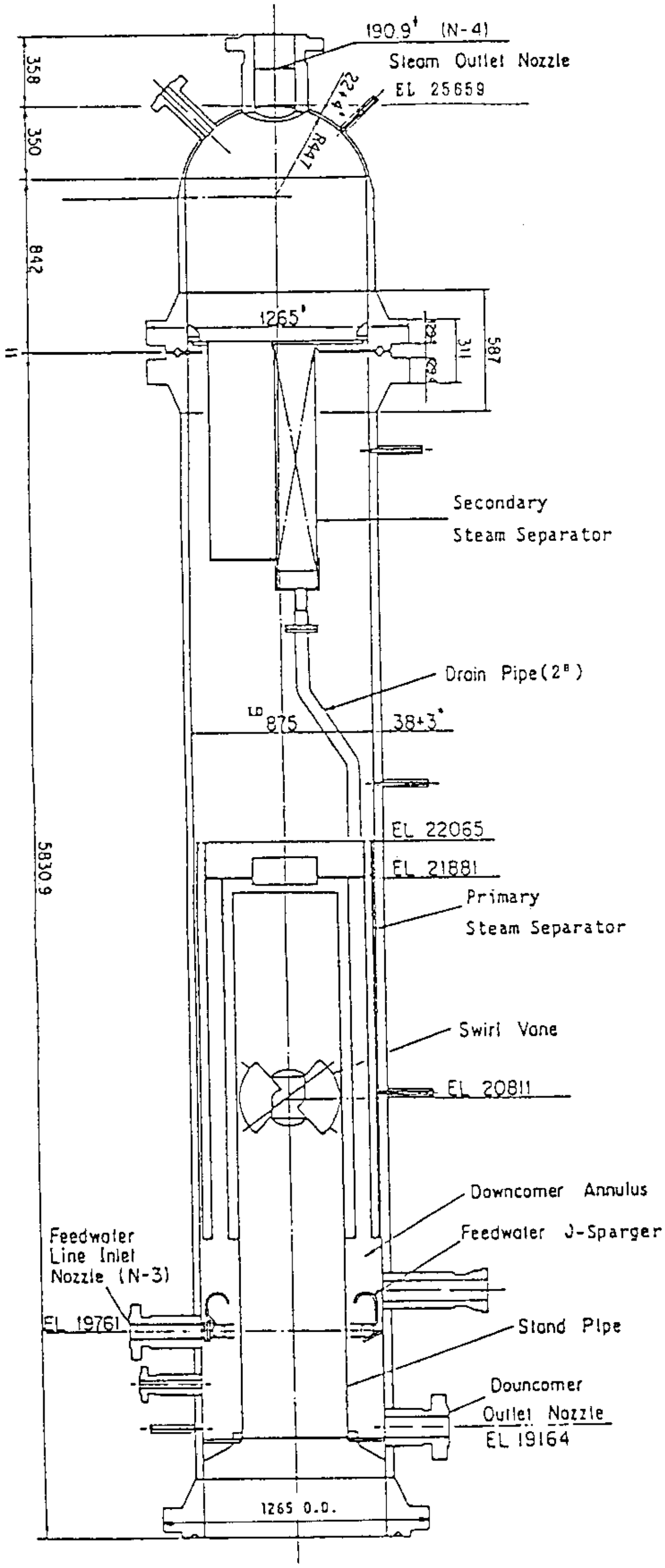


Fig. 5.3.5 Details of Top Part of SG Vessel

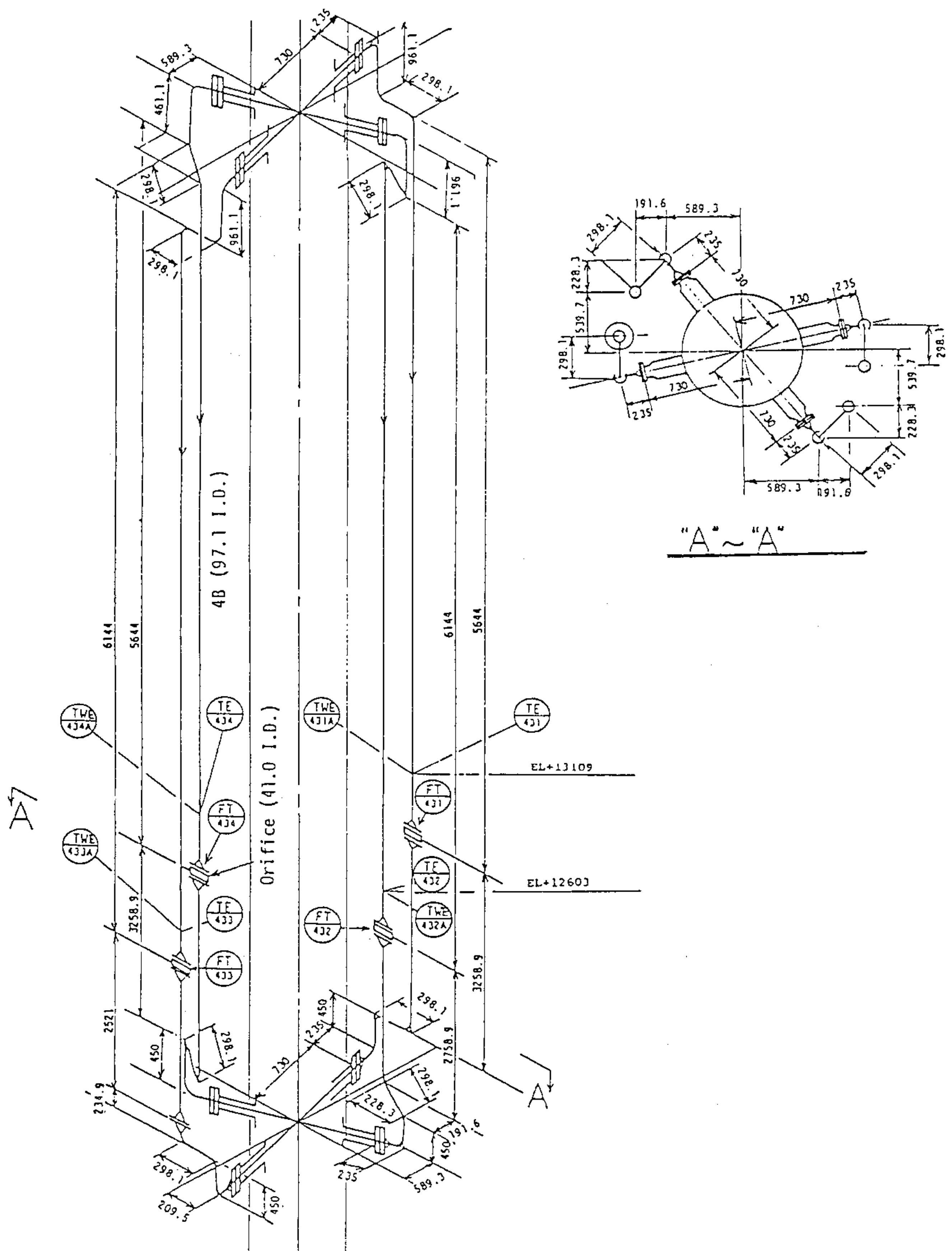


Fig. 5.3.6 Details of Downcomer Pipings

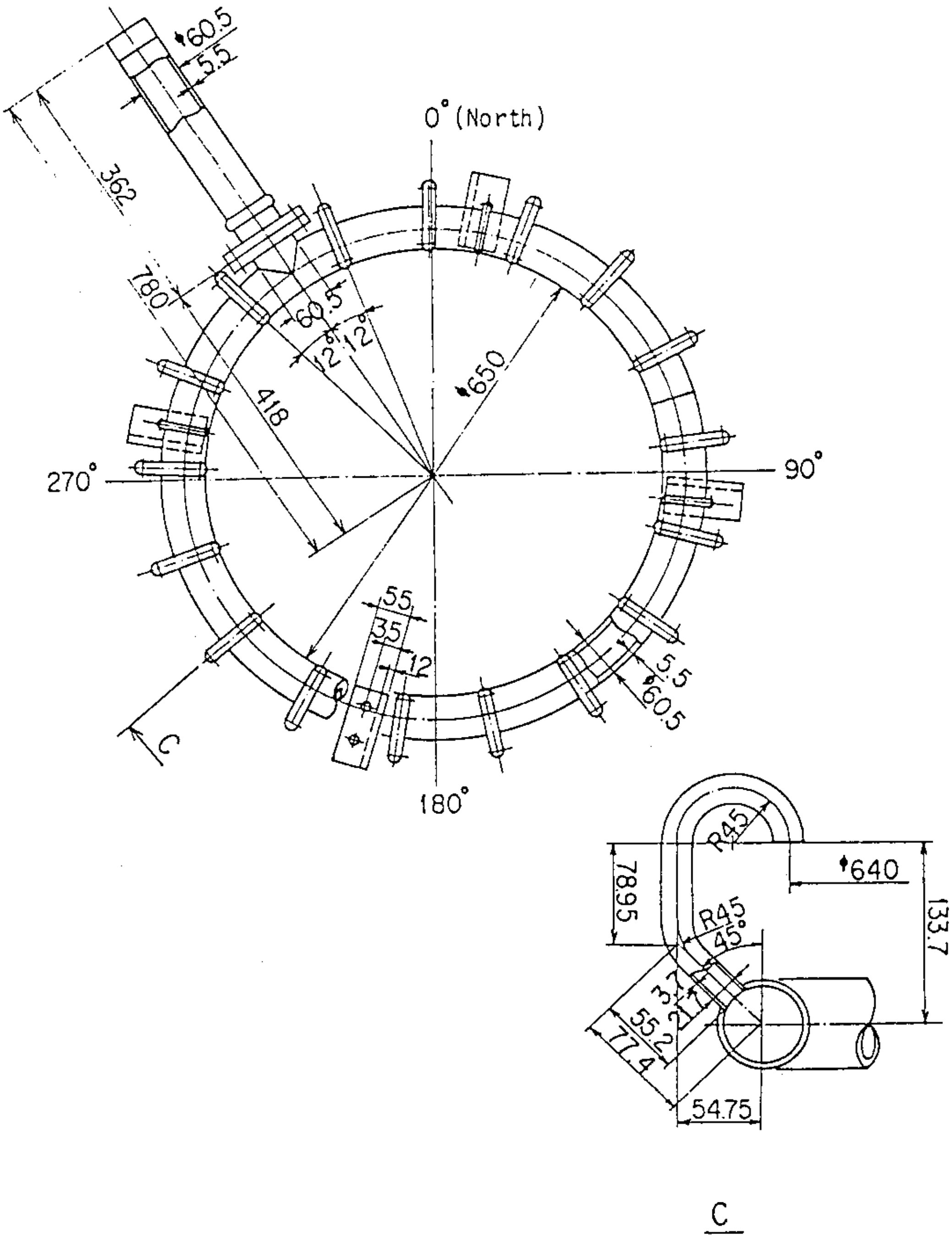


Fig. 5.3.7 (a) Configuration of Feedwater Ring and J Sparger

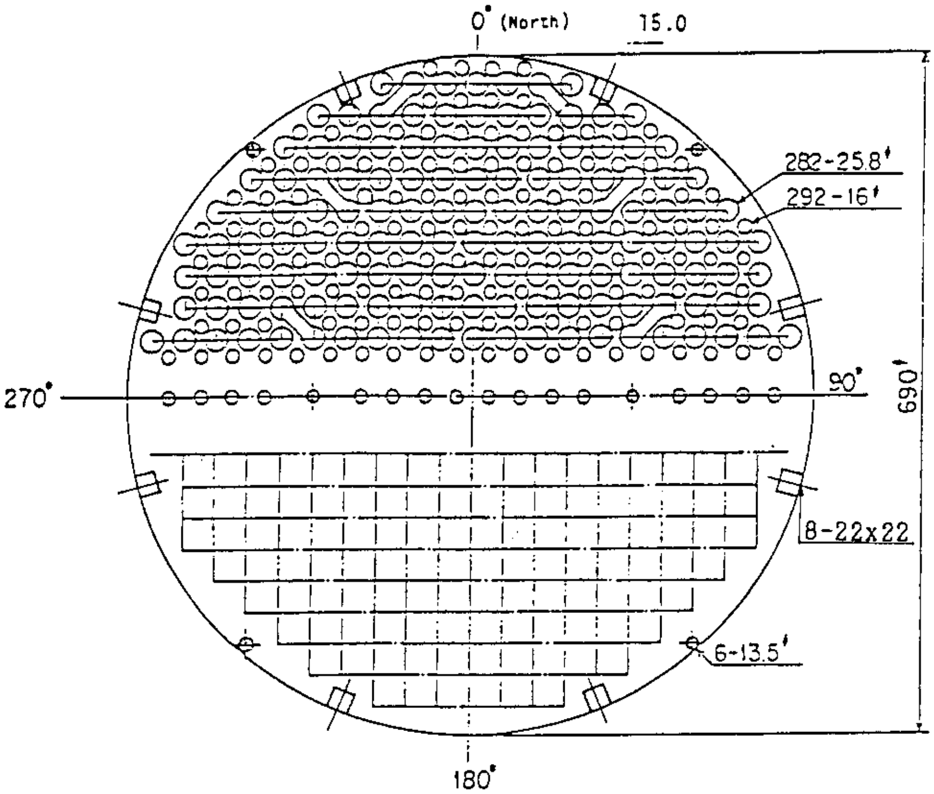


Fig. 5.3.7 (b) Details of U-tube Support Plate

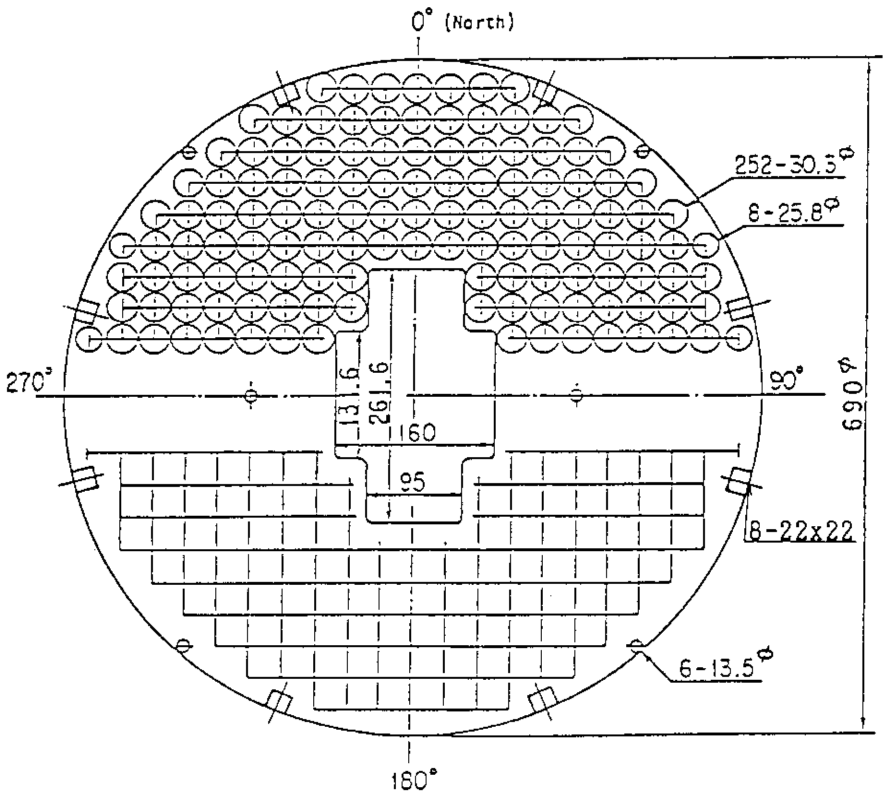


Fig. 5.3.7 (c) Details of Flow Distributor

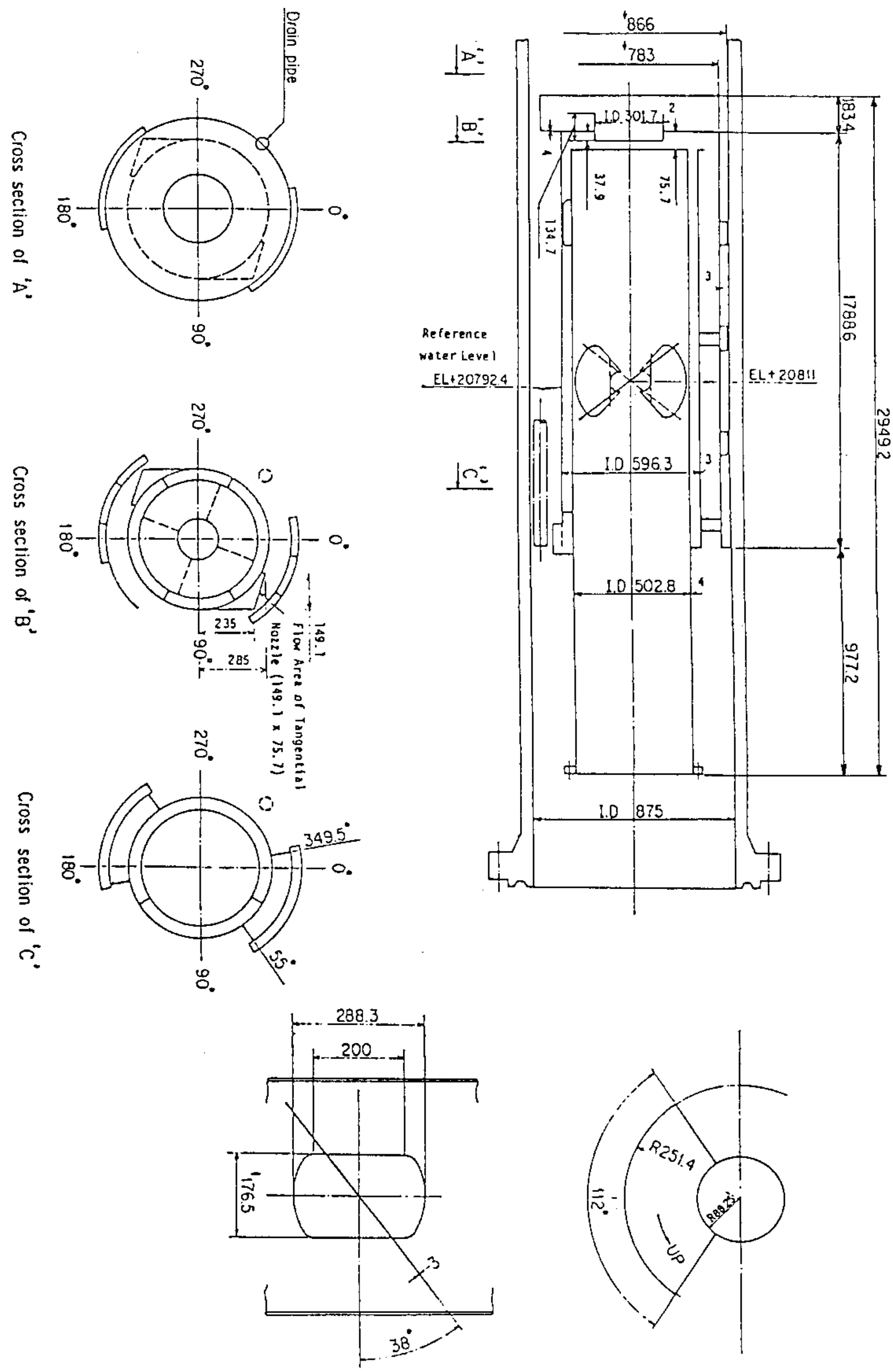


Fig. 5.3.8 Details of Primary Steam Separator

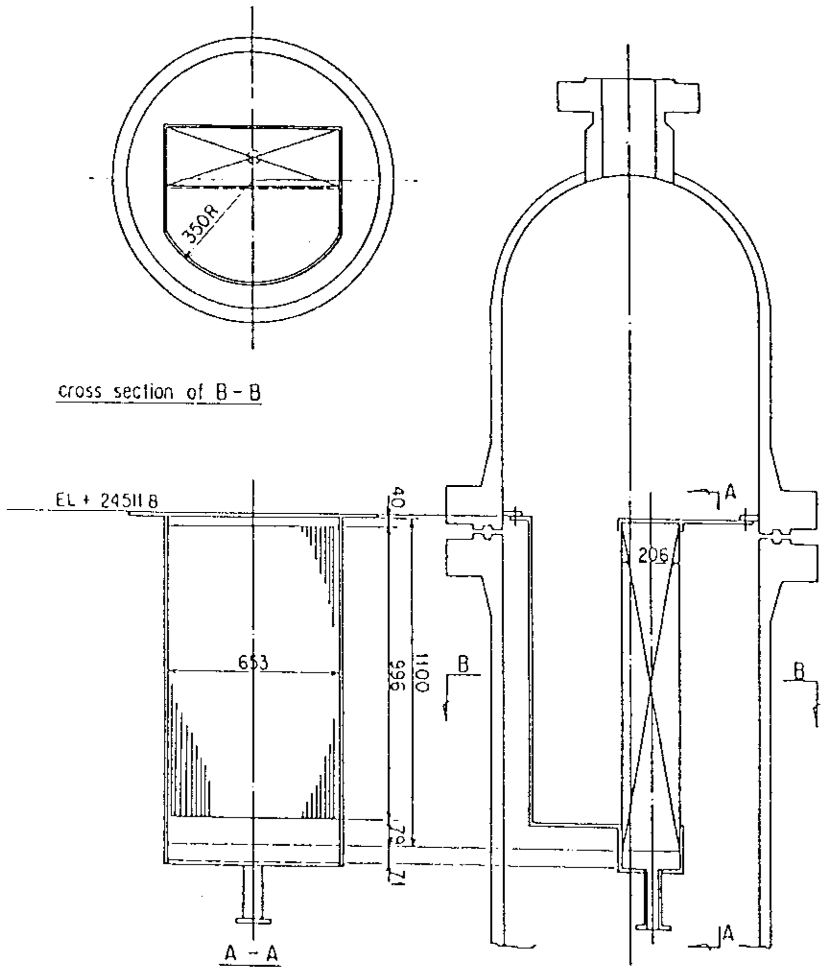


Fig. 5.3.9 (a) Configuration of Secondary Steam Separator

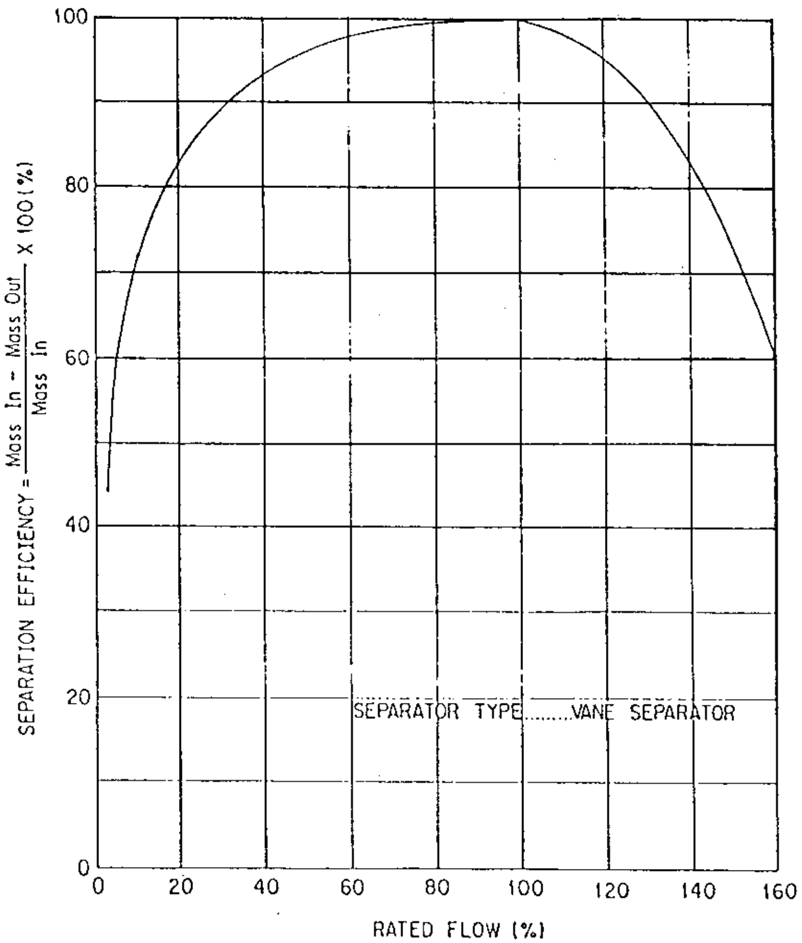


Fig. 5.3.9 (b) Design Flow Characteristics for Secondary Steam Separator

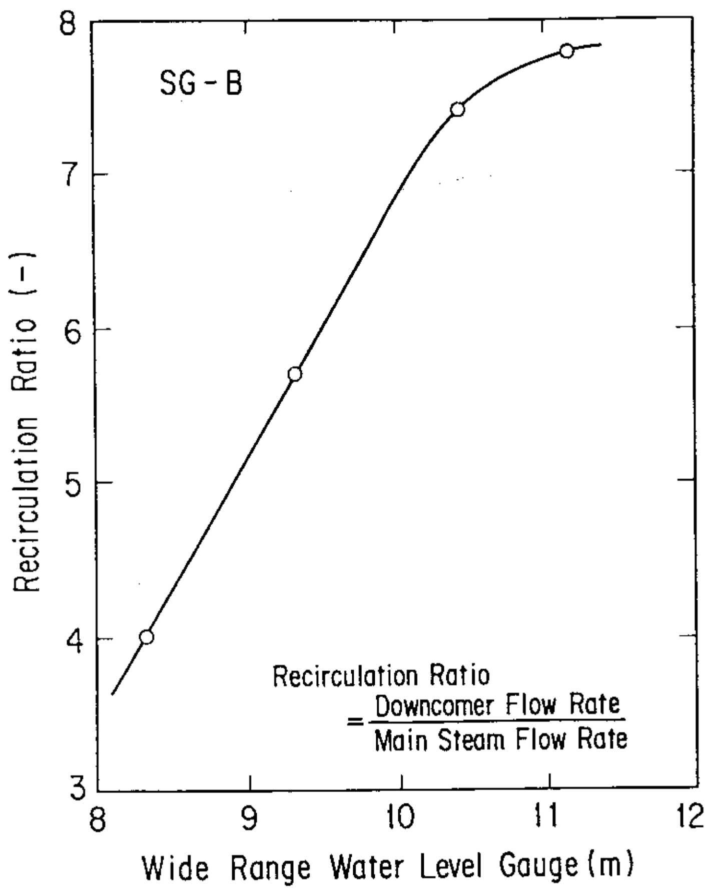
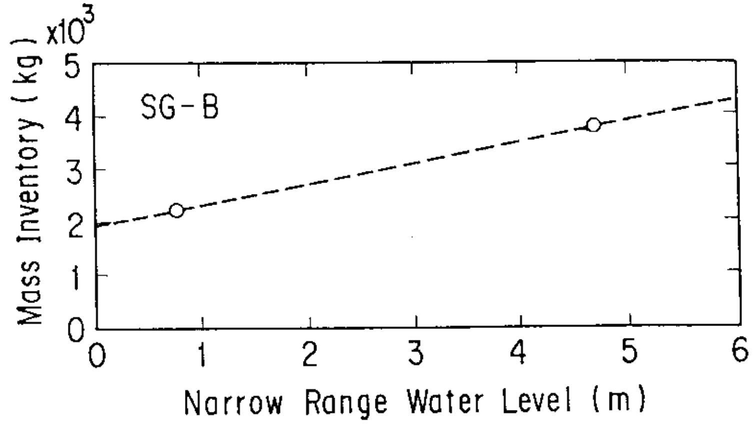
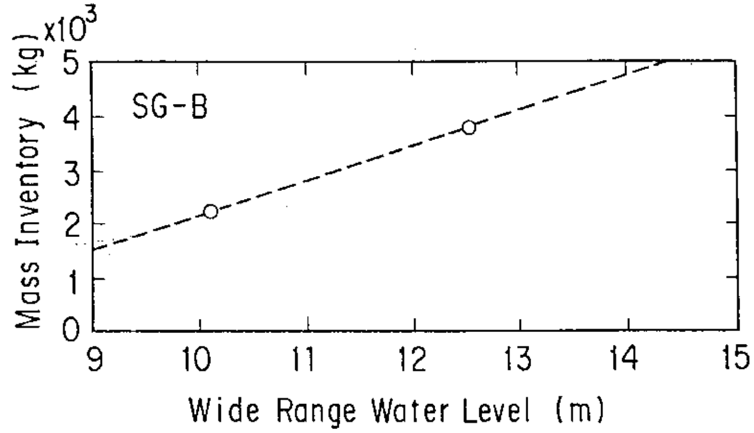


Fig. 5.3.10 Recirculation Ratio in SG Secondary System at Constant Core Power of 10 MW

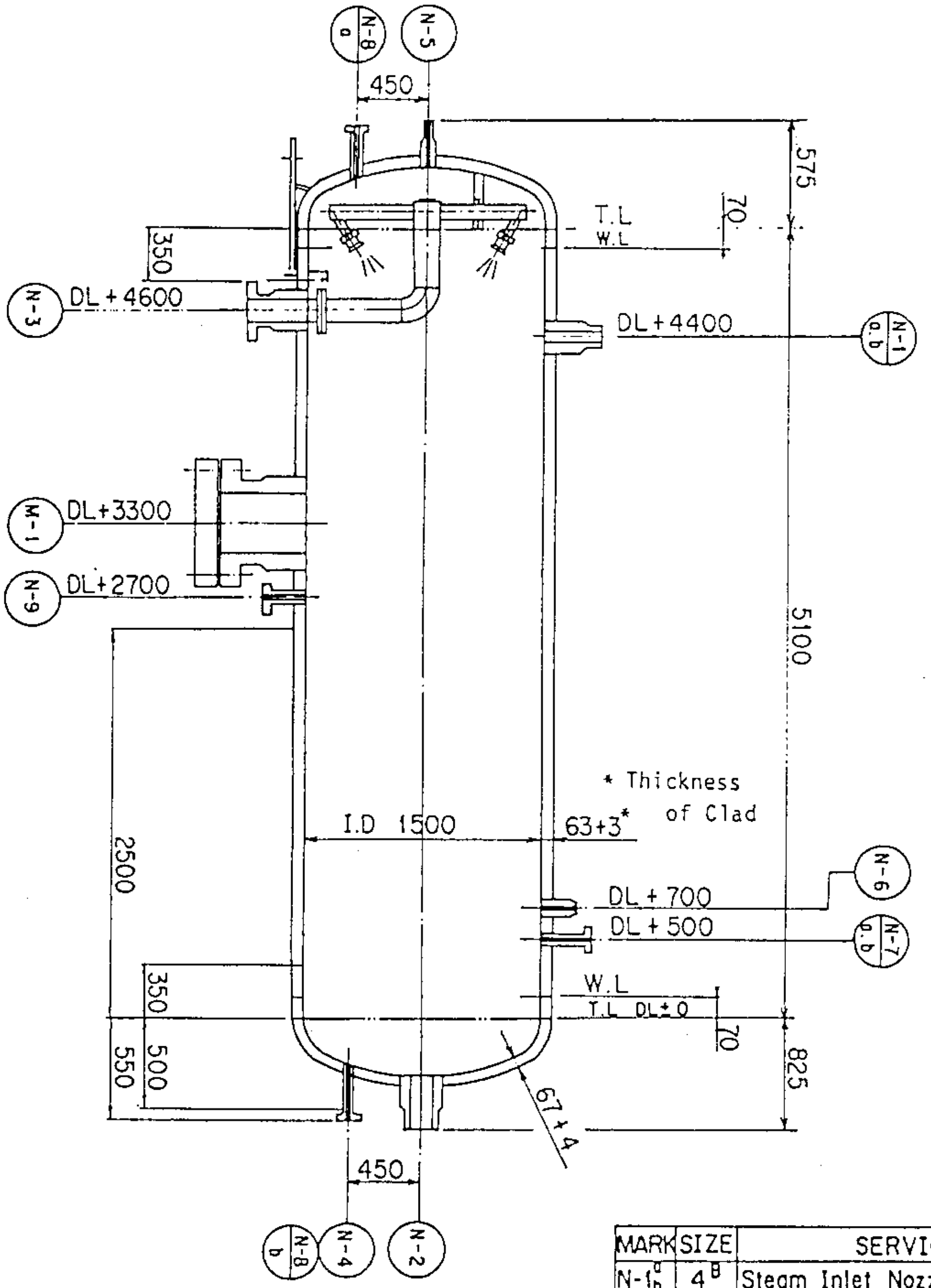


(a) Narrow-range Level Meter



(b) Wide-range Level Meter

Fig. 5.3.11 SG-B Secondary Fluid Mass Inventory Related to Water Level at Constant Core Power of 10 MW



MARK	SIZE	SERVICE
N-1 a/b	4B	Steam Inlet Nozzle
N-2	8B	Hot Water Outlet Nozzle
N-3	6B	Spray Nozzle
N-4	1B	Auto-Bleed Line Nozzle
N-5	1B	Vent-Condenser Line Nozzle
N-6	PT1/8	T/C Tap
N-7 a/b	1B	Charging Line Nozzle
N-8 a/b	1/2B	Taps for Pressure and Level Meter
N-9	1/2B	Pressure Tap
M-1	18B	Manhole

Fig. 5.3.12 Details of Jet Condenser JC

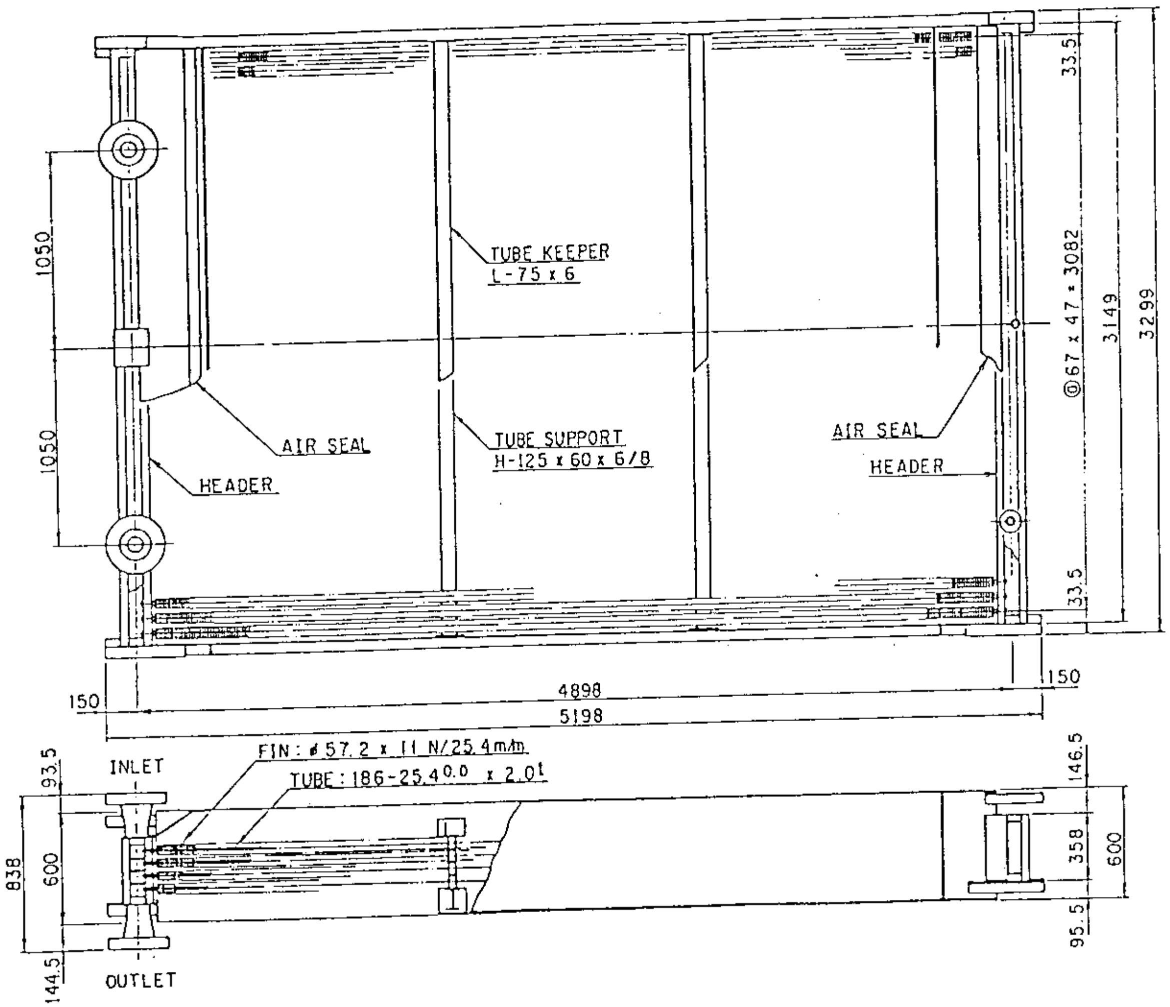


Fig. 5.3.13 (a) Details of Cooling Tower CT-1

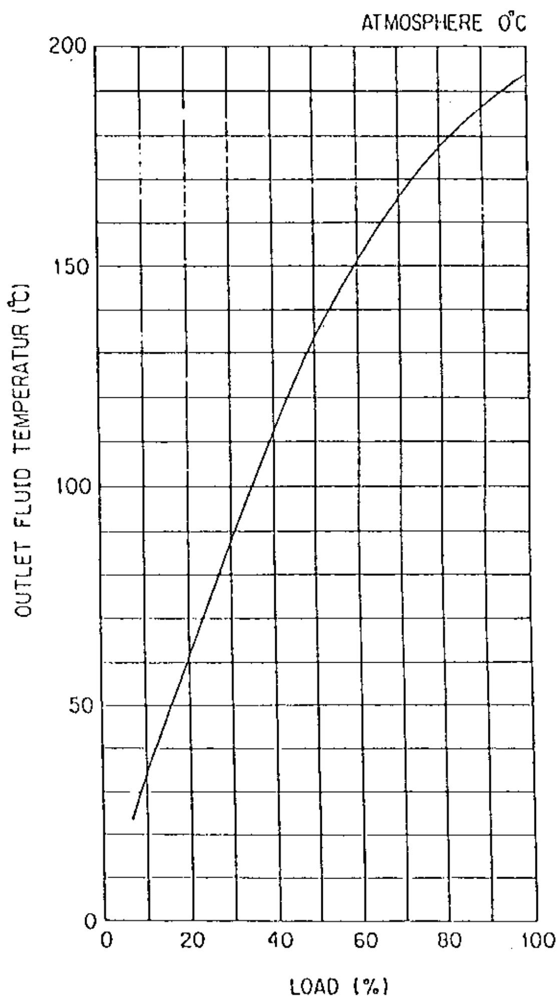


Fig. 5.3.13 (b) Design Performance for CT-1

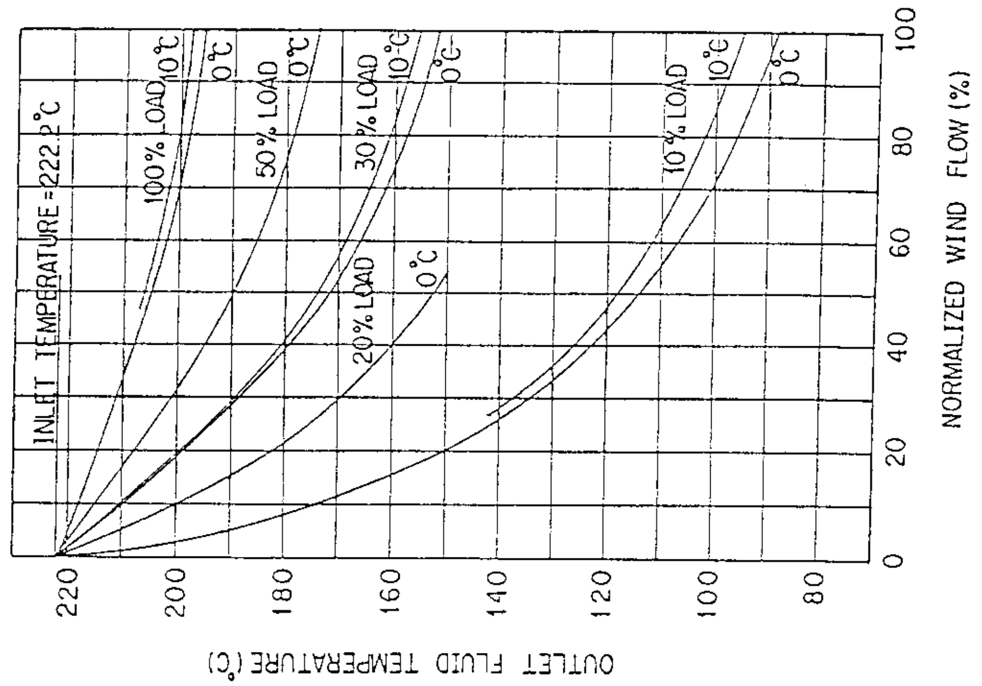


Fig. 5.3.14 (b) Design Performance for CT-2

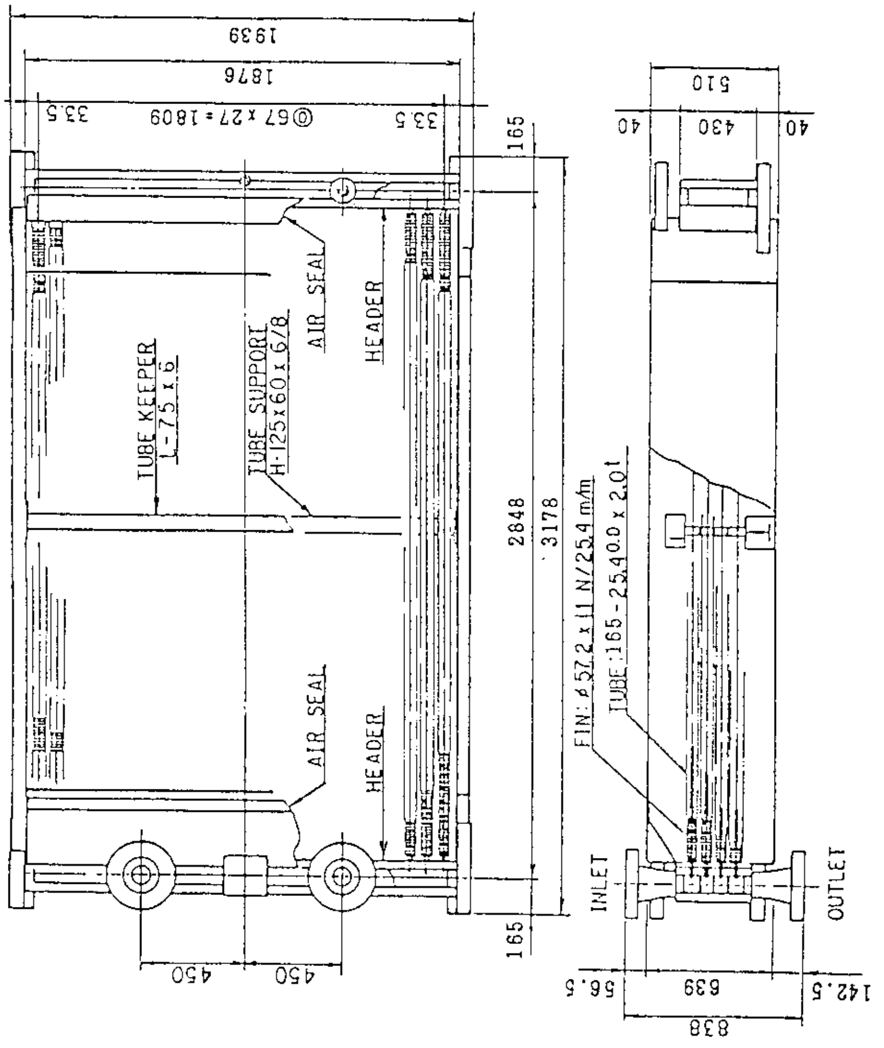


Fig. 5.3.14 (a) Details of Cooling Tower CT-2

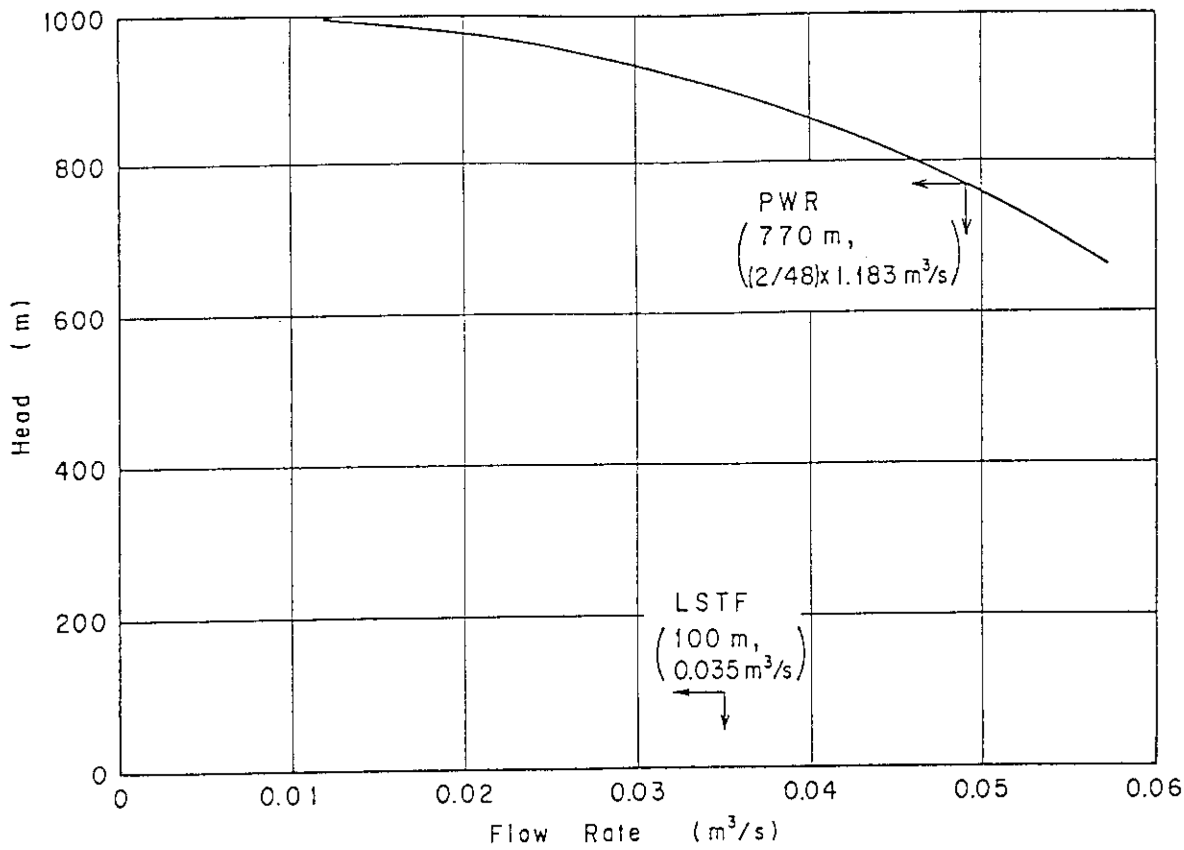


Fig. 5.3.15 Pump Characteristics of PWR Main Feedwater Pump

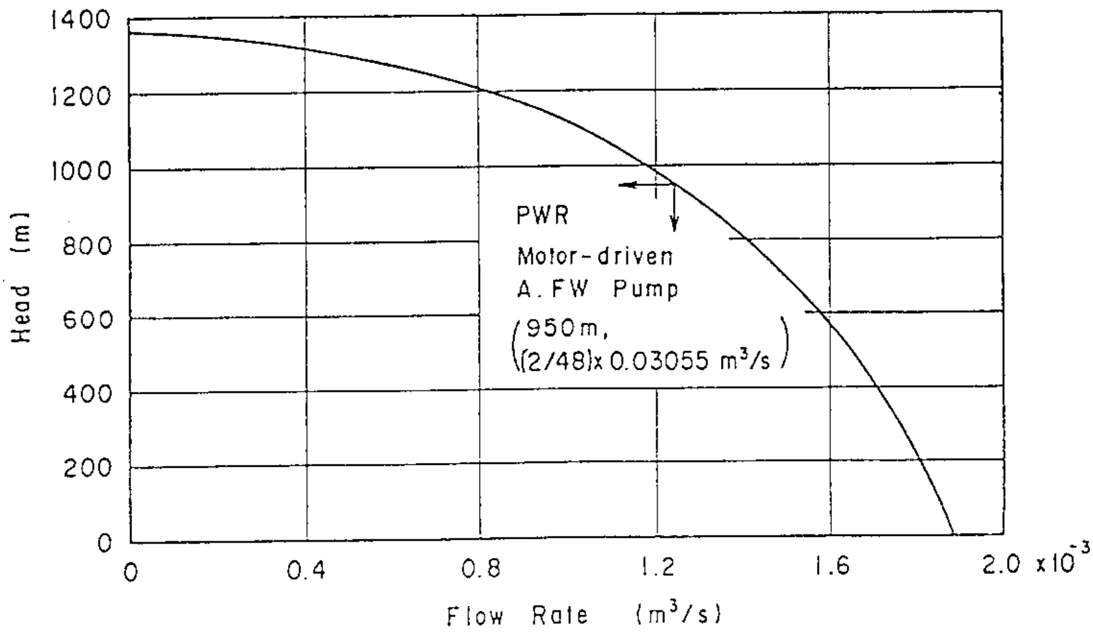


Fig. 5.3.16 Pump Characteristics of PWR Auxiliary Feedwater pump

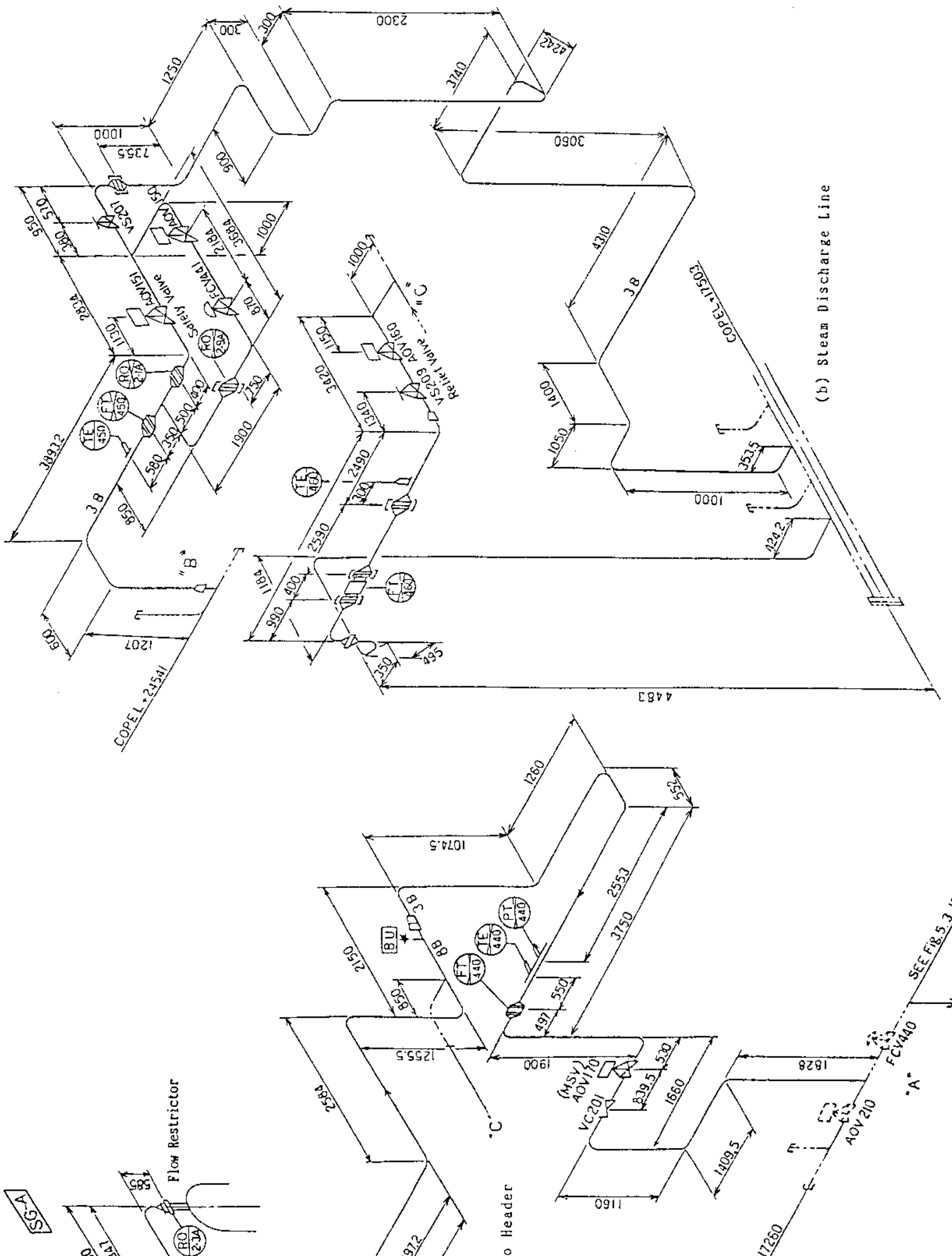


Fig. 5.3.17 Main Steam Line from SG-A to JC

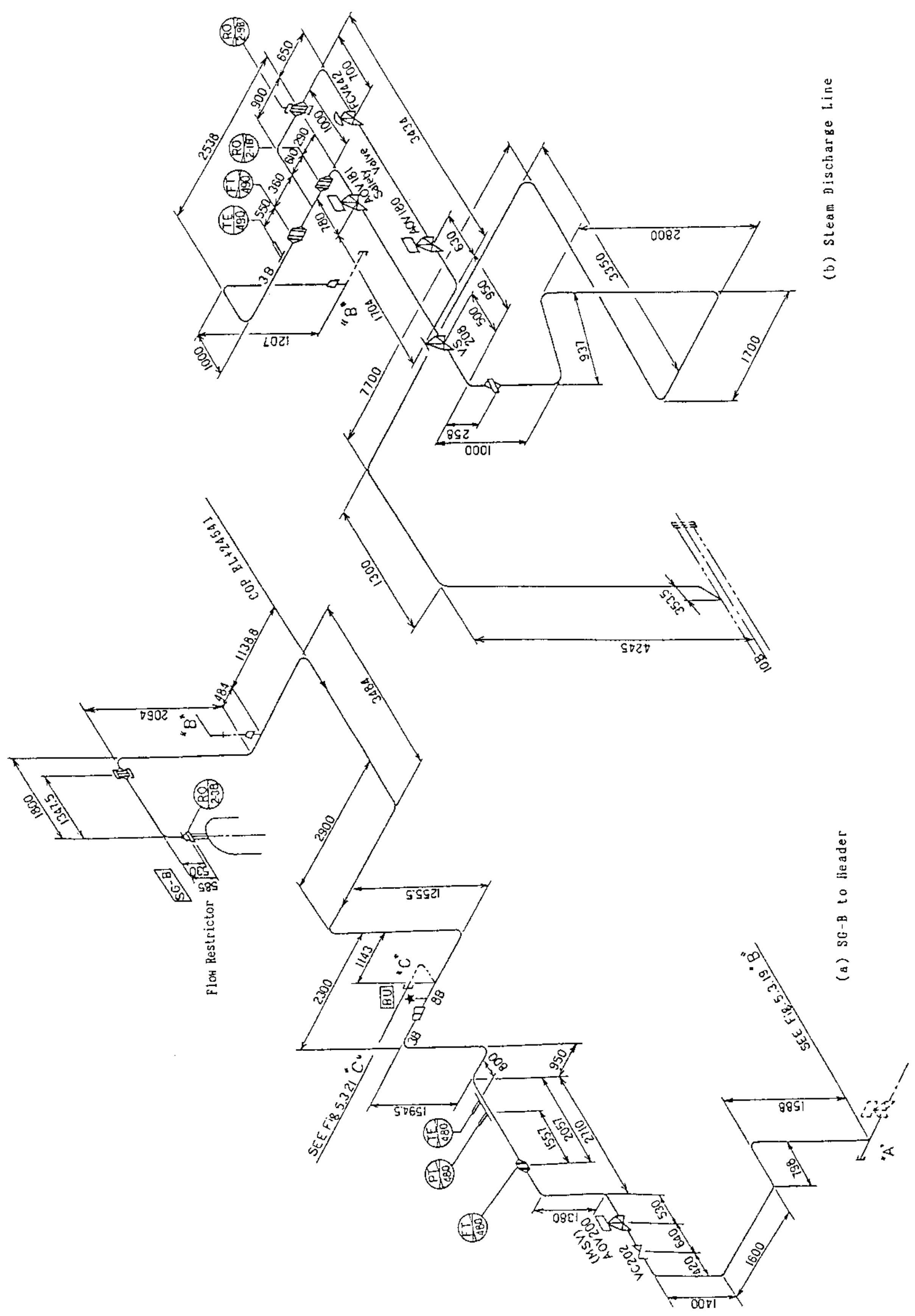


Fig. 5.3.18 Main Steam Line from SG-B to JC

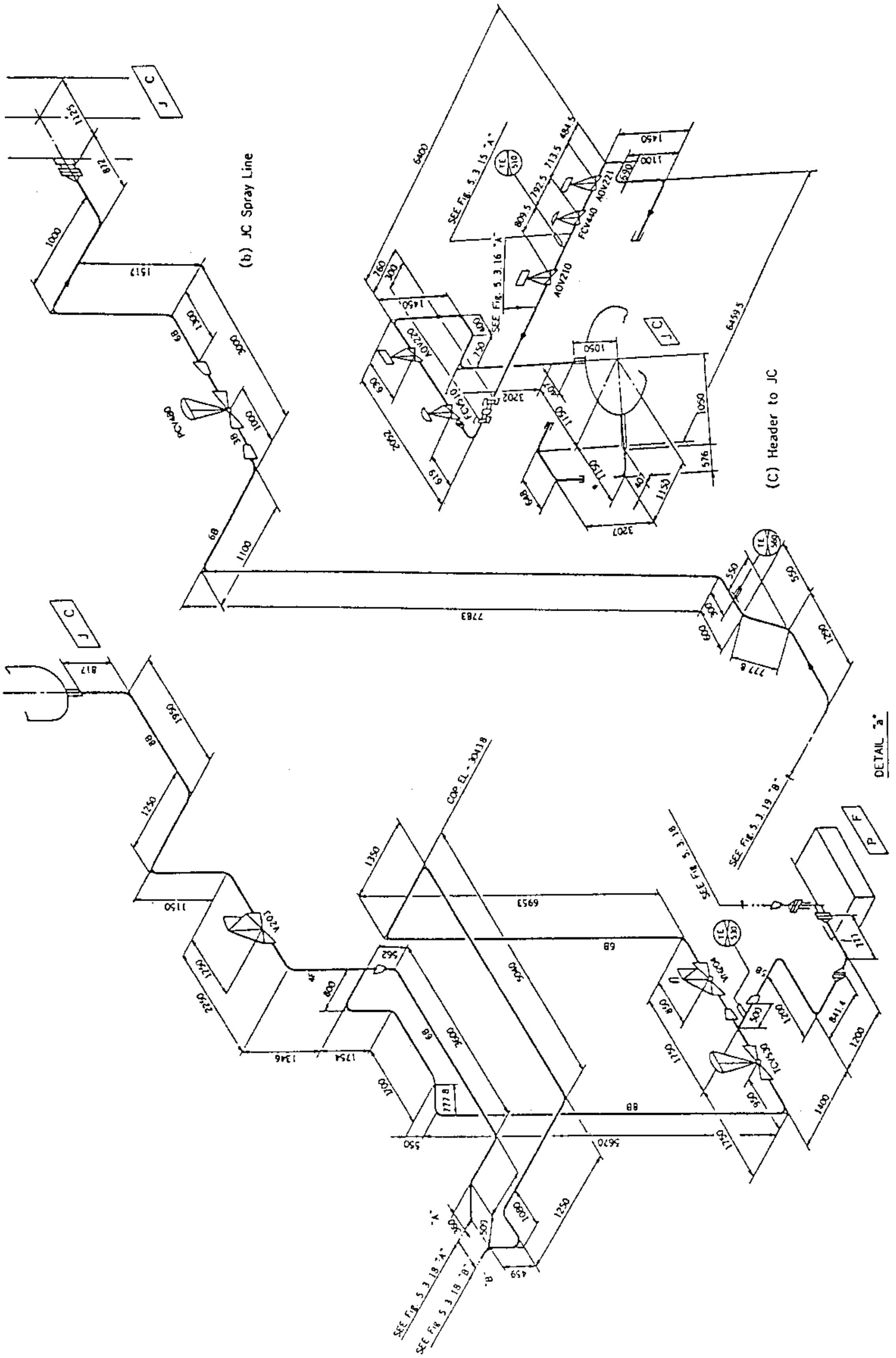


Fig. 5.3.19 Steam Header, JC Spray Line and Main Feedwater Line Around CT-1 Including CT-1 Bypass Line

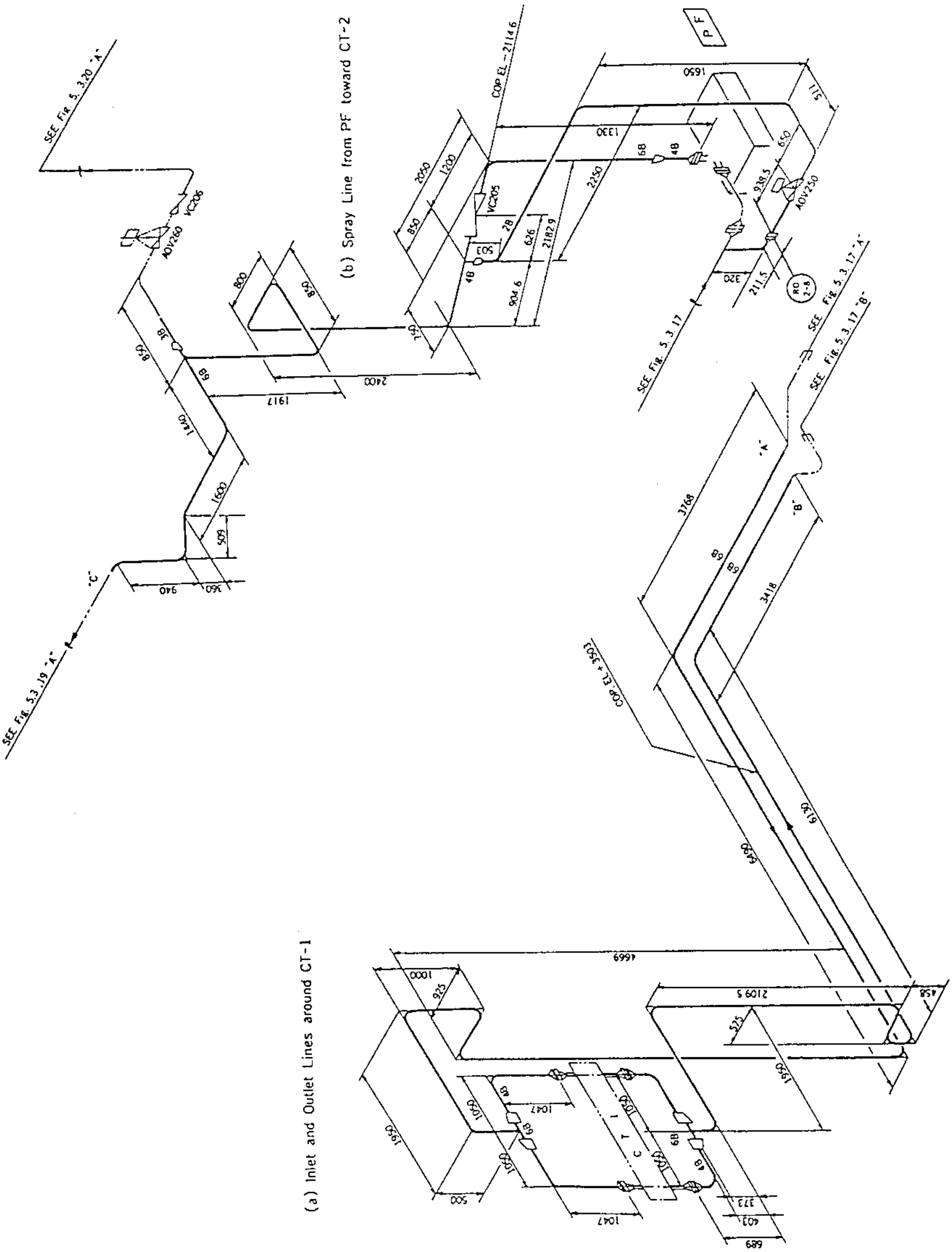


Fig. 5.3.20 Main Feedwater Line Around CT-1 and PF

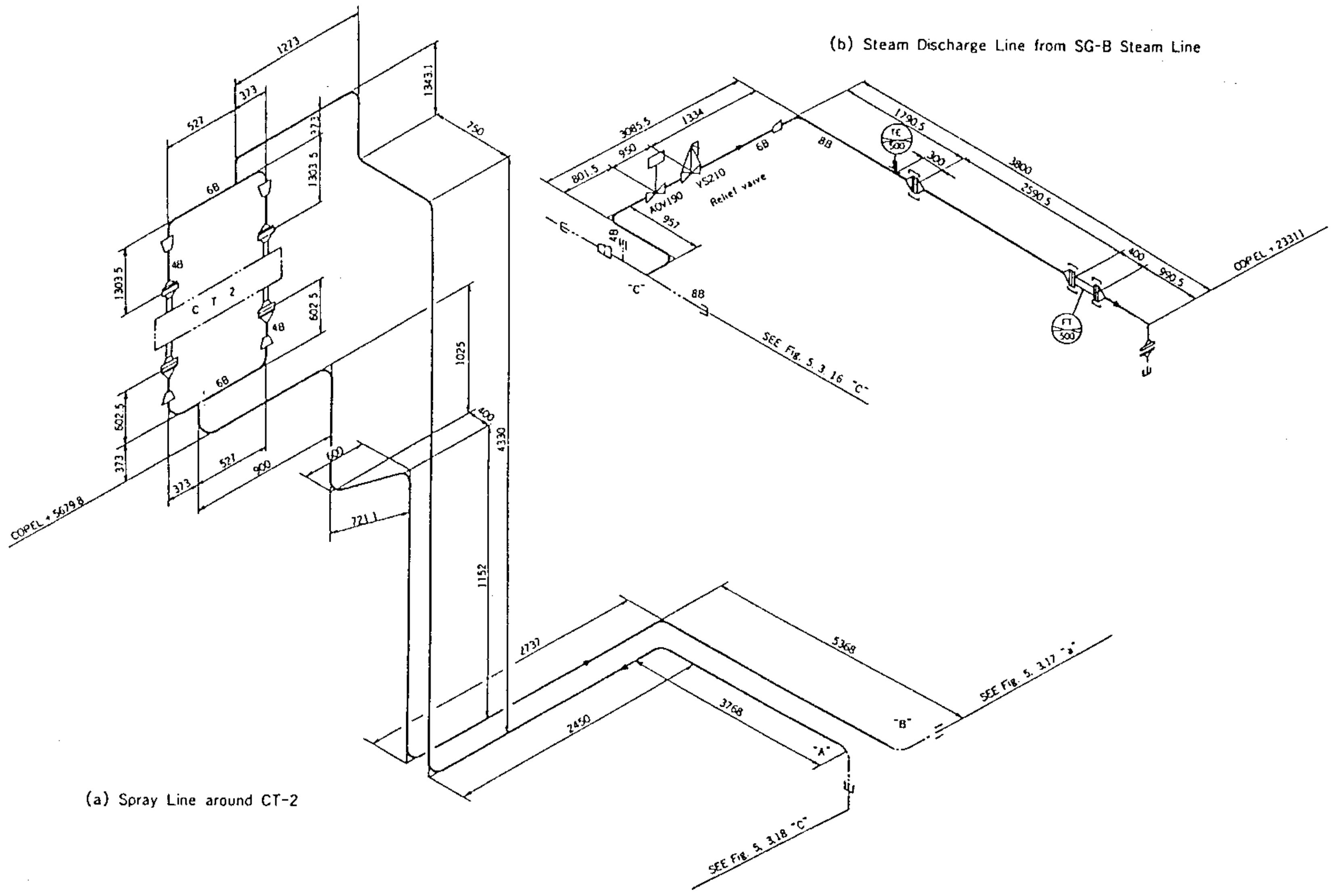


Fig. 5.3.21 JC Spray Line Around CT-2 and Steam Discharge Line from SG-B Steam Line

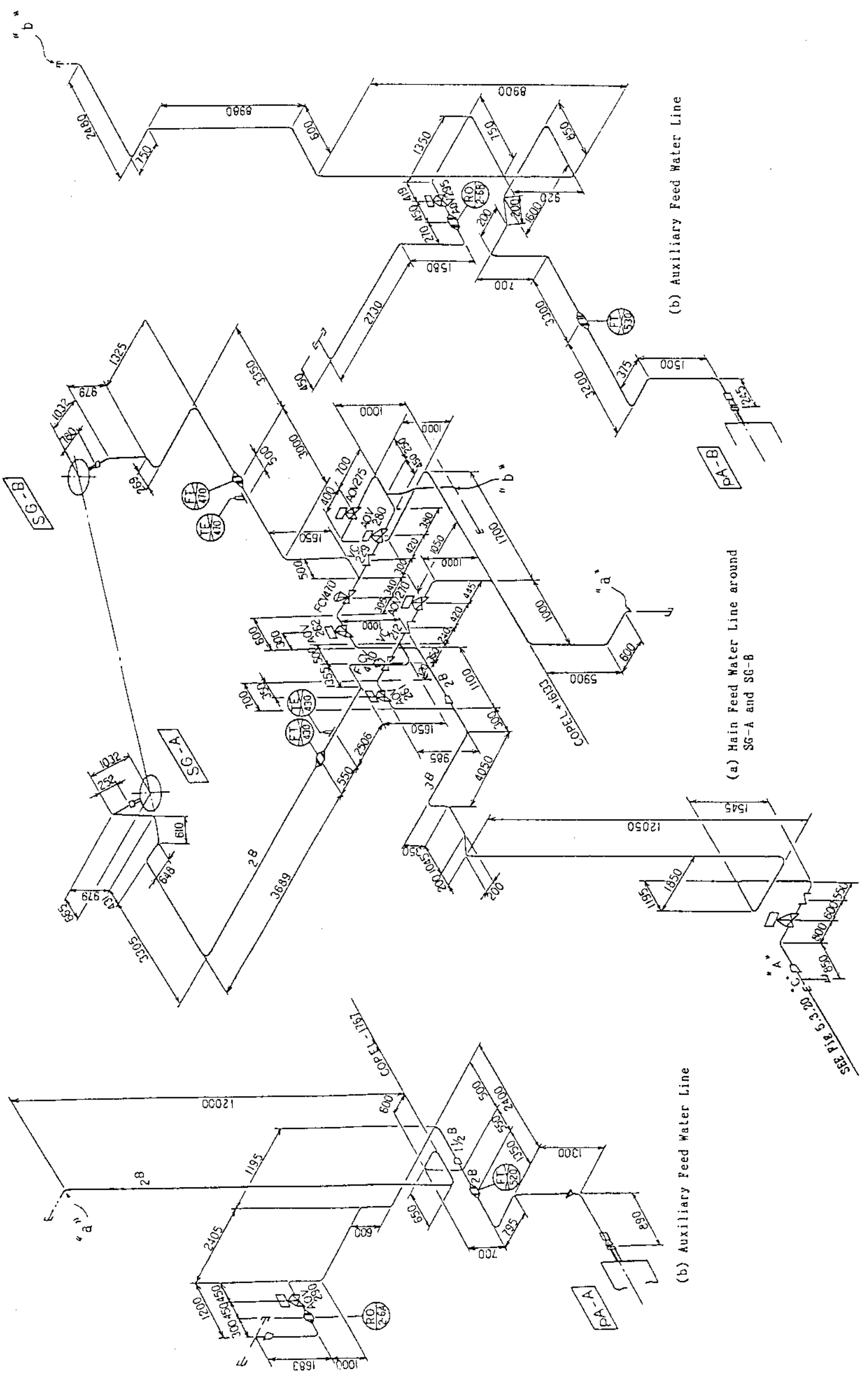


Fig. 5.3.22　Main and Auxiliary Feedwater Lines around SG-A and SG-B

5.4 Blowdown System

The LSTF blowdown system consists of a break unit, blowdown piping and a break flow storage tank (ST). As shown in Table 5.4.1 and Fig. 5.4.1, nineteen break locations are provided in LSTF including the cold and hot legs, the crossover leg, the lower plenum and upper head of the pressure vessel, the pressurizer, the steam generator tube, the steam generator feedwater line and the main steam line. In the cold and hot legs of the primary coolant loop B, the break at top, middle or bottom of the pipe can be simulated.

The break unit shown in Fig. 5.4.2 is designed to be attachable to every break location by a GRAYLOC fitting. The break unit consists of a venturi flow meter, a spool piece to measure two-phase break flow rate and density, a break orifice or a break nozzle and a break valve. The location of each component, which is also connected each other by the GRAYLOC, can be changed in the break unit to optimize the break condition. Details of the spool piece, the break orifice, the break nozzle and the venturi flow meter are shown in Figs. 5.4.3 through 5.4.6, respectively.

Break orifices and nozzles which can be installed flush to the inner wall surface of the cold and hot legs in the loop-B have been made. These orifices and nozzles have three different length downstream tubes to fit the different length nozzles of the each leg for the top, bottom and horizontal break. When this new orifices or nozzles are used, other components of the break unit are located downstream of the orifice or nozzle.

The ST is shown in Fig. 5.4.7. The effluence from the break is collected in this ST. The liquid level change in the ST is used to measure the break flow rate. The liquid in the ST is circulated from N-4 to N-1 nozzle by the suppression tank circulation pump (PY) and sprayed at the top of the ST. To stabilize the steam condensation in the ST, the number of the vapor sparger nozzles were decreased relative to the original design as shown in Fig. 5.4.7 and air is injected from the air inlet nozzle N-5 during each experiment.

The blowdown piping is shown in Fig. 5.4.8 and the brief description of the piping is shown in Table 5.4.2. The blowdown piping consists of a common piping and a piping near the break which is connected to the common piping with the connerctor denoted by (8K-n) in Table 5.4.2 and Fig.

5.4.1. The material of the piping is SUS304TP-A. The size of the pipe is mainly 8B except near the break, 4B, as shown in Fig. 5.4.1.

Table 5.4.1 Break Locations

Number	Location	Notation
1	Hot Leg B Bottom	HL-B-Bot.
2	Hot Leg B Middle	HL-B-Mid.
3	Hot Leg B Top	HL-B-Top
4	Cold Leg B Bottom	CL-B-Bot.
5	Cold Leg B Middle	CL-B-Mid.
6	Cold Leg B Top	CL-B-Top
7	Hot Leg A	HL-A
8	Cold Leg A	CL-A
9	Crossover Leg B Bottom	COL-PC
10	Crossover Leg B near SG	COL-SG
11	Hot Leg B near SG	HL-SG
12	PV Lower Plenum	PV-Bot.
13	PV Upper Head	PV-Top
14	Pressurizer Top	PR
15	SG B Secondary FW Line	SG-B
16	SG A Secondary FW Line	SG-A
17*	SG Tube Rupture	SG-Tub.
18*	SG B Main Steam Line	MSH-B
19*	SG A Main Steam Line	MSH-A

* Break Flow is not collected in ST

Table 5.4.2 **Brief Description of Pipings of the Break System** (1/2)

No.	Name of Pipe	Size (B)	Sch.	Length (mm)	Volume (m^3)	Elbow 90°	45°	other	Memo
1)	Common Part (between center of Connector* or Valve of ST)								
a	ST(V801) = 8K-4	8	40	7836.75	0.2460	3.5	2	-	
b	8K-4 = 8K-3	8	40	2146.8	0.06738	2	-	-	
c	8K-3 = 8K-2	8	40	5640.4	0.1770	3.5	1	-	
d	8K-2 = 8K-1,5	8	40	15489.0	0.4861	1	3.5	-	Junction of 8K-1
e	8K-4 = 8K-8	8	40	7857.0	0.2466	3.5	1	-	
2)	Near the Break (between Break Unit Outlet and center of Connector*, Contains one 4^B-8^B Reducer, Break Flow is led to ST)								
a	HL-B-Bot. = 8K-3	8	40	9340.0	0.2931	4.5	3	-	
b	HL-B-Mid. = 8K-2	8	40	8540.7	0.2680	3	3	-	
c	HL-B-Top. = 8K-2	8	40	9084.9	0.2851	3	3	-	
d	CL-B-Bot. = 8K-3	8	40	12102.6	0.3798	5.5	4	-	
e	CL-B-Mid. = 8K-8	8	40	20224.6	0.6347	7	2	-	
f	CL-B-Top. = 8K-8	8	40	21369.0	0.6707	7	2	-	
g	HL-A = 8K-8	8	40	19013.8	0.5967	5	4	-	
h	CL-A = 8K-2	8	40	12860.4	0.4036	5	2	-	
i	COL-PC = 8K-8	8	40	7266.6	0.2281	4	1	1/75°	
j	COL-SG = 8K-8	8	40	11391.3	0.3575	4	2	1/35°	
k	HL-SG = 8K-2	8	40	6619.3	0.2077	4	1	-	
l	PV-Bot. = 8K-4	8	40	8007.3	0.2513	1.5	1	-	
m	PV-Top. = 8K-2	8	40	14362.4	0.4508	4	1	-	
n	PR = 8K-5	8	40	9305.1	0.2920	3	2.5	-	
o	SG-B = 8K-1	8	40	16007.2	0.5024	8	1.5	-	

* Connectors are denoted by 8K-n, also in Fig. 5.4.1

Table 5.4.2 (Cont'd) (2/2)

No.	Name of Pipe	Size (B)	Sch.	Length (mm)	Volume (m^3)	Elbow 90°	Elbow 45°	Elbow other	Memo
p	SG-A = 8K-1	8	40	15634.0	0.4907	8	1.5	-	
3)	Other Breaks (Break Flow is not led to ST)								
a	SG-Tube = Break (between Flange of SG and Break Unit Inlet)								
		4	160	3181.0	0.01904	3	-	-	
	Break = SG Secondary Side (between Break Unit Outlet and flange of SG)								
		1 1/4	80	12221.5	0.01039	10	1	-	
b	MSH-B = Break (between Flange of SG Top and Break Unit Inlet)								
		8	80	15215.3	0.4355	7		1/Tee	
		4	160	1128.5	0.00675	1		1/Tee	
c	MSH-A = Break (between Flange of SG Top and Break Unit Inlet)								
		8	80	14069.7	0.4027	6		1/Tee	
		4	160	1128.5	0.00675	1		1/Tee	
4)	Circulation Loop of ST								
a	ST-Bot. = PY	4	20	4183.8	0.03588	2	-	-	1/Reducer $4^{B}x3^{B}$
b	PY = FI600	3	20	6181.7	0.03115	6	-	1/Tee	1/Reducer $3^{B}x4^{B}$
c	FI600	4	20	820	0.00703	-	-	-	Flow Meter
d	FI600 = ST-Top.	3	20	13205.8	0.06655	6	2	-	1/Reducer $4^{B}x3^{B}$
5)	Instrumentation near ST Inlet								
a	ST (V801) = TE600	8	40	5061	0.1588	2	2	-	
b	ST (V801) = PE600	8	40	5061	0.1651	2	2	-	
c	ST (V801) = CP560	8	40	5461	0.1714	2	2	-	

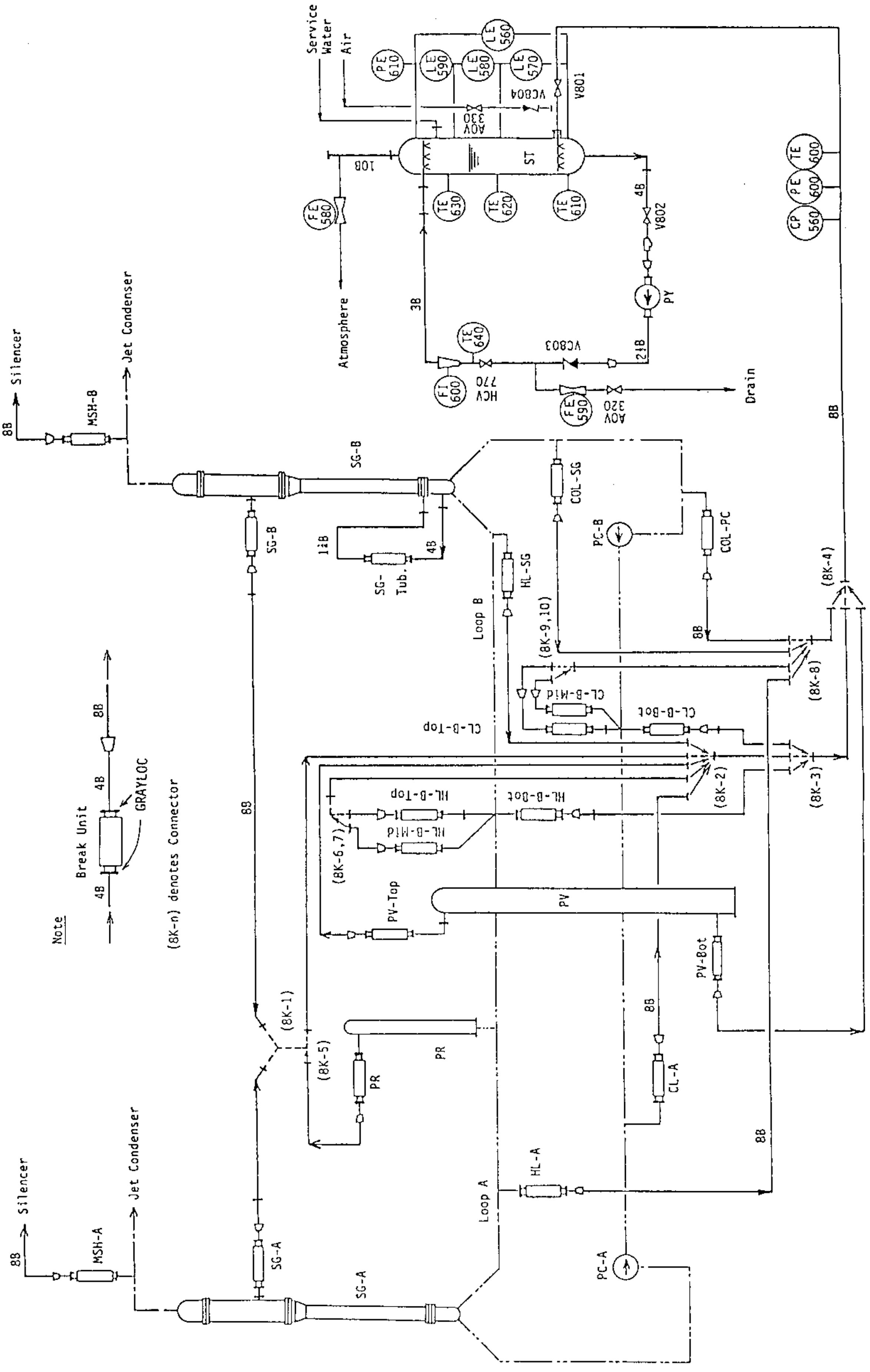


Fig. 5.4.1 Blowdown System Flow Diagram

Location	Description	Material
1	Venturi Flow Meter	SUSF316L
2	Spool Piece	SUS316L
3	R.O. Piece 1/2	SUS316L
4	R.O. Piece 1/2	SUS316L
5	Break Valve	SCS13

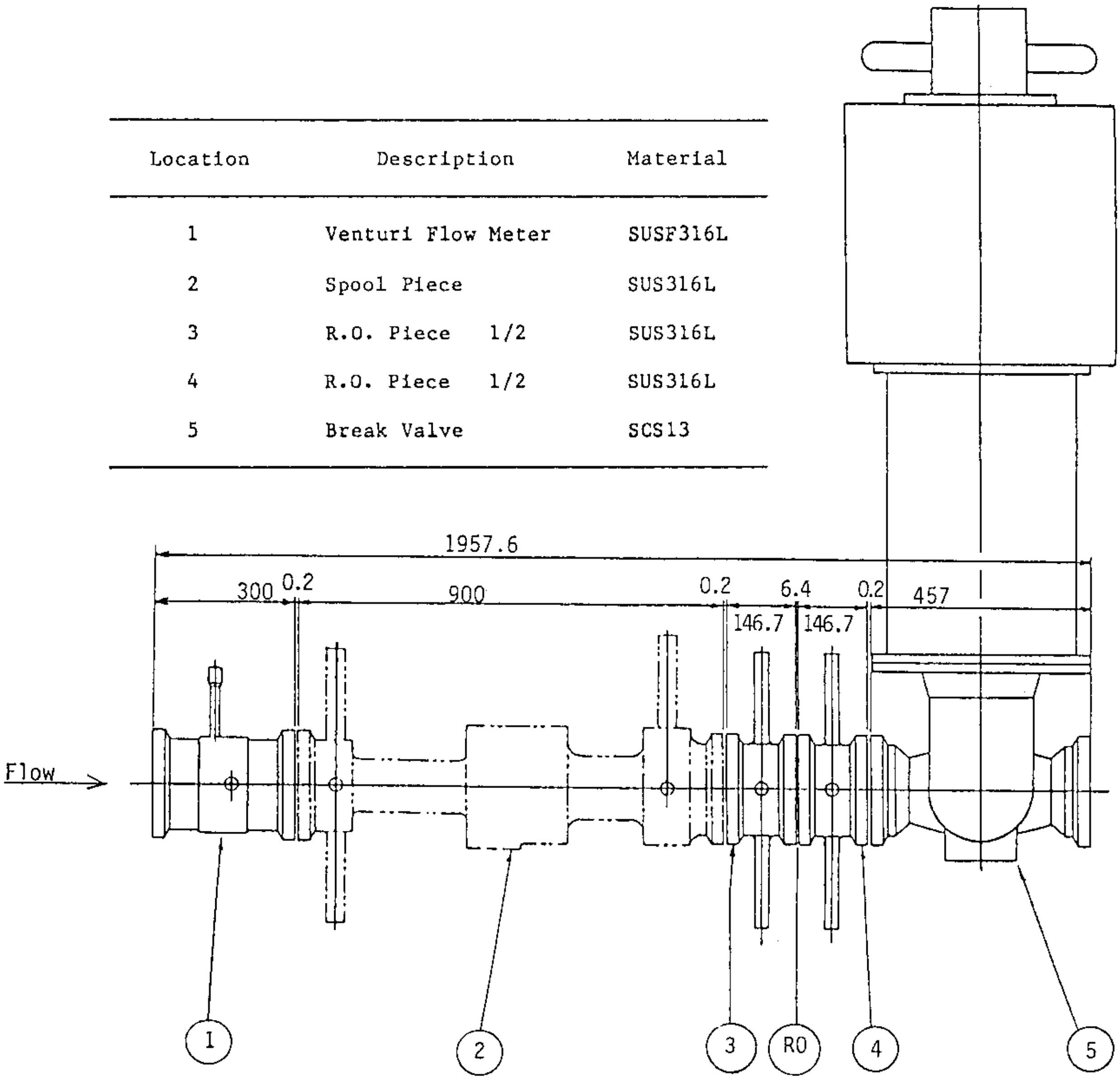


Fig. 5.4.2 Break Unit

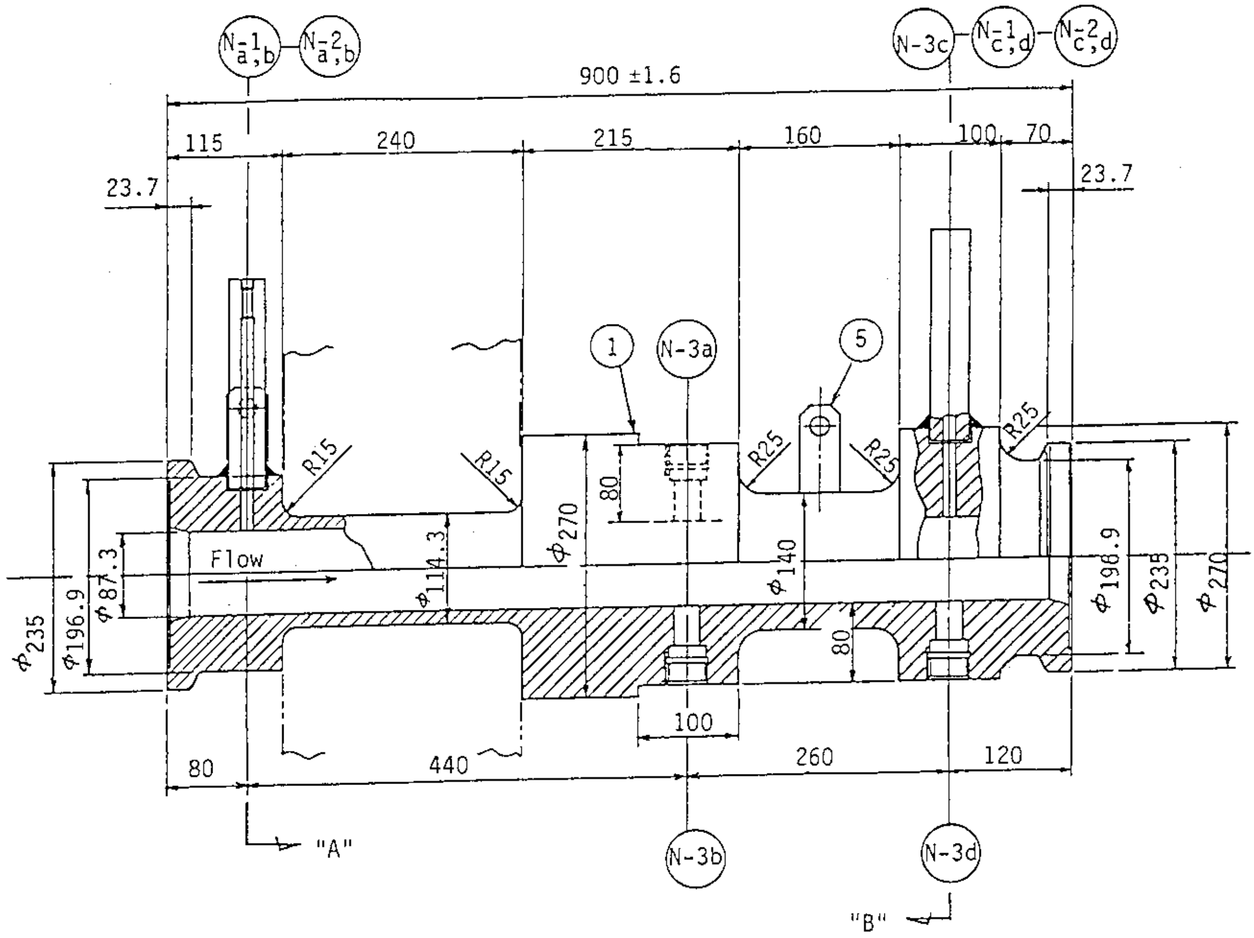
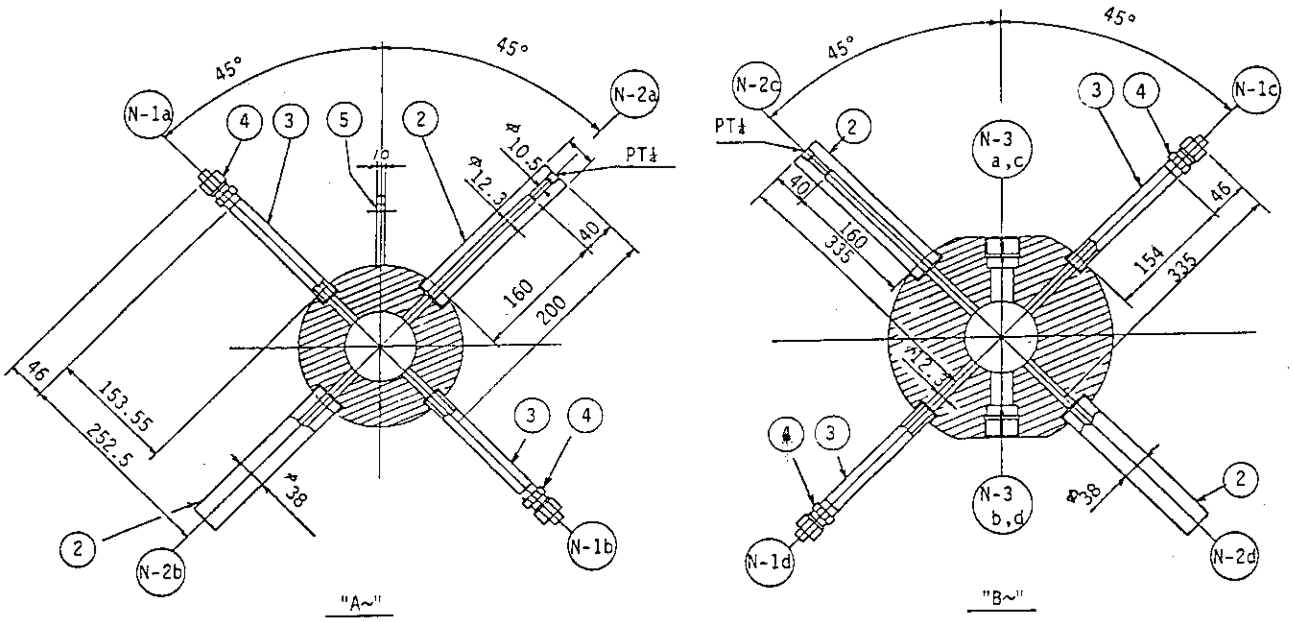


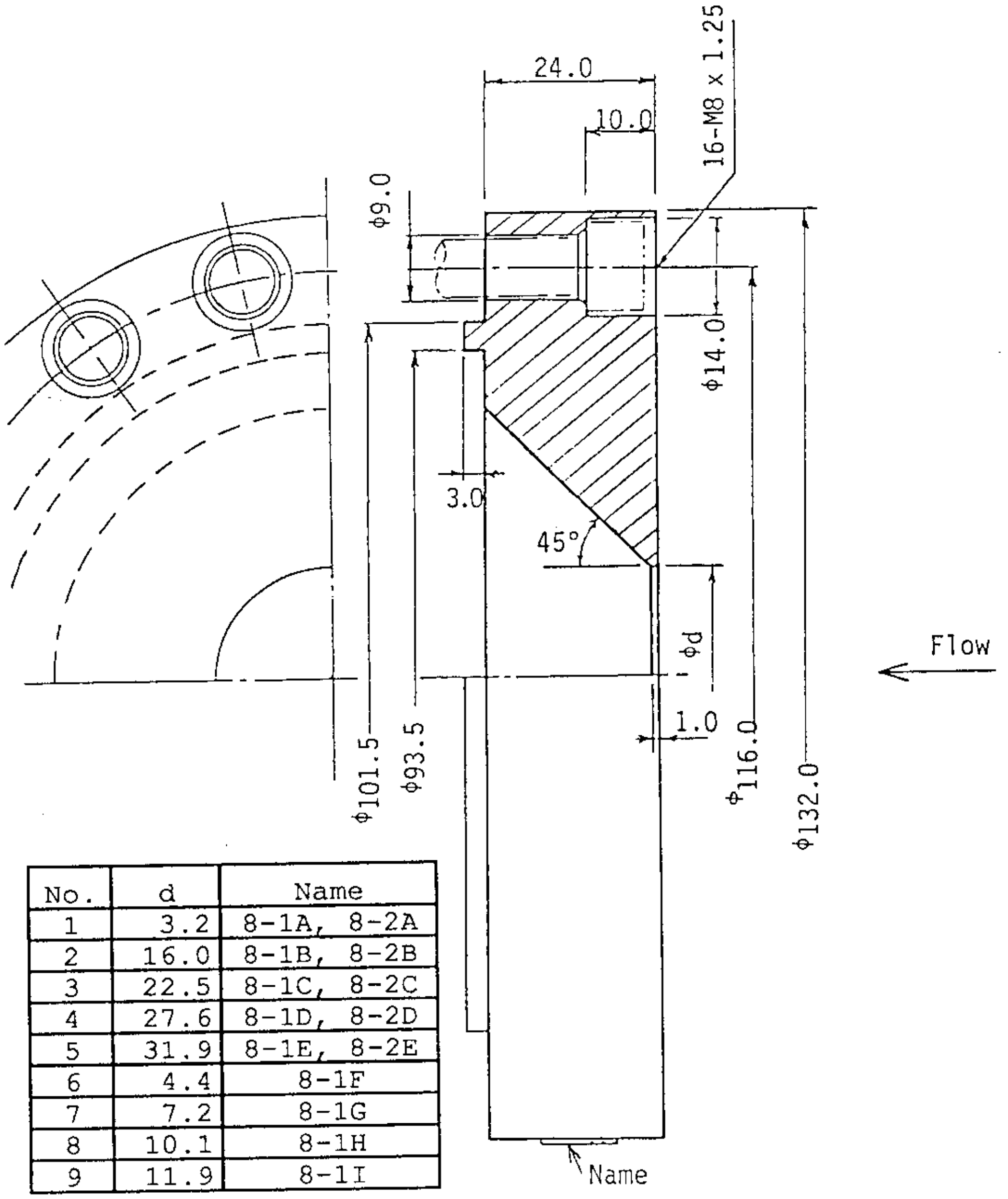
Fig. 5.4.3 Spool Piece Details (1/2)



Location	Description	Material
1	Spool Piece	SUS 316L
2	Half Coupling	SUS 316L
3	Pipe 1/2 B	SUS 316LTP-S
4	Swagelok 1/2 B	SUS 316
5	Lifting Lug	SUS 304

Location	Service	Size
N-1 a-d	Differential Pressure	1/2 B
N-2 a-d	Fluid Temperature	PT 1/4
N-3 a-d	Drag Disk	1 5/8"

Fig. 5.4.3 (Cont'd) (2/2)



No.	d	Name
1	3.2	8-1A, 8-2A
2	16.0	8-1B, 8-2B
3	22.5	8-1C, 8-2C
4	27.6	8-1D, 8-2D
5	31.9	8-1E, 8-2E
6	4.4	8-1F
7	7.2	8-1G
8	10.1	8-1H
9	11.9	8-1I

Fig. 5.4.4 **Break Orifice** (1/3)

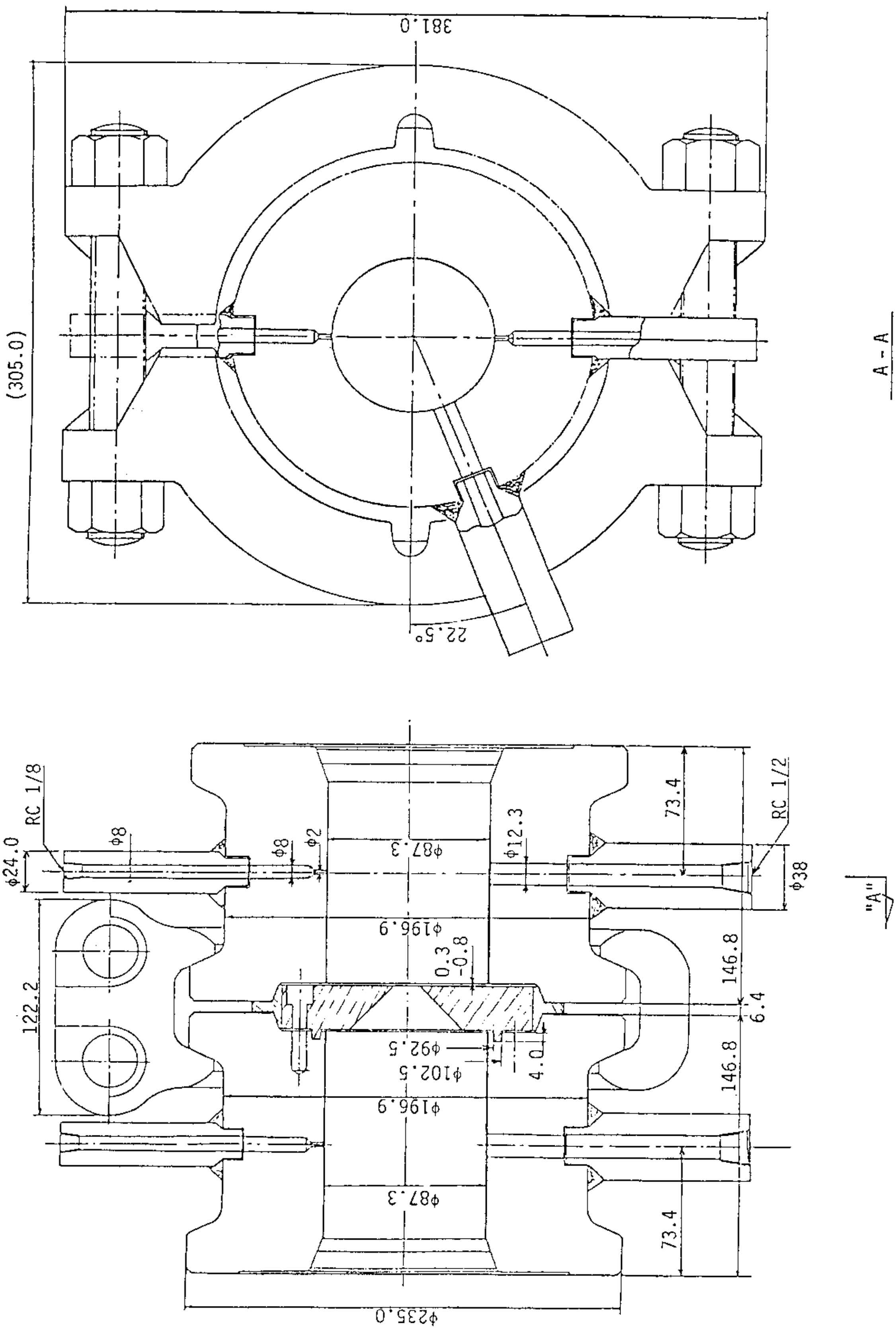
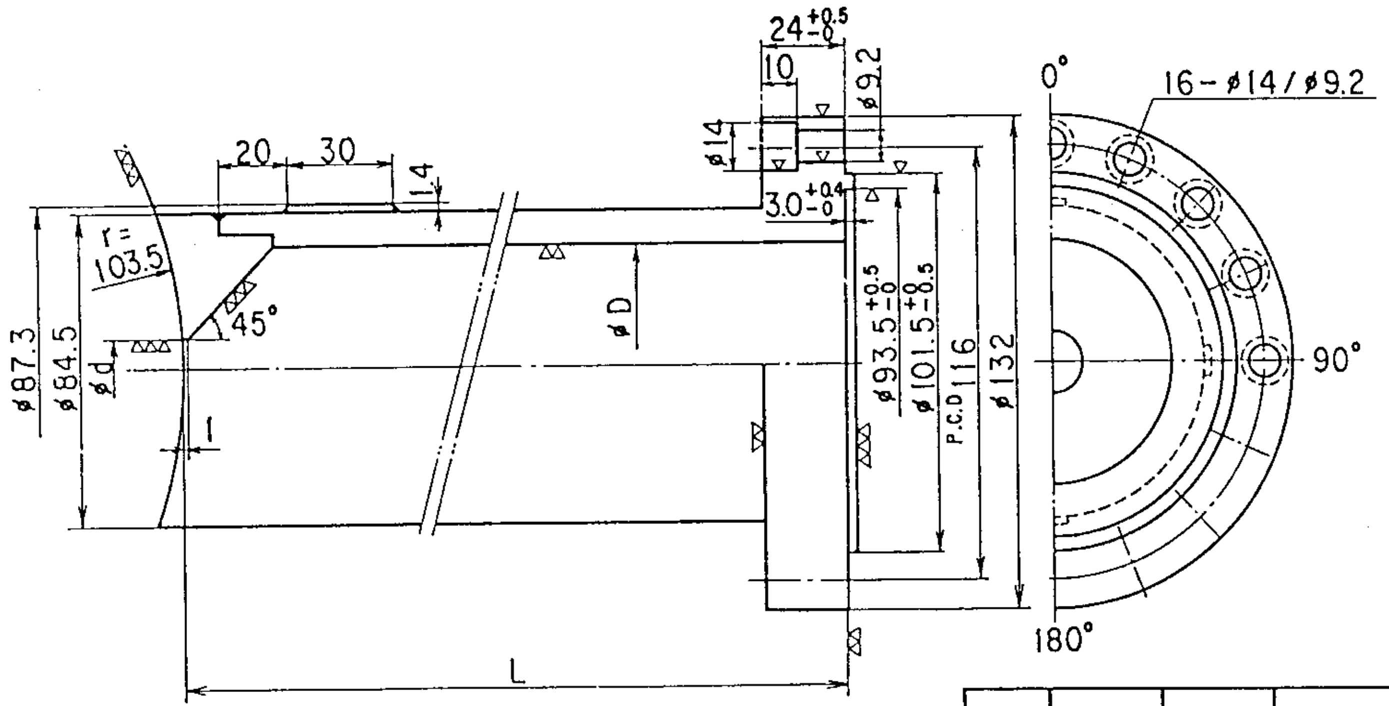
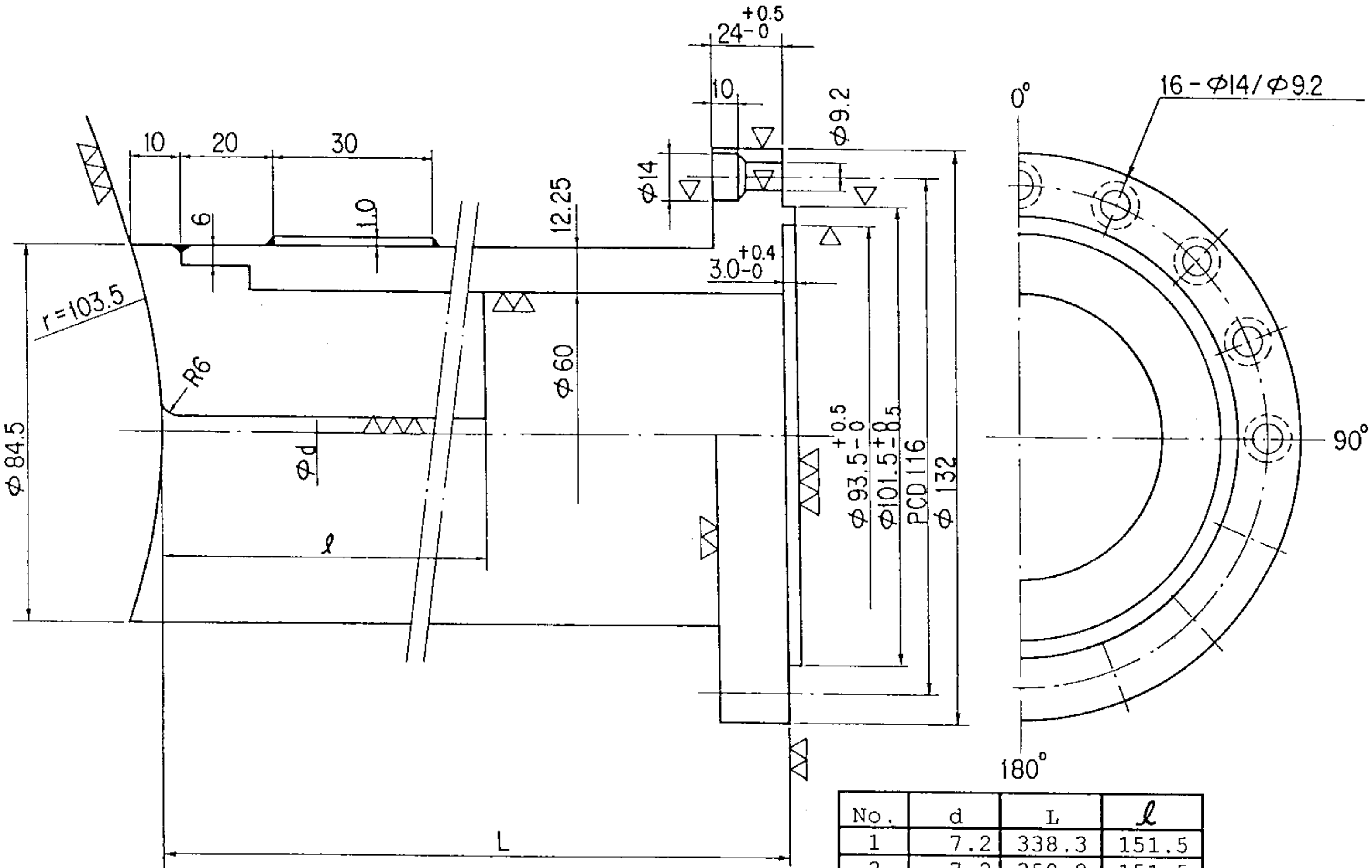


Fig. 5.4.4 (Cont'd) (2/3)



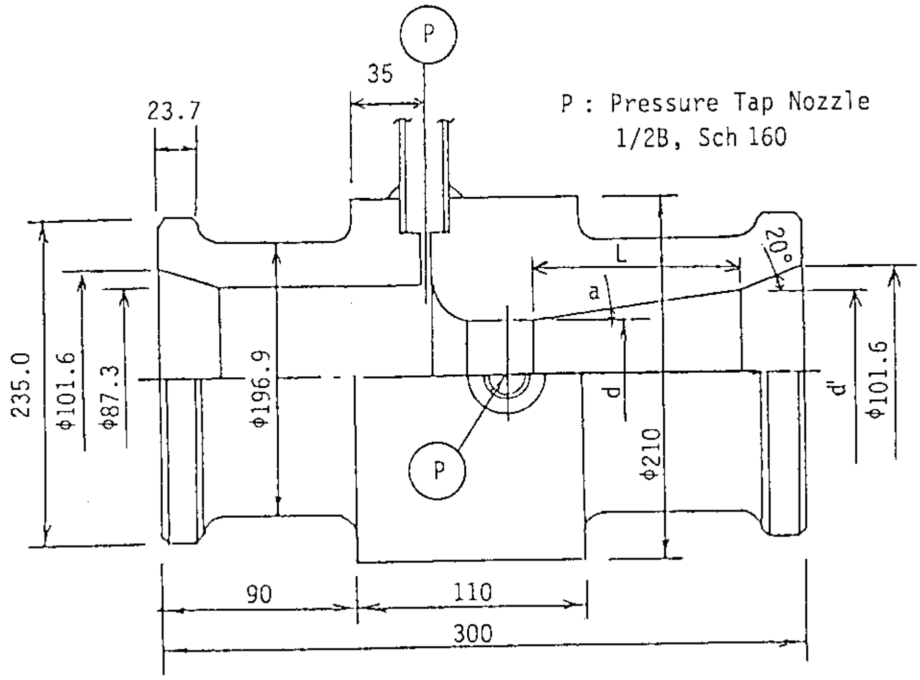
No.	d	D	L	Name
1	7.2	60.0	338.3	9 A
2	7.2	60.0	350.8	9 B
3	7.2	60.0	506.8	9 C
4	16.0	65.0	338.3	9 D
5	16.0	65.0	350.8	9 E
6	16.0	65.0	506.8	9 F
7	22.5	65.0	338.3	9 G
8	22.5	65.0	350.8	9 H
9	22.5	65.0	506.8	9 I

Fig. 5.4.4 (Cont'd) (3/3)



No.	d	L	ℓ
1	7.2	338.3	151.5
2	7.2	350.8	151.5
3	7.2	506.8	151.5
4	25.7	350.8	255.0

Fig. 5.4.5　　Break Nozzle



Specifications*

Notations	FE-560-BU	FE-570-BU
Fluid	Liquid	Liquid
Rated Fluid Temperature (K)	562.3	598.1
Rated Fluid Pressure (MPa)	7.3	15.4
Rated Fluid Density (kg/m³)	734.0	665.6
d (mm)	64.53	33.29
β	0.739	0.381
Rated Flow Rate (kg/s)	100 (Max)	10 (Max)
Rated Pressure Difference (kPa)	45.0	21.8
Materials	SUSF316L	SUSF316L
L (mm)	79	64
d' (mm)		49.01
a (°)	9	7

* Nozzle Type Venturi Tube (JIS)

Fig. 5.4.6 Venturi Flow Meter Details

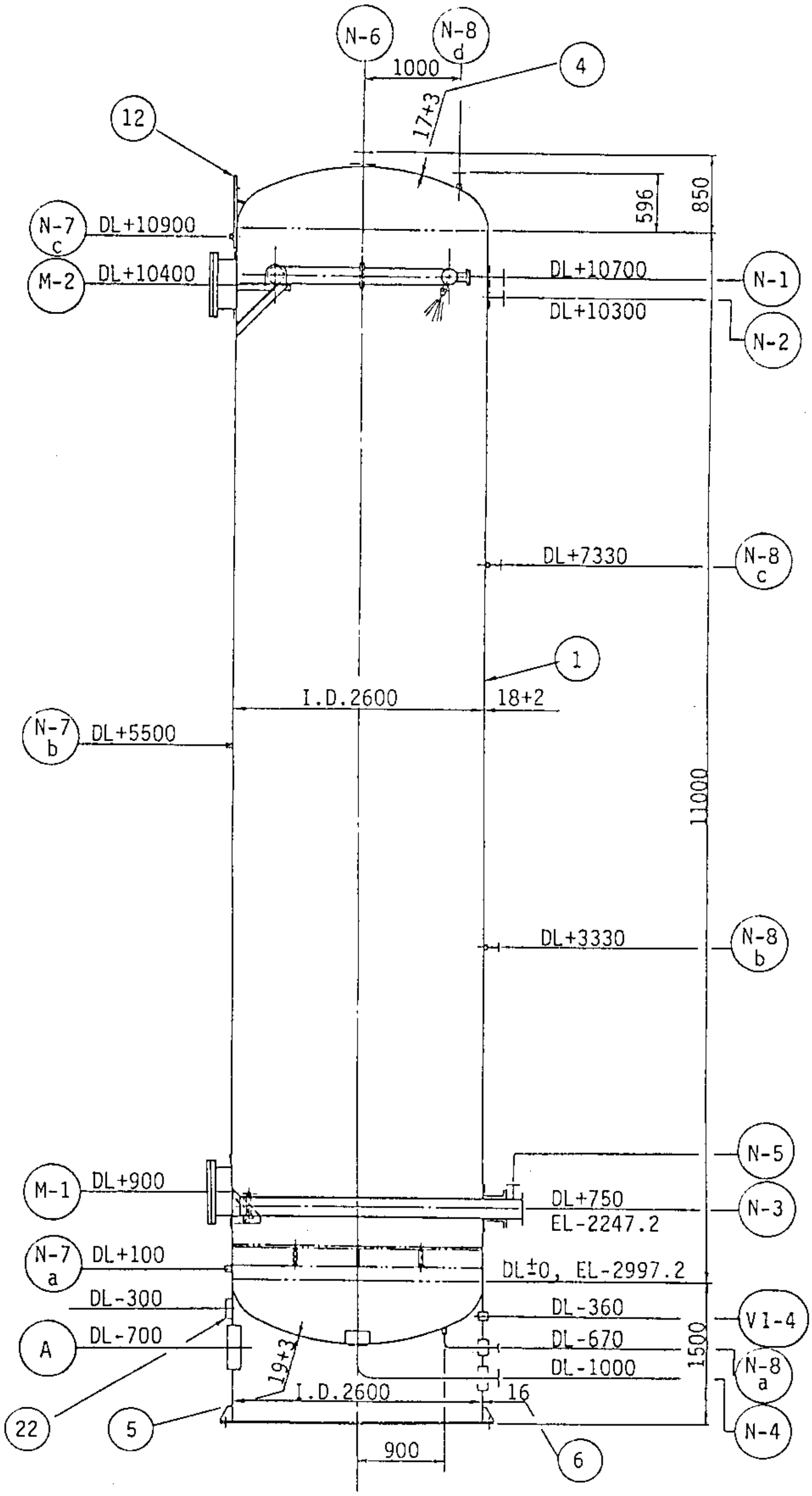
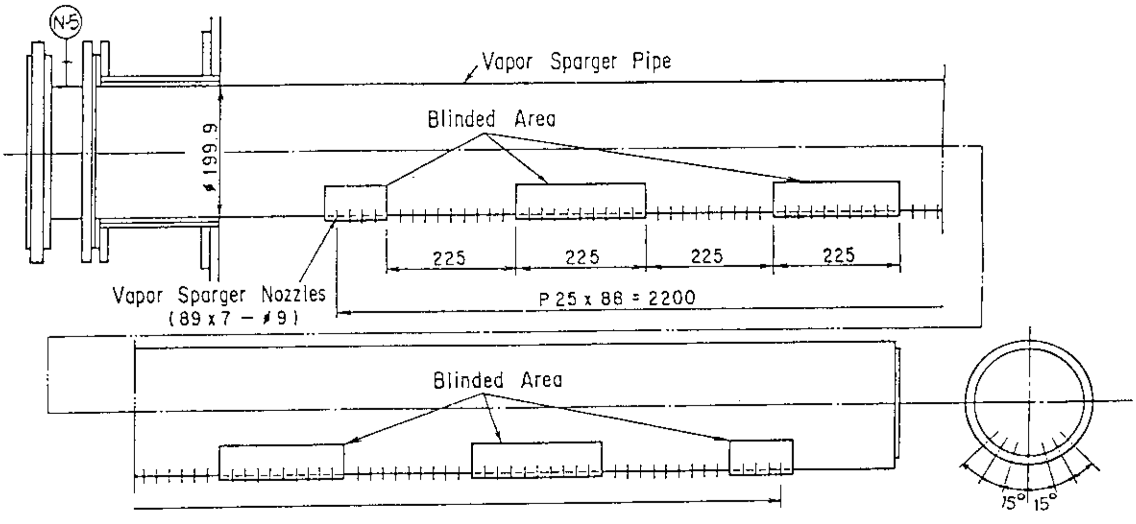


Fig. 5.4.7 Break Flow Storage Tank (ST) (1/2)

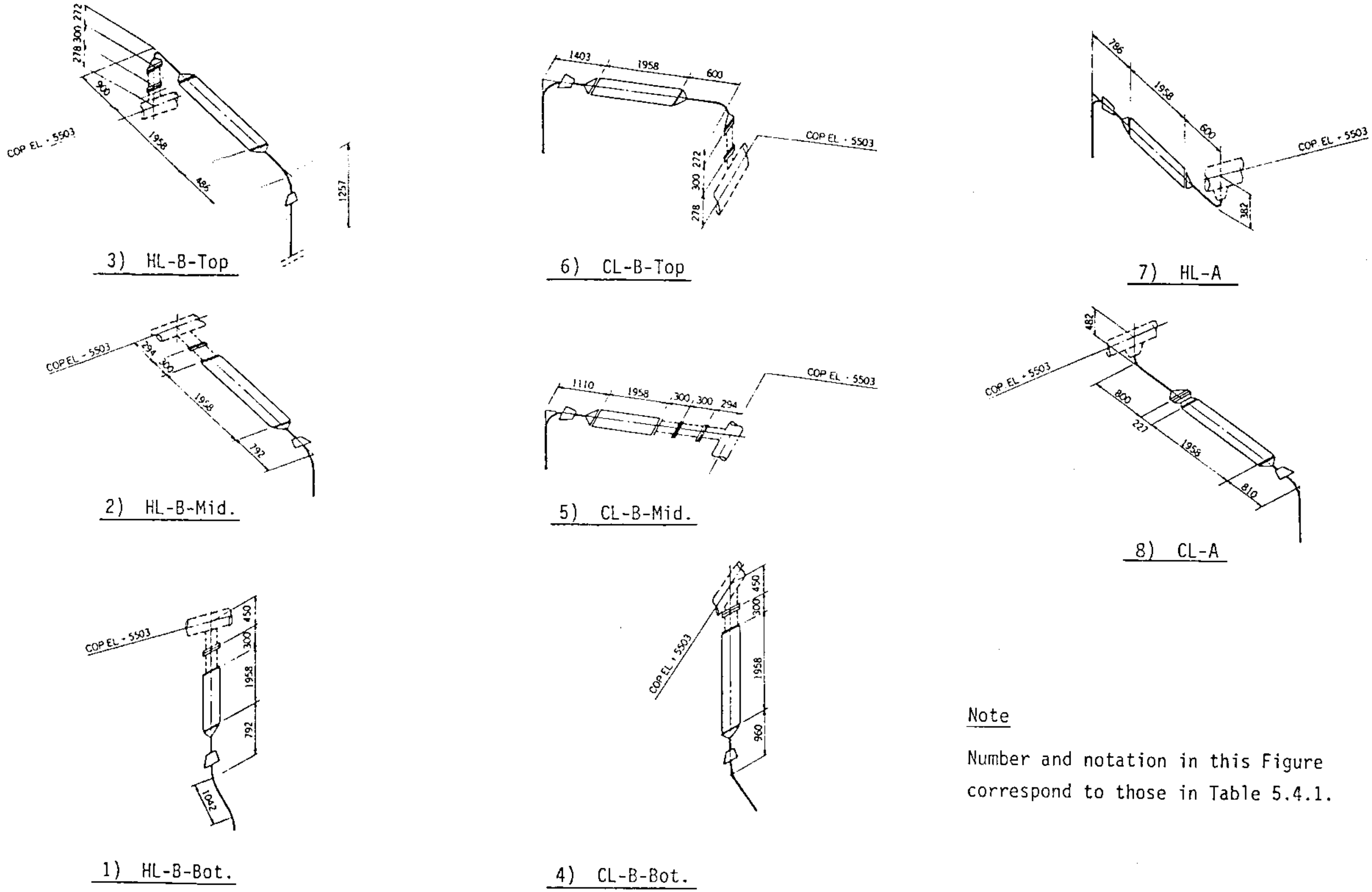


Details of Nozzle N-3

Location	Description	Material
1	Shell (I.D. 2600)	SM41B + SUB304L Clad
4	Elliptical Head (2:1)	SM41B + SUS304L Clad
5	Elliptical Head (2:1)	SM41B + SUS304L Clad
6	Skirt	SS41
12	Lifting Lug	SS41
22	Name Plate	SUS304

Location	Service	Size	Pipe Sch.
N-1	Circulation Line Inlet	3^B	40
N-2	Feedwater Inlet	2^B	80
N-3	Steam (Break Flow) Inlet	$8^B/10^B$	40
N-4	Ciruclation Line Outlet	4^B	40
N-5	Air Inlet	$1/2^B$	80
N-6	Vent	10^B	40
N-7	Thermocouple	PT 1/2	-
N-8	Liquid Level Meter	$2/1^B$	80
M-1	Manhole	20^B	t 6
M-2	Manhole	3^B	t 6
V	Vent Hole	3^B	SGP
A	Access Hole	I.D. 450	t 16

Fig. 5.4.7 (Cont'd) (2/2)



Note

Number and notation in this Figure correspond to those in Table 5.4.1.

Fig. 5.4.8 Pipings near Blowdown Nozzles (1/3)

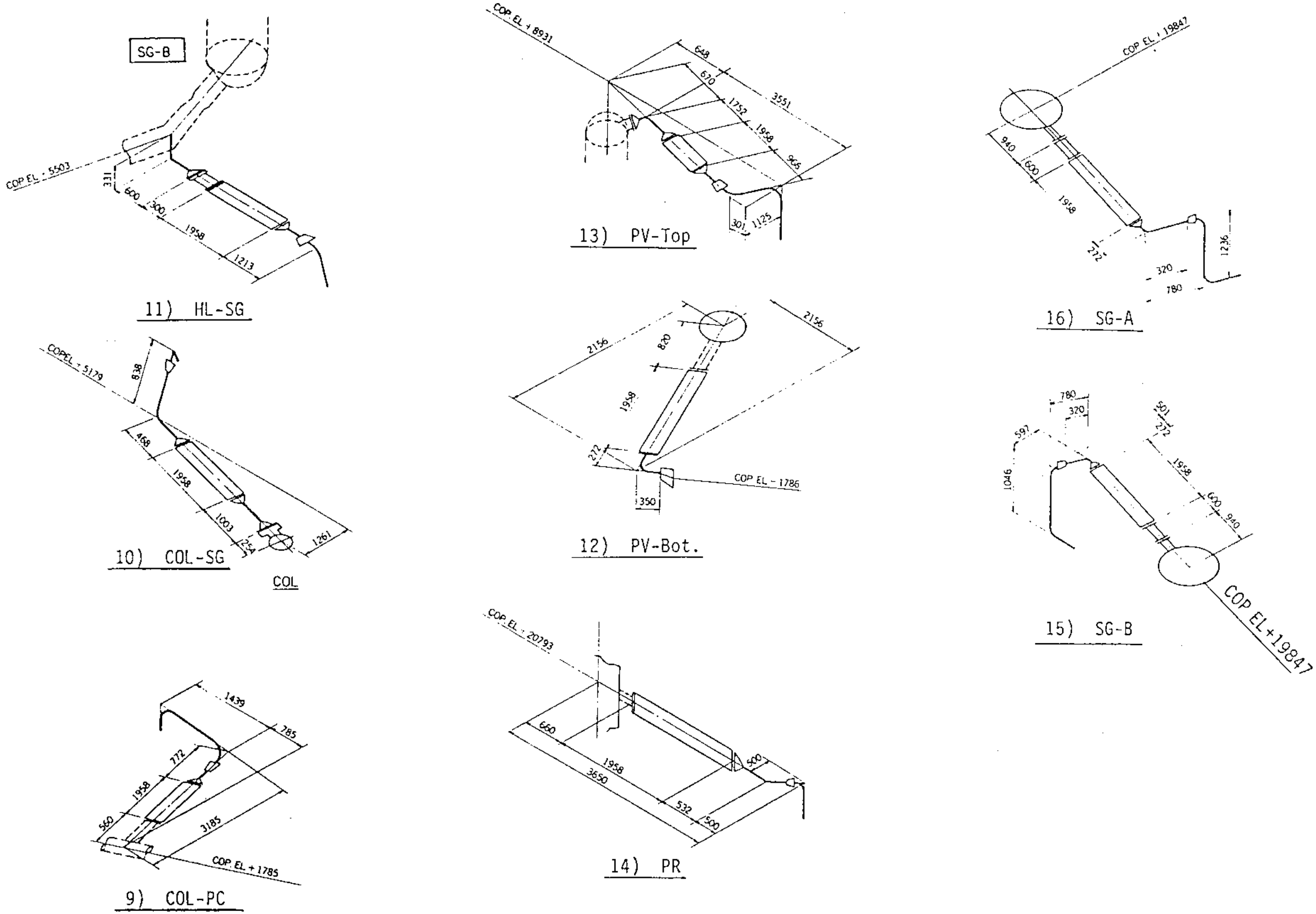


Fig. 5.4.8 (Cont'd) (2/3)

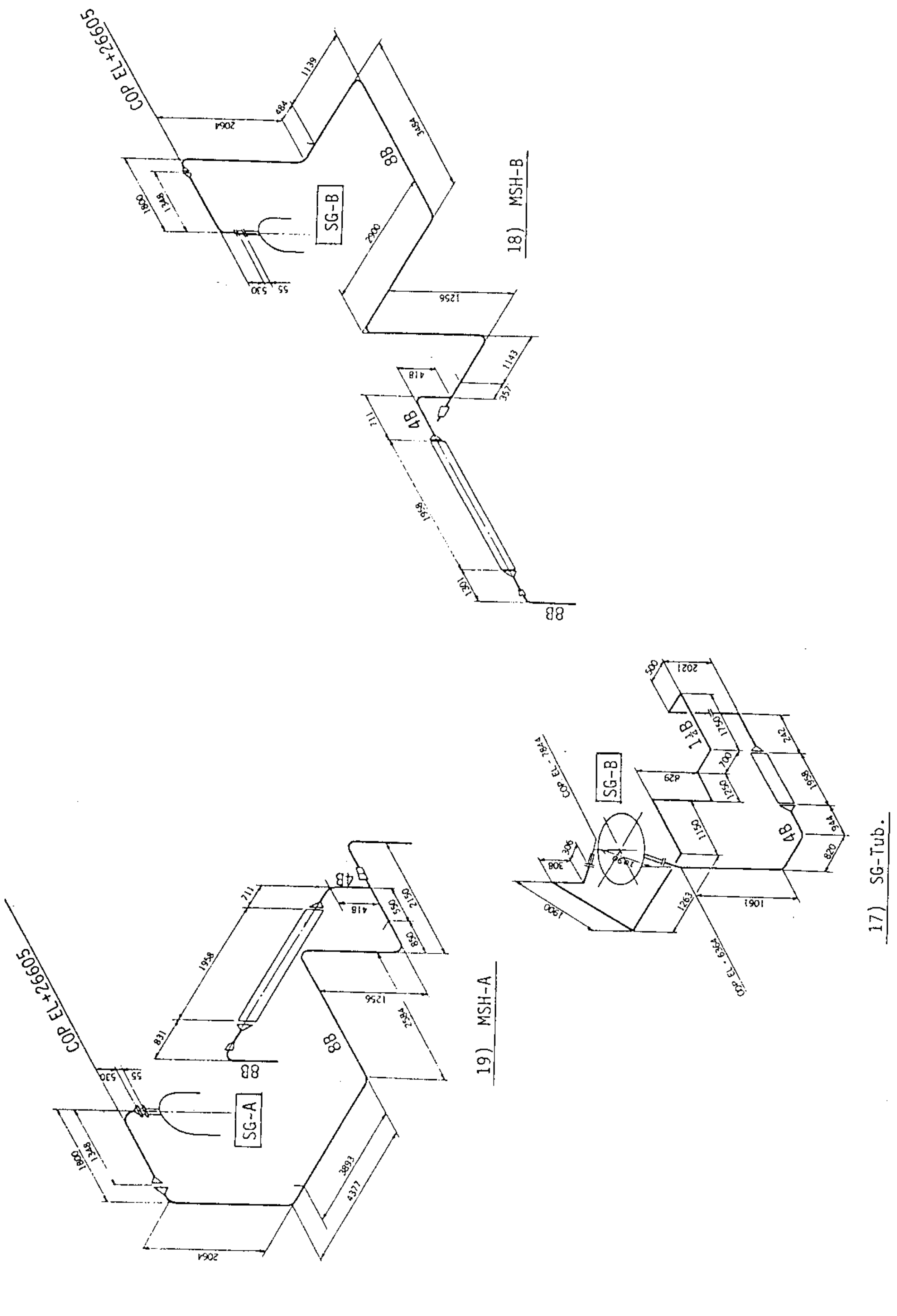


Fig. 5.4.8 (Cont'd) (3/3)

5.5 Emergency Core Cooling Systems

The LSTF emergency core cooling systems (ECCSs) consist of a high pressure injection system (HPIS), a low pressure injection system (LPIS), an accumulator (ACC) injection system, and a residual heat removal (RHR) system. There are several ECC injection locations as a test parameter. Flow diagrams for these systems are shown in Figs. 5.5.1 through 5.5.3 and ECCS injection locations are schematically summarized in Fig. 5.5.4. A brief description of ECCS pipings is also summarized in Table 5.5.1.

5.5.1 High Pressure Injection System

The HPIS is designed to be able to change the injection location during a test. The system has two pumps. One is a high pressure injection pump (PH) and the other is a charging pump (PJ). These pumps are plunger type pumps with a stroke adjustable flow control device. The injection flow rates are automatically controlled by the controller with the programmed head-flow curves. The flow meters suitable for measuring the low flow rate were added in the pipings to the PV top and bottom and the hot, cold and crossover legs of the primary coolant loop B as shown in Figs. 5.5.1 and 5.5.4.

5.5.2 Low Pressure Injection System

The LPIS is shown in Fig. 5.5.2. The low pressure injection pump (PL) for the LPIS is a centrifugal type pump. The flow rate is controlled by a flow control valve.

5.5.3 Accumulator Injection System

The LSTF has two accumulator tanks of the same size. One is the ACC-Cold simulating an actual PWR ACC and the other is the ACC-Hot designed to inject hot water into the primary system to investigate the effect of ECC subcooling. The ACC flow rate is limited by the two orifices, i.e. the flow restriction orifice and the orifice of the flow meter, in the surge lines. These orifices are listed in Table 5.7.5. The ACC tank is shown in Fig. 5.5.5.

The volume of both ACC tank is 4.8 m^3, which is 1.5 times larger than the volume scaled at 1/48 of four ACC tank volumes of the reference PWR. The capacity of each ACC tank is thus enough for the one LSTF LOCA experiment. The pressure and temperature of the ACC coolant are controlled by the heater and N_2 gas pressure. Electric heaters (140 kW and 280 kW) are installed in the ACC-Cold and -Hot tanks, respectively.

5.5.4 Residual Heat Removal System (RHR)

The RHR system shown in Fig. 5.5.2 consists of a low pressure injection pump (PL) and a RHR heat exchanger (HX). The fluid in the hot leg(s) is cooled through the RHR-HX and reinjected into the cold leg(s) by the PL which functions as the RHR Pump when the RHR system is operated. The coolant temperature and flow rate are controlled by the flow control valve and the heat exchanging rate. The RHR-HX is shown in Fig. 5.5.6.

The head-flow characteristics of the PJ, PH and PL are shown in Figs. 5.5.7 and 5.5.8, respectively. The pipings of the ECCS are shown in Fig. 5.5.9 through 5.5.15. The ECC injection nozzles in the cold legs are inclined at 45 as in the reference PWR. The ECC injection ports has an inner sleeve to minimize thermal shock when cold water is injected. The material of the ECCS piping is SUS316LTP-S except for a part of the HPCS piping made of SUS304TP-S.

Table 5.5.1 Brief Description of Pipings of the ECCS (1/3)

No.	Name of Pipe	Size (B)	Sch.	Length (mm)	Volume (m^3)	Elbow 90°	Elbow 45°	Tee	Memo
1)	HPIS* (between AOV and Injection Nozzle Flange or Tee of Common Pipe)								
a	AOV460 = HL-A	2 1/2	160	7797.8	0.02011	4	2	1	
b	AOV470 = COL-A	2 1/2	160	5290.3	0.01364	4	-	-	
c	AOV480 = CL-A	2 1/2	160	1616.4	0.004168	2	-	1	
d	AOV490 = HL-B	1 1/2	160	8017.6	0.007452	5	-	1	
e	AOV500 = COL-B	1 1/2	160	3185.3	0.002960	5	-	-	
f	AOV510 = CL-B	1 1/2	160	1150.0	0.001069	1	-	1	
g	AOV520 = PV-Bot	1 1/2	160	5489.0	0.005102	3	-	1	
h	AOV530 = PV-Top	1 1/2	160	10452.2	0.009714	7	-	1	
i	AOV560 = CL-A	1/2	160	2679.2	0.000318	4	-	1	1/VC
j	AOV570 = JC	1	80	2627.7	0.000928	4	-	1	1/VC
2)	ACC-Cold** (between the flanges of the ACC outlet nozzle and ECC nozzle)								
a	ACC = AOV410	4	80	3882.9	0.02875	3	-	-	FE650
b	AOV410 = 4K-3	4	80	16168.3	0.11973	9.5	2	-	
c	4K-3 = CL-A	4	160	1980.3	0.01185	1.5	-	-	1/VC
d	ACC = AOV420	4	80	6016.6	0.04455	3	2	-	FE660
e	AOV420 = 4K-5	4	80	1012.9	0.00750	0.5	-	-	
f	4K-5 = 4K-4	4	80	17810.0	0.13188	5.5	-	-	
g	4K-5 = 4K-10	4	80	15233.7	0.11281	5.5	5	-	
h	4K-4 = PV-B	4	160	1791.8	0.01073	0.5	1	1	1/VC
i	4K-10 = CL-B	4	160	2399.6	0.01436	2.5	-	-	1/VC
3)	ACC-Hot** (between the flanges of the ACC outlet nozzle and ECC nozzle)								
a	ACC = AOV440	4	80	5125.4	0.03795	3	-	-	FE670

* See Figs. 5.5.1 and 5.5.3

** See Fig. 5.5.2

Table 5.5.1 (Cont'd) (2/3)

No.	Name of Pipe	Size (B)	Sch.	Length (mm)	Volume (m³)	Elbow 90°	Elbow 45°	Tee	Memo
b	AOV440 = 4K-6	4	80	1699.8	0.01259	1.5	-	-	
c	4K-6 = CV403	4	80	11240.7	0.08324	7.5	-	-	
d	CV403 = HL-A	4	160	2119.9	0.01269	2	-	1	
e	4K-6 = 4K-3	4	80	13254.6	0.09815	6	4	-	
f	4K-6 = 4K-4	4	80	20052.0	0.14849	6	-	-	
g	ACC = AOV450	4	80	5164.6	0.03824	3	1	-	FE680
h	AOV450 = 4K-7	4	80	1249.6	0.00925	1.5	-	-	
i	4K-7 = CV404	4	80	8260.6	0.06117	5.5	-	-	
j	CV404 = HL-B	4	160	2119.9	0.01269	2	-	1	
k	4K-7 = CV	4	80	4975.6	0.03684	4.5	-	-	
l	CV = PV-T	4	160	3214.5	0.01924	1	-	1	
m	4K-7 = 4K-10	4	80	5093.6	0.03772	5	-	-	
4)	LPIS,RHR***								
a	PL-Deliv. = Bypass-I	4	160	7350.5	0.04400	4	1	1	1/Reducer 4 1/2^{B}x4^B
b	Bypass-I = -O	4^B/3^B	160	2615.0	0.01565	2	-	2	TCV840 2/Reducer 4^{B}x3^B
c	Bypass-I = RHR-HX	4	160	1306.6	0.00782	2	-	-	
d	RHR-HX = Bypass-O	4^B/3^B	160	4490.6	0.02688	2	-	1	FCV820 2/Reducer 4^{B}x3^B

*** See Fig. 5.5.3

Table 5.5.1 (Cont'd) (3/3)

No.	Name of Pipe	Size (B)	Sch.	Length (mm)	Volume (m^3)	Elbow 90°	Elbow 45°	Tee	Memo
e	Bypass-0 = Tee-F	4	160	4750.0	0.02843	3	-	1	FE820
f	Tee-F = VC503A	4	160	5700.0	0.03412	2	-	2	FE830 VC503A
g	VC503A = AOV590	4	160	1500.	0.008979	1	-	1	
h	AOV590 = HL-A	4	160	8866.4	0.05307	6	1	2	FE
i	VC503A = AOV600	4	160	5721.4	0.03425	4	-	1	
j	AOV600 = 4K-2	4	160	1493.0	0.008937	1.5	-	-	
k	4K-2 = CL-A	4	160	4037.7	0.02417	4.5	-	1	
l	4K-2 = PV-T	4	160	10393.7	0.06221	5.5	1	1	
m	Tee-F = VC503B	4	160	12562.1	0.07519	7	3	1	FE840 VC503B
n	VC503B = AOV610	4	160	2196.5	0.01315	2	-	1	
o	AOV610 = 4K-1	4	160	1350.0	0.00808	1.5	-	-	
p	4K-1 = HL-B	4	160	8792.5	0.05263	6.5	-	2	
q	4K-1 = PV-B	4	160	11492.2	0.06879	4.5	2	1	
r	VC503B = AOV620	4	160	5913.6	0.03540	3	1	1	FE
s	AOV620 = CL-B	4	160	5260.2	0.03149	5	-	1	
t	HL-A = AOV640	4	160	1929.8	0.01155	2	1	1	
u	AOV640 = Tee-R	4	160	7119.6	0.04262	4	-	-	
v	HL-B = AOV650	4	160	1929.8	0.01155	2	1	1	
w	AOV650 = Tee-R	4	160	14035.4	0.08401	8	-	-	
x	Tee-R = PL-Suc.	4	160	12498.4	0.07481	6	2	1	1/Reducer $4^B x 3^B$

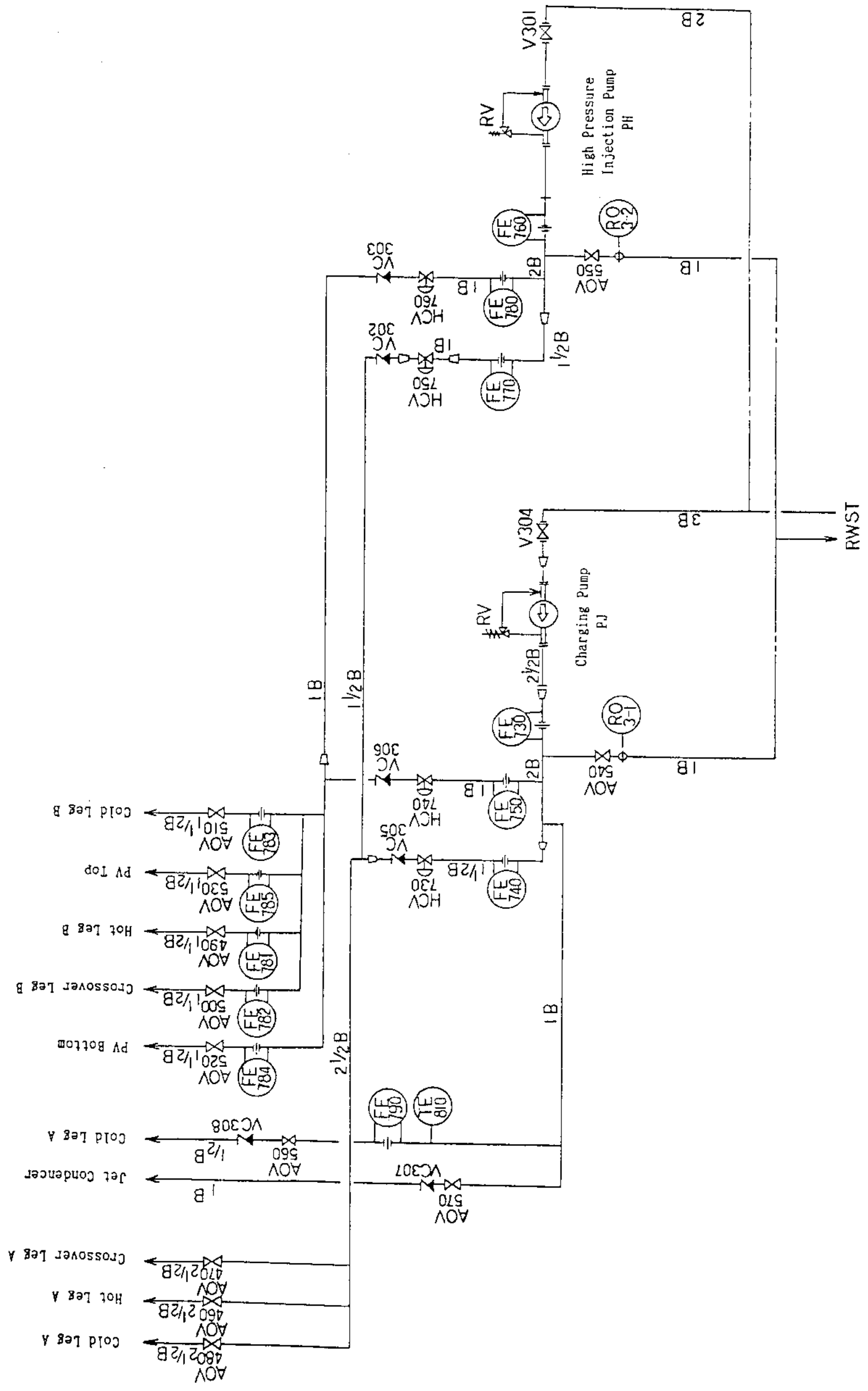


Fig. 5.5.1 HPIS Flow Diagram

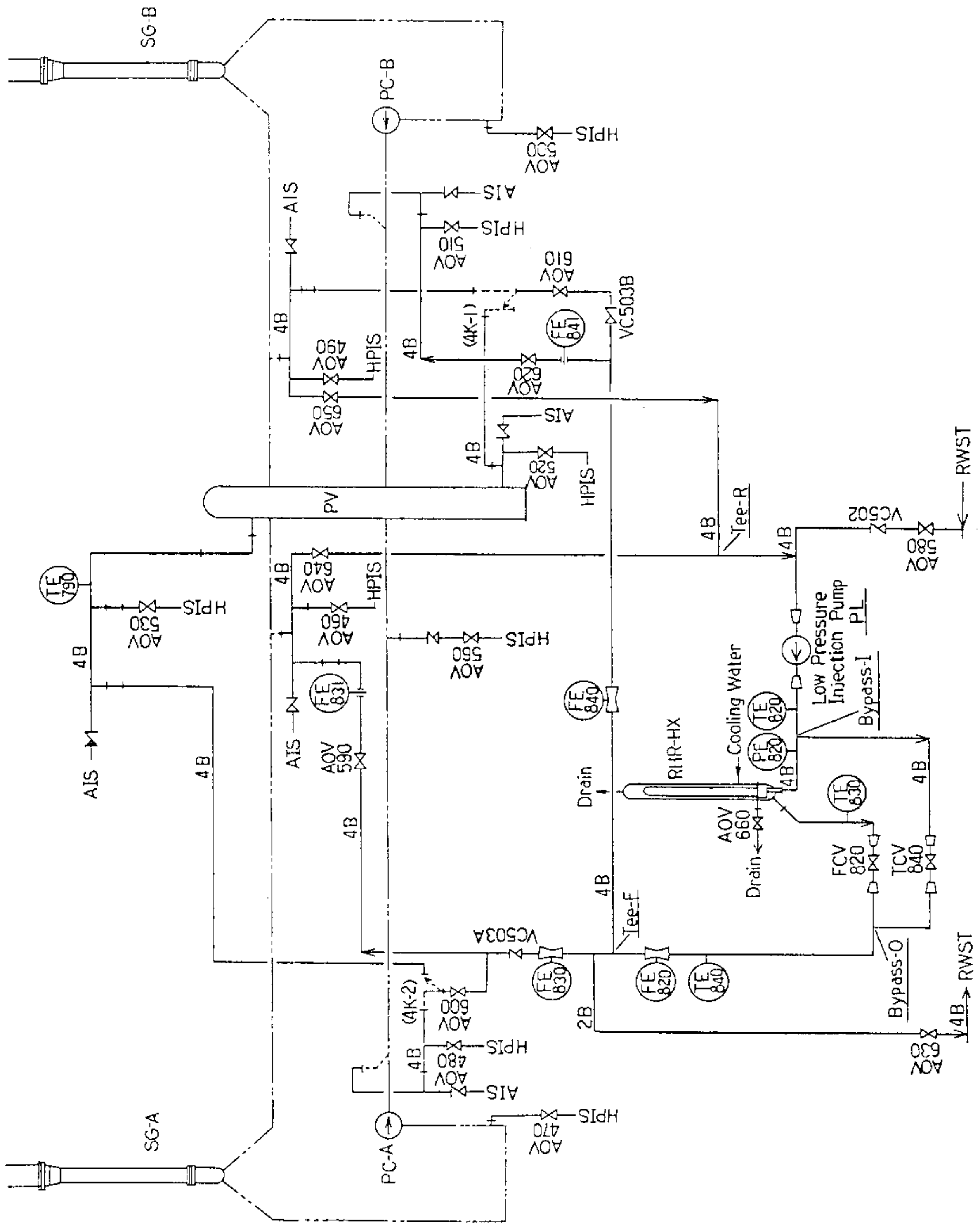


Fig. 5.5.2 LPIS, RHR and HPIS Flow Diagram

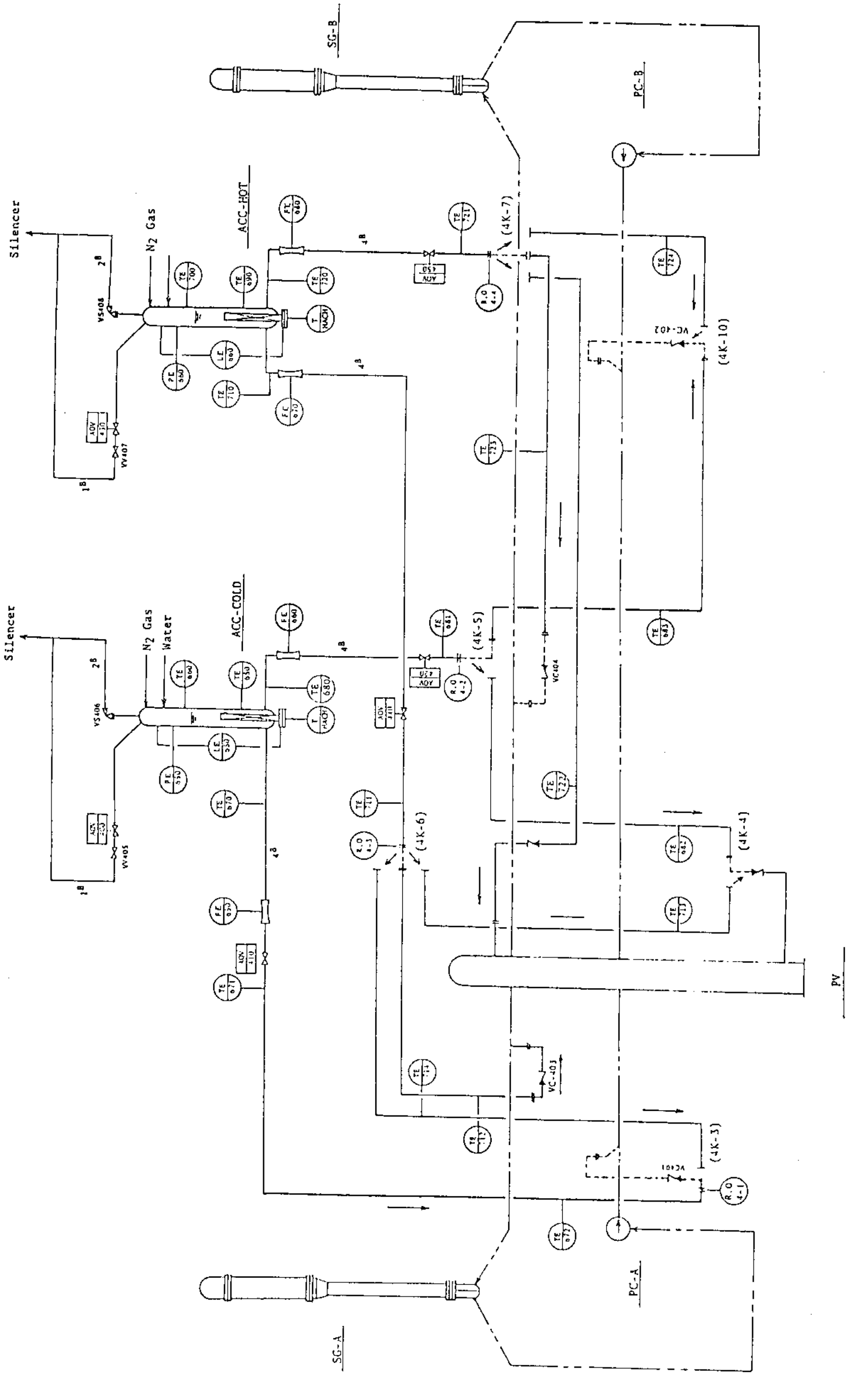


Fig. 5.5.3 ACC Injection System Flow Diagrams

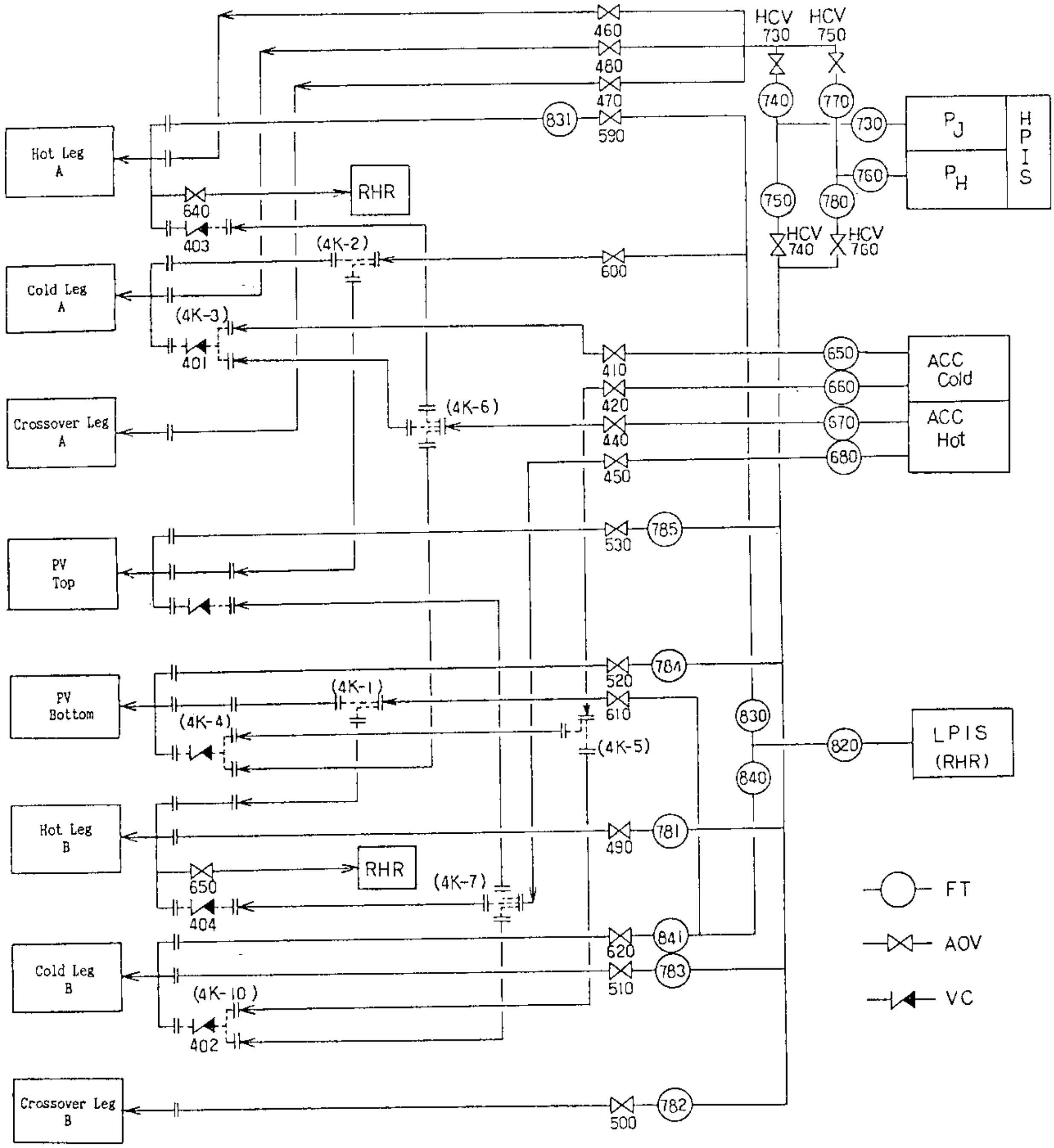


Fig. 5.5.4 ECCS Injection Schematics

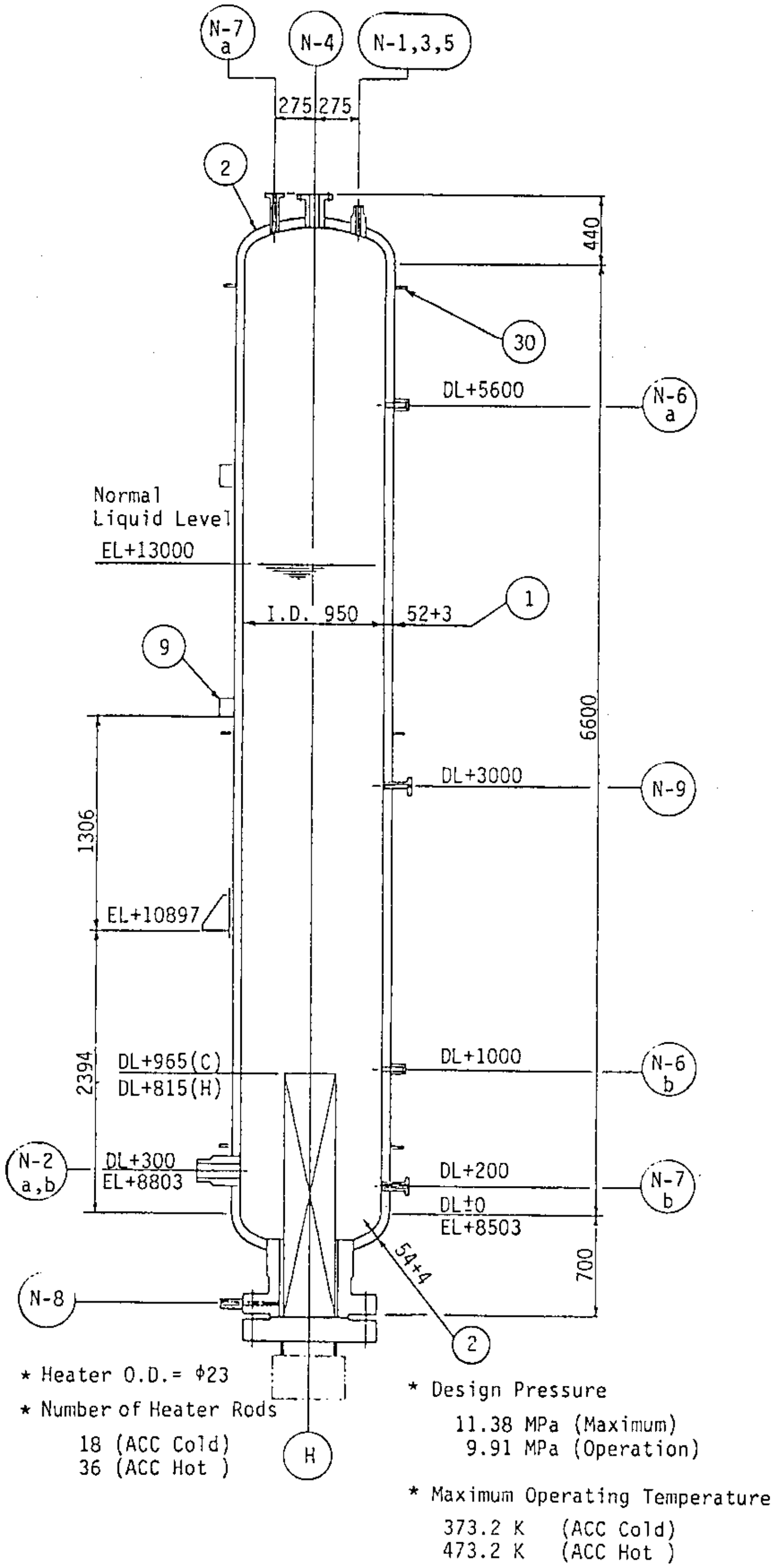


Fig. 5.5.5 Accumulator (ACC) Tank (1/2)

Location	Description	Material
1	Shell (I.D. 950)	SB49 + SUS316L Clad
2	Elliptical head (2:1)	SB45 + SUS316L Clad
9	Name Plate	SS41
30	Ring	SS41

Location	Service	Size	Pipe Sch.
N-1	Liquid Inlet	1^{B}	80
N-2	Liquid Outlet	4^{B}	80
N-3	N_2 Gas Inlet	1^{B}	80
N-4	Safety Valve	$1\ 1/2^{B}$	80
N-5	Rerief Valve	1^{B}	80
N-6	Thermometer	PT 1/8	80
N-7	Liquid Level Meter	$1/2^{B}$	80
N-8	Drain	1^{B}	80
N-9	Pressure Gauge	$1/2^{B}$	80
H	Heater Unit	18^{B}	80

a) Liquid Volume between the top of the heaters and the normal liquid level in the ACC.

ACC-Cold 2.50 m^3

ACC-Hot 2.61 m^3

b) N_2 Gas Volume is 1.6 m^3

Fig. 5.5.5 (Cont'd) (2/2)

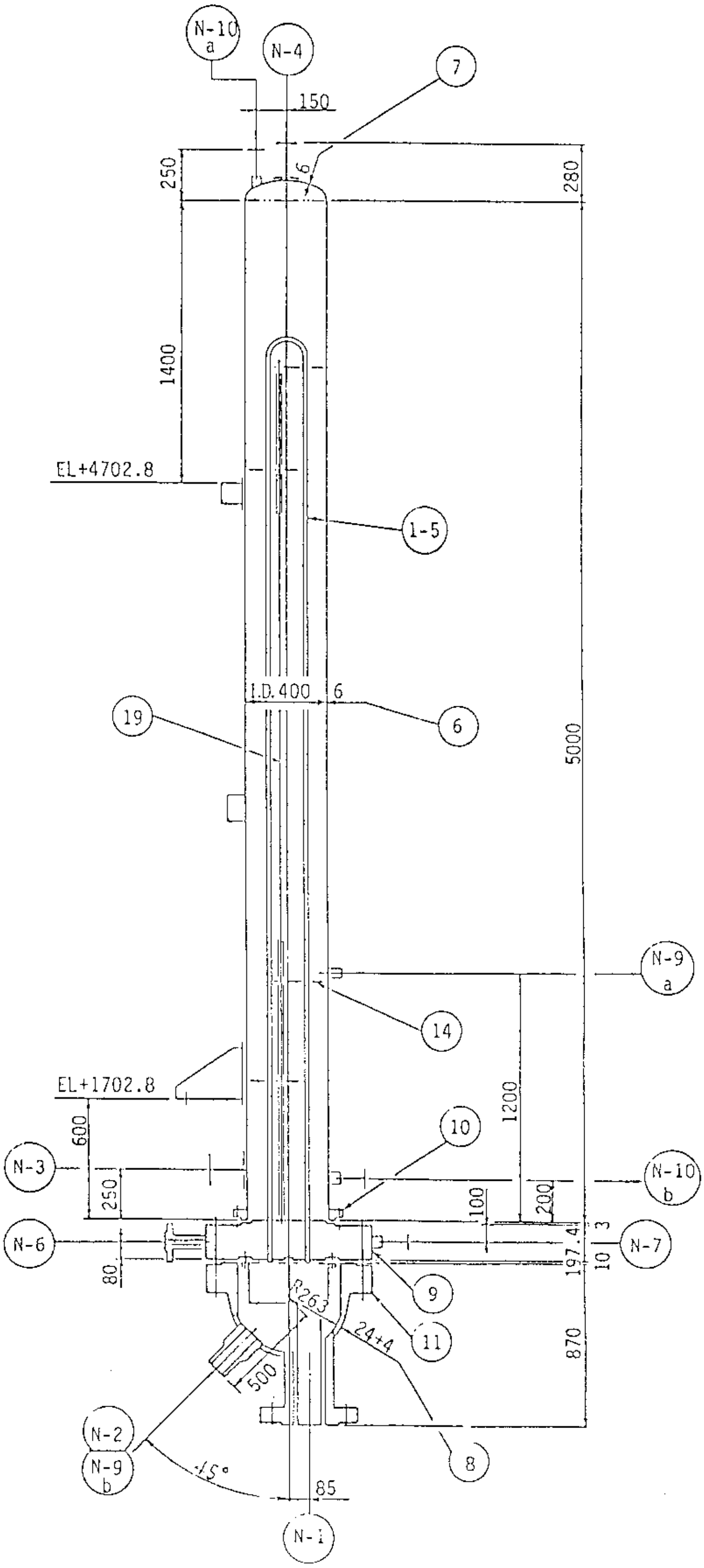


Fig. 5.5.6 Residual Heat Removal Heat Exchanger (RHR-HX)(1/2)

Location	Description	Material
1	U Tube (O.D. 19, t 1.6) (8995.7 x 10)	SUS316 TB-S
2	U Tube (O.D. 19, t 1.6) (9073.3 x 10)	SUS316 TB-S
3	U Tube (O.D. 19, t 1.6) (9150.9 x 10)	SUS316 TB-S
4	U Tube (O.D. 19, t 1.6) (9228.1 x 10)	SUS316 TB-S
5	U Tube (O.D. 19, t 1.6) (9305.7 x 8)	SUS316 TB-S
6	Shell (I.D. 400, t 6)	SUS304
7	Elliplical Head (2:1)	SUS304
8	Hemi-Spherical Head	SB40 + SUS316L Clad
9	Tube Sheet	SUSF316L
10	Shell Flange	S25C
11	Channel Flange	SF50 + SUS316L Overlay
14	Buffle	SUS304
19	Tie Rod	SUS304

Location	Service	Size	Pipe Sch.
N-1	Primary Coolant Inlet	4 B	160
N-2	Primary Coolant Outlet	4 B	160
N-3	Secondary Coolant Inlet	2 B	205
N-5	Secondary Coolant Outlet	2 B	205
N-6	Primary Side Vent	1/2 B	160
N-7	Drain	1 B	40
N-9a	Thermometer	PT 1/8	40
N-9b	Thermometer	PT 1/8	160
N-10	Liquid Level meter	1/2 B	40

Fig. 5.5.6 (Cont'd) (2/2)

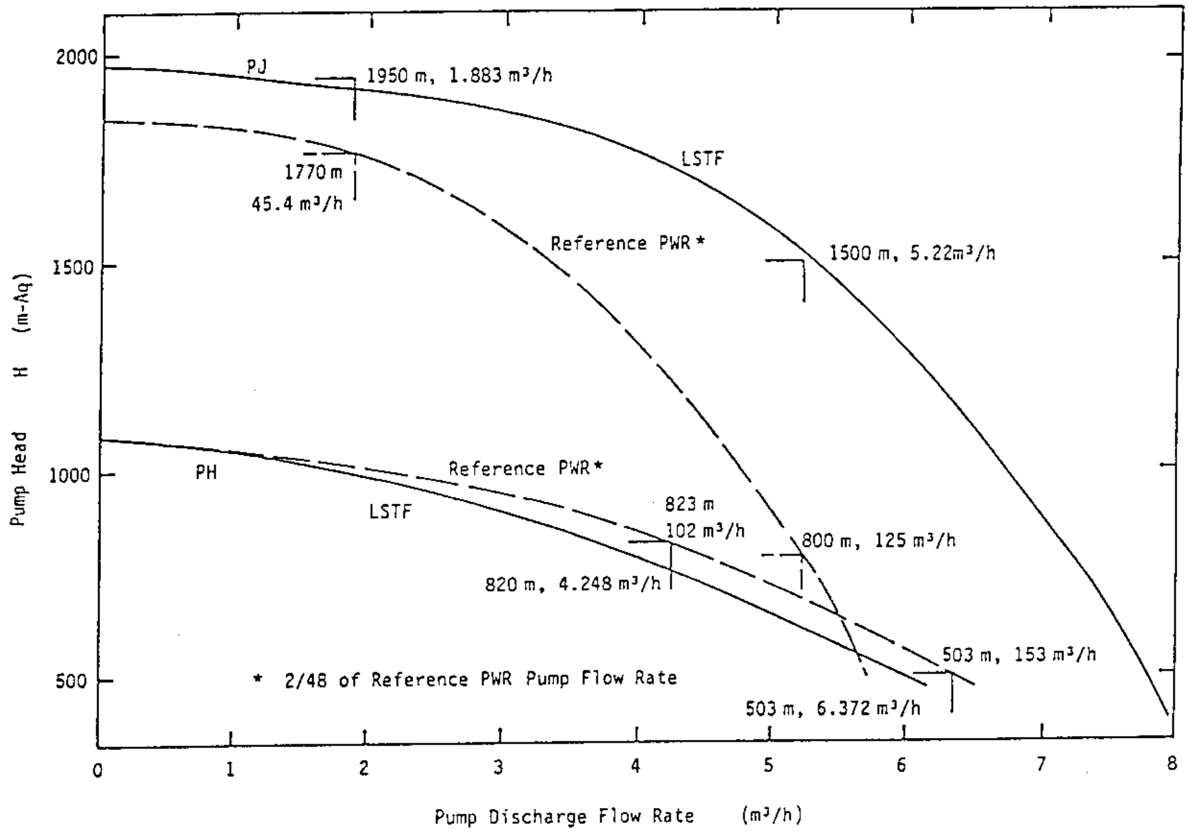


Fig. 5.5.7 Head vs. Flow Characteristics of P_H and P_J

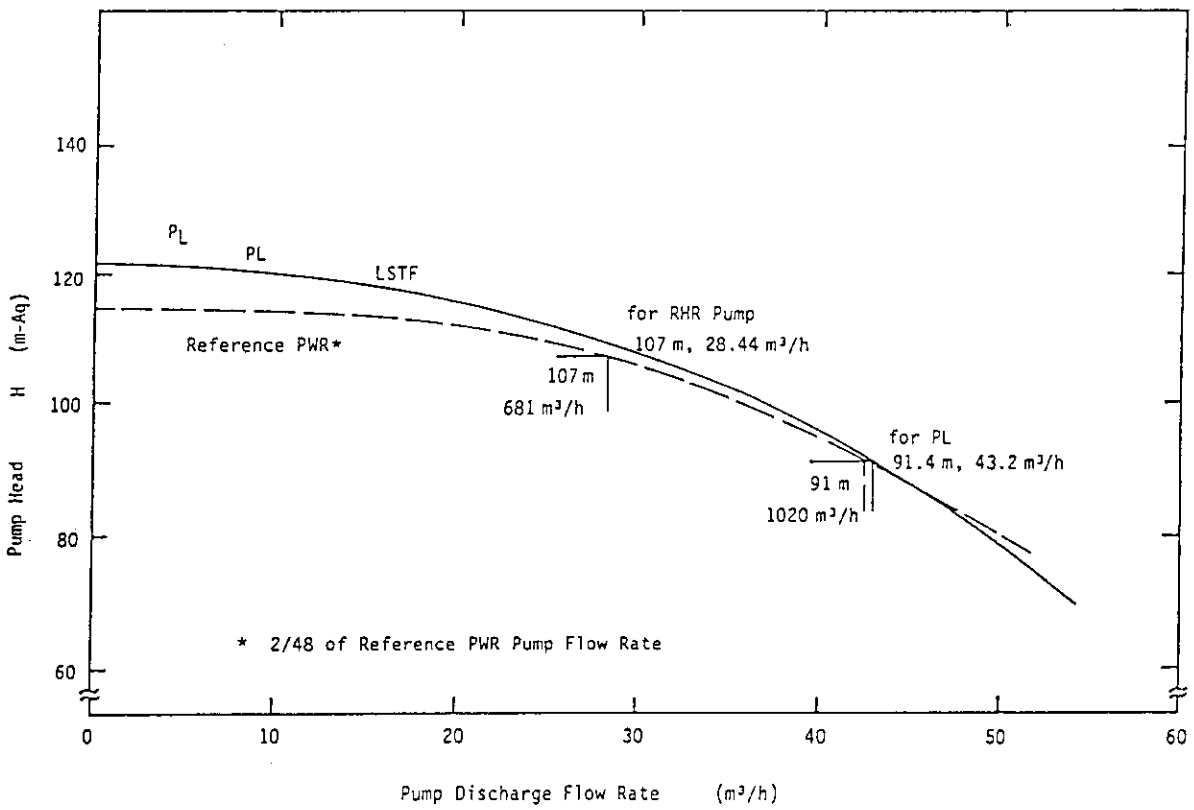


Fig. 5.5.8 Head vs. Flow Characteristics of P_L

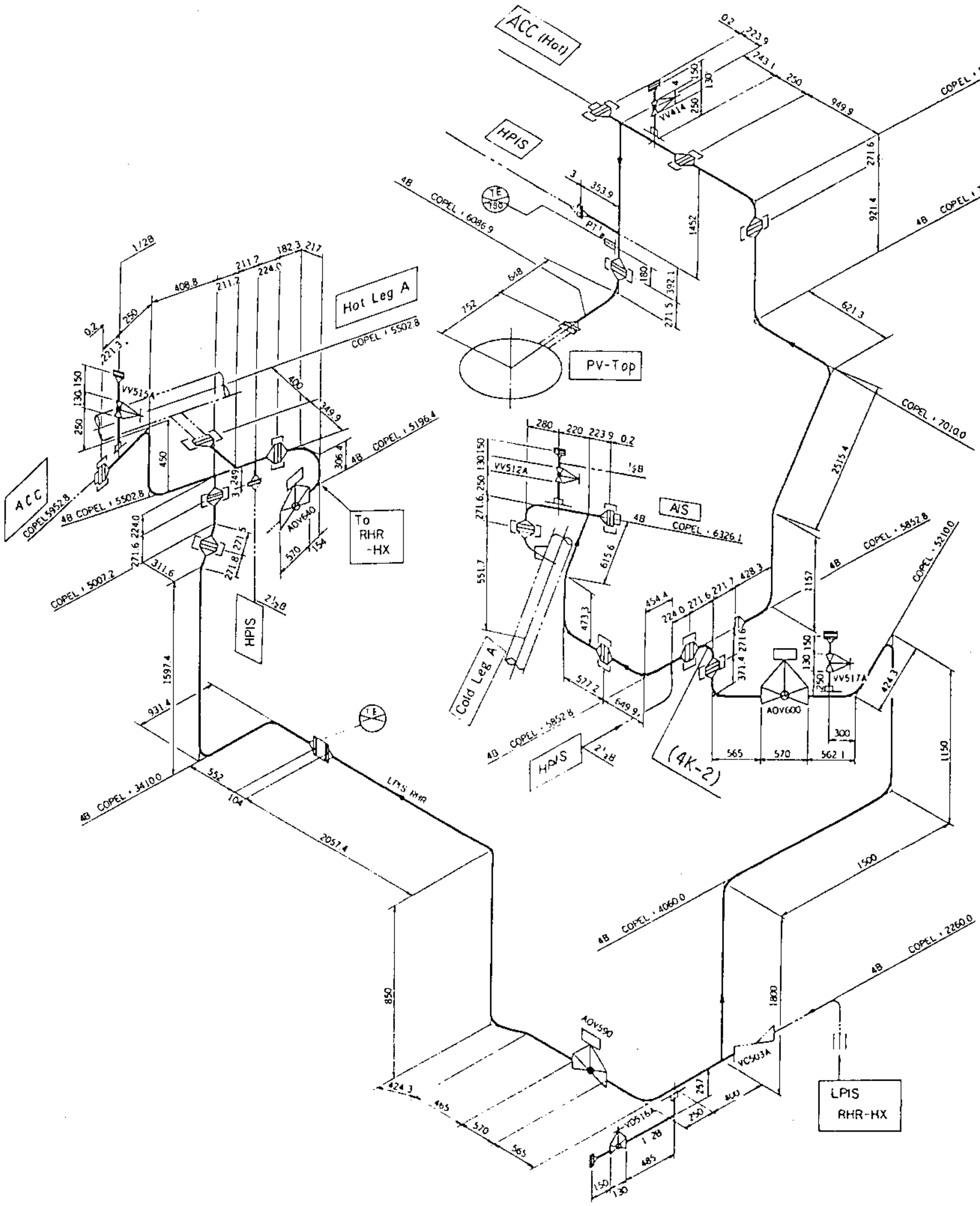


Fig. 5.5.9 Piping near Hot Leg A, Cold Leg A and Pressure Vessel Top

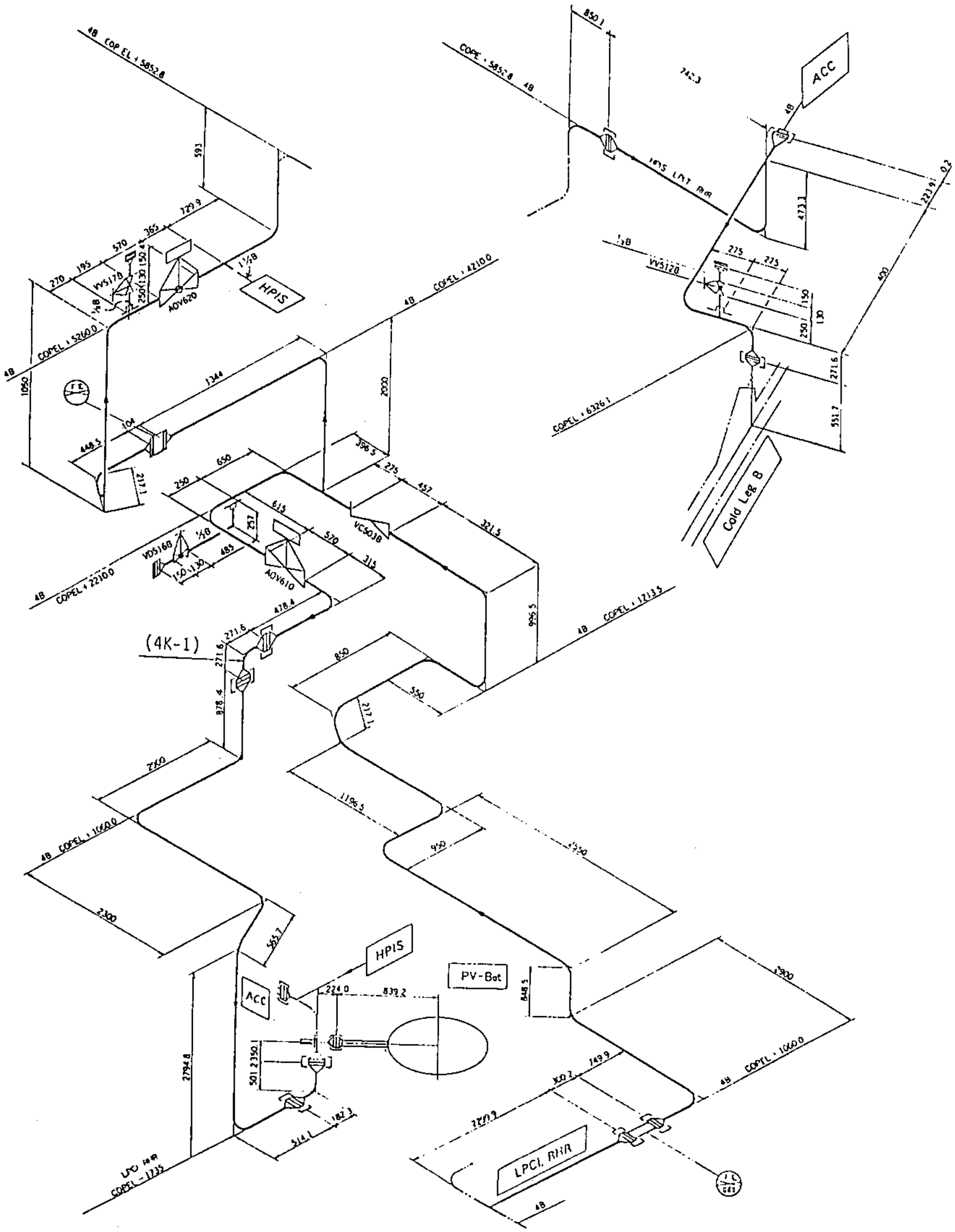


Fig. 5.5.10　Piping near Cold Leg B and Pressure Vessel Bottom

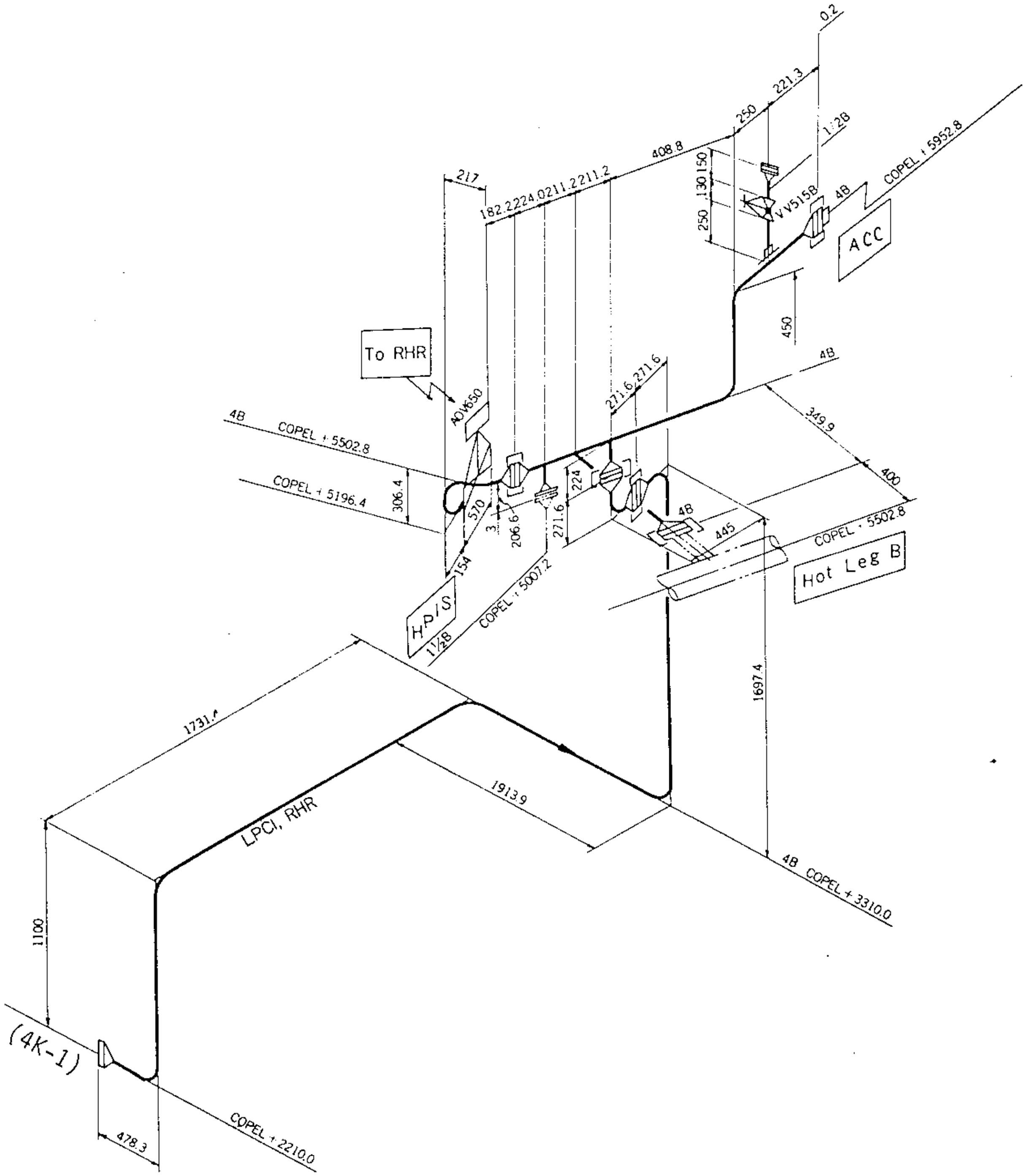


Fig. 5.5.11 Piping near Hot Leg B

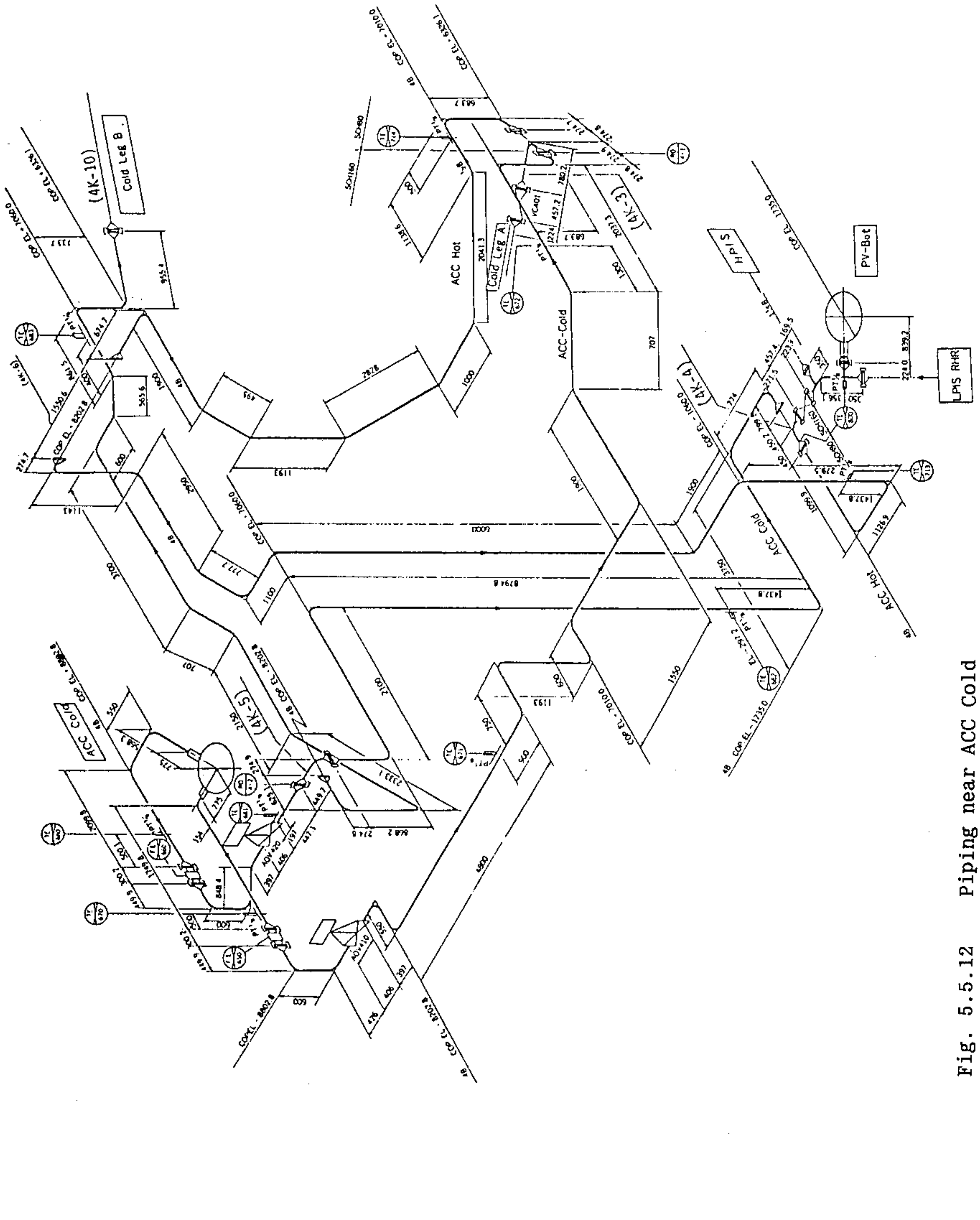


Fig. 5.5.12 Piping near ACC Cold

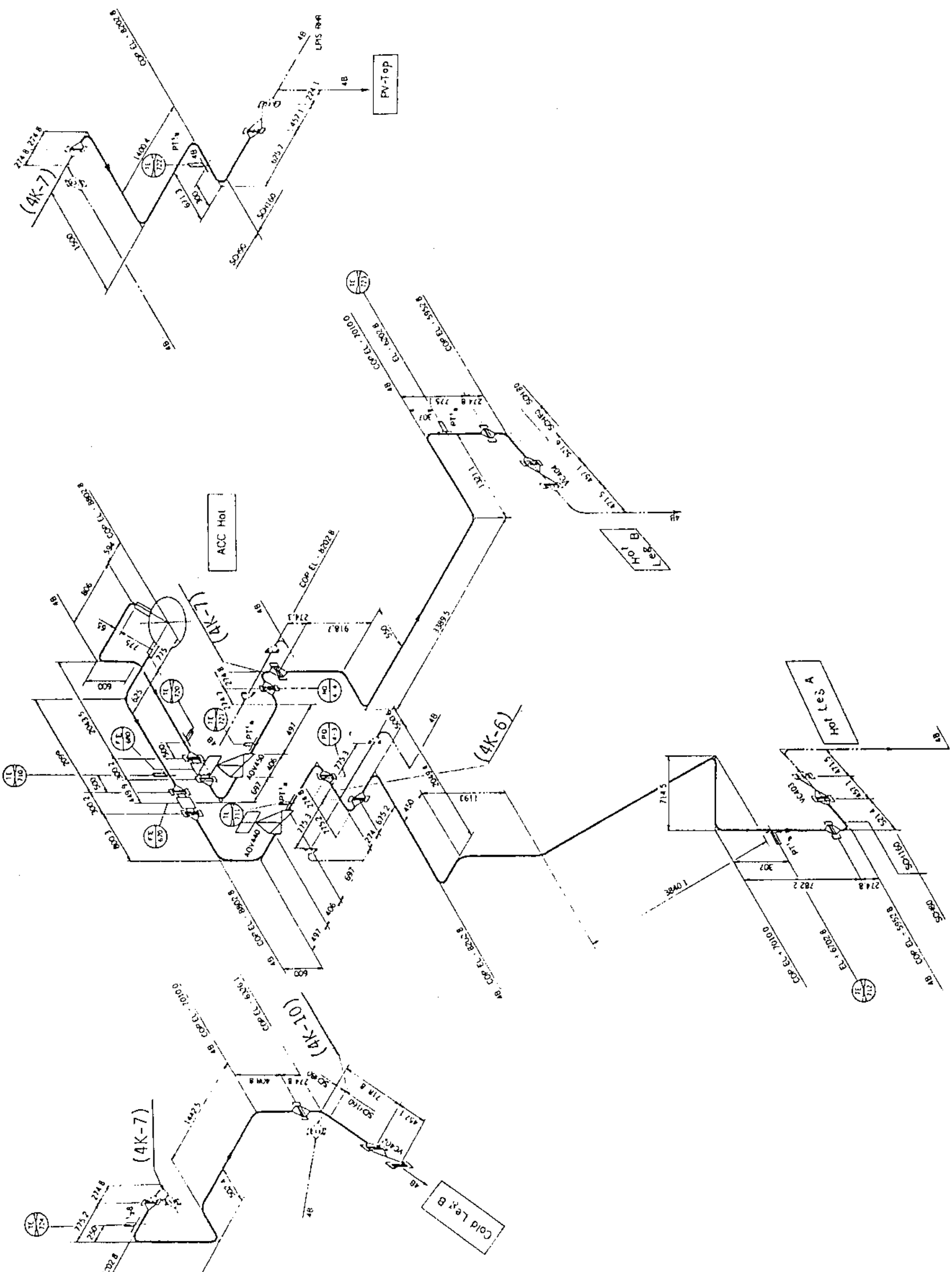


Fig. 5.5.13 Piping near ACC Hot

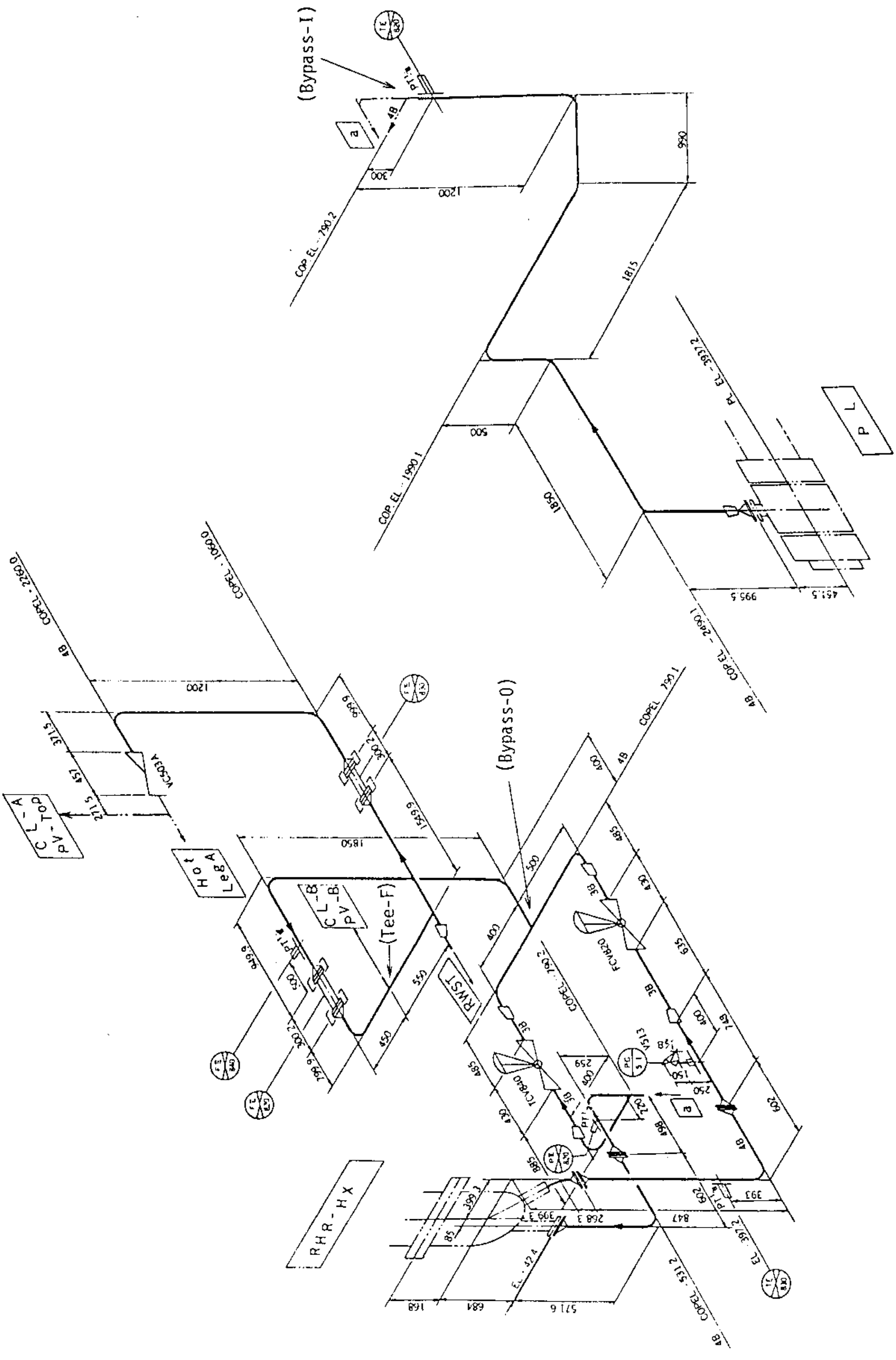


Fig. 5.5.14 Piping near P_L and RHR-HX

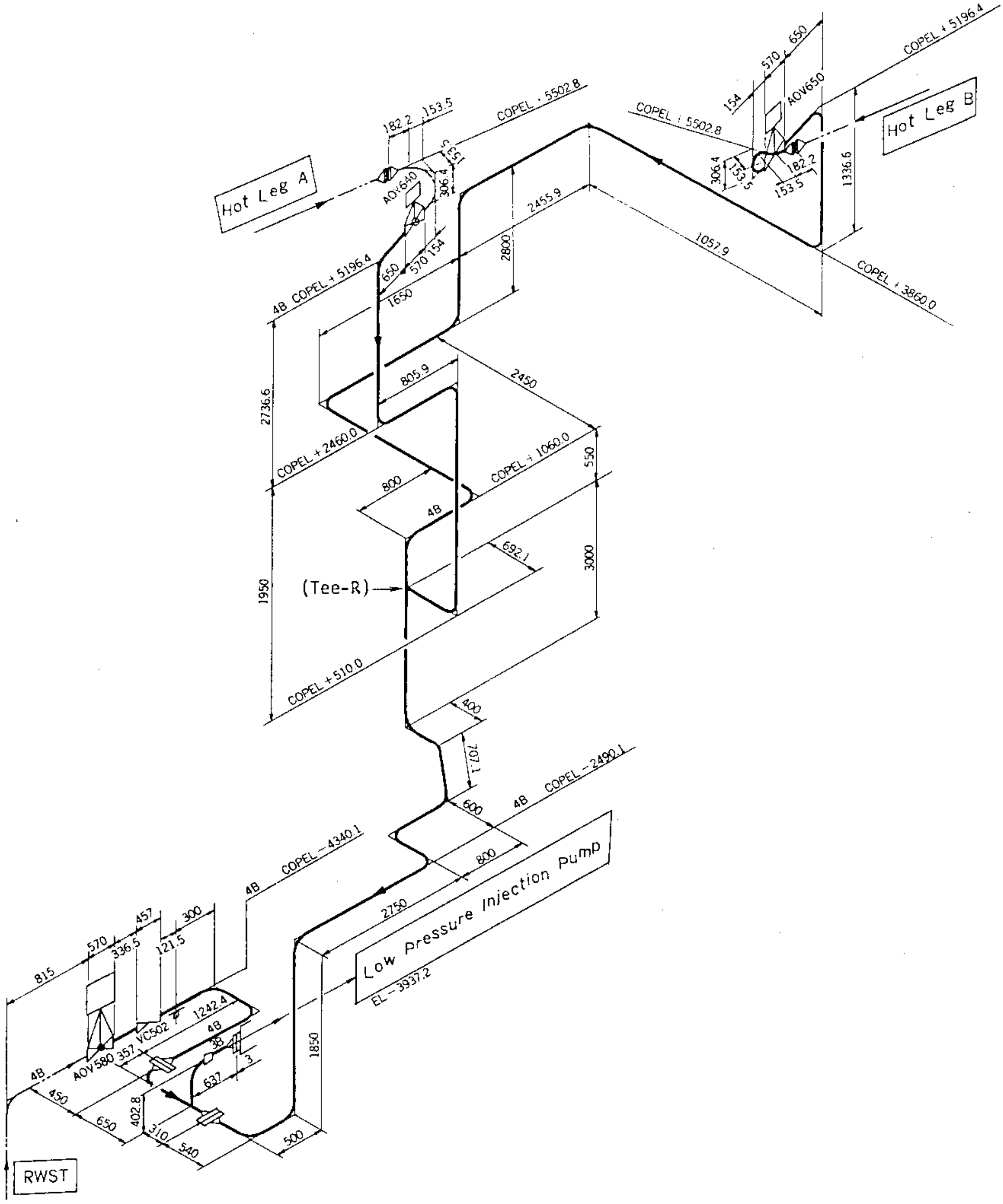


Fig. 5.5.15 Piping from Hot Leg to P_L

5.6 Power Supply and Other Supplement Systems

5.6.1 Power Supply System

The power supply system is composed of transformers, power controllers, power distributors, monitoring system to provide electricity to the simulated fuel assembly, heaters, and motors of pumps and so on. The block diagram of the power supply system is shown in Fig. 5.6.1, and the list of the heaters is presented in Table 5.6.1.

(1) Power Supply System for Fuel Assembly

This System supplies electricity to the fuel assembly and consists of the following equipments.

- Transformers for the fuel assembly
- Thyristor power controller I and control panel I
- Low-phase filter and power factor improver

This equipment serves to attenuate high-frequency component which is generated by power control to the fuel assembly.
The specifications of the thyristor power controller for the fuel assembly are given in Table 5.6.2. The relationship between the fuel power outputs and the transformer capacities is shown in Fig. 5.6.2 for three cases of core radial power distribution.

(2) Power Supply System for Heaters

This system supplies power to heaters used for heating water in the vessels such as ACC Hot, and used for thermal insulation of vessels and piping. It consists of the following equipments.

- Transformers for the heaters
- Power controller II and control panel II
  This controller receives electricity from the secondary side of the transformer through a 440 V bus duct and supplies electricity to each heater through air circuit breakers (ACBs).
- Thyristor power controller III and control panel III
  This controller controls electricity to heaters in the vessels, i.e. the pressurizer (PR), the accumulators (Hot, Cold) and the water storage tank (RWST), to control water temperatures in the vessels.
- Thyristor power controller IV and control panel IV
  This controller controls electricity to heaters used for thermal insulation of the pressure vessel, the steam generators, the hot and cold legs and others, and heaters for preheating the accumulator

injection piping and its thermal insulation.
The specifications of the thyristor power controller IV for the thermal insulation heaters are presented in Table 5.6.3.

(3) Power Supply System for Pumps and Others

This system functions to control pump rotating speeds, and to start or stop pumps. It consists of the following equipments.

- Transformers
- Controllers and control panel

(4) Monitor Board for Remote Control System

This board serves to switch on or off circuit breakers in each power supply system and to monitor instruments in each system.

(5) Control System for Pilot Valves to Operate Air Actuating Valves

This system accommodates a control circuit for pilot valves used to open or close air actuating valves.

(6) Service Power Supply System

This system supplies electricity to the control panel for pilot valves and others, and consists of the following apparatuses.

- Transformer
- Panelboard for control system

  This board supplies electricity to each load for control.

5.6.2 Thermal Insulation and Heat Loss Control

This control system is intended to compensate heat loss from piping and vessels during an experiment by on-off control of heaters wound outside the surface of the piping and vessels (thermal insulation heaters). Thermal insulation heaters are wound on the outside surface of the following piping and vessels, and the list of the heaters is presented in Table 5.6.1.

- SG(A), SG(B)
- PV
- PC(A), PC(B)
- PR Surge Line Piping, PR Spray Line Piping
- ACC Hot Piping, ACC Cold Piping
- HL A and HL B Piping
- CL A and CL B Piping

- LS A and LS B Piping
- SG A and SG B Piping

5.6.3 Supplement System

(1) Purified Water Supply System

The purified water supply system consists of a water demineralizer (IECH), a feedwater pump (PS), piping and valves. This system supplies purified water to each portion in the test facility. The specifications of the water purifier and the feedwater pump are given in Tables 5.6.4 and 5.6.5, respectively.

(2) Nitrogen Gas Supply System

The nitrogen gas supply system consists of a nitrogen gas container, piping and valves. This system serves to pressurize the accumulators and to supply nitrogen gas to the upper and lower plena in the pressure vessel. The specifications of the nitrogen gas supply system are summarized in Table 5.6.6.

(3) Compressed Air Supply System

The compressed air supply system consists of compressors, piping and valves. This system serves to provide compressed air for control valves, air operated valves and other equipments which require compressed air, and to provide cooling air for video probes. The specifications of the compressed air supply system are given in Table 5.6.7.

(4) Cooling Water System

The cooling water system consists of a cooling water storage tank (CWT), a cooling water pump (PW), piping and valves. The system serves to provide cooling water for motors of pumps, autobleeds in the pressure vessel and jet condenser, the secondary side of the RHR heat exchanger and instruments which is necessary to be cooled. The specifications of the CWT and the cooling water pump are summarized in Tables 5.6.8 and 5.6.9, respectively.

5.6.4 Miscellaneous

(1) Drainage System

This system consists of drain pumps, sump pumps and piping.

(2) Monitoring System of Facility Area during Test

During a test the facility area is evacuated and is monitored by two TV cameras and two microphones in the experiment control room during a test. The monitoring system consists of the following apparatuses.

TV camera	2
Microphone	2
Remote operating system	2
Monitor TV	2

(3) Building Internal Steel Structure

Large, heavy vessels and piping are fixed on the building internal steel structure. The building internal steel structure was designed and manufactured in full consideration of earthquake-proof, impulsive load during blowdown, thermal expansion, and easy access for maintenance, inspection and operation.

(4) Voltage Stabilizer Equipment

This equipment supplies stabilized voltage electricity to the data acquisition system and other electronics. The specifications of this equipment are presented in Table 5.6.10.

Table 5.6.1 List of Heaters (1/4)

Heater	Number	Rating				Type of Heater	Temperature		Attaching		Remarks
		Power (kW)	Voltage (V)	Current (A)	Phase		Control System	Temperature (K)	Location	Connection Form	
Heater for PR	1	112.5	400		3	Sheath Heater	SCR	615.4	PR		
"	1	7.5	400		3	"	"	"	"		
Heater for ACC(COLD)	1	130	400		3	"	—	373	ACC(C)		Used only during heating
"	1	10	400		3	"	SCR	"	"		
Heater for ACC(HOT)	1	260	400		3	"	—	473	ACC(H)		Used only during heating
"	1	20	400		3	"	SCR	"	"		
Heater for RWST	1	870	400		3	"	—	313	RWST		Used only during heating
"	1	30	400		3	"	SCR	"	"		
Heater for Thermal Insulation of SG(A)	4	3.0	200		3	"	SCR		Inside of Building		HSA1∿HSA4
Heater for Thermal Insulation of SG(B)	4	3.0	200		3	"	SCR		"		HSB1∿HSB4
Heater for Thermal Insulation of PV	4	10.0	200		3	"	SCR		"		HPV1∿HPV4

Table 5.6.1 (Cont'd) (2/4)

Heater	Number	Rating				Type of Heater	Temperature		Attaching		Remarks
		Power (kW)	Voltage (V)	Current (A)	Phase		Control System	Temperature	Location	Connection Form	
Heater for PR Surge Line Piping	1	3.0	200		3	Sheath Heater	SCR		Inside of Building		HSU1
Heater for PR Spray Piping	1	6.0	200		3	"	SCR		Inside of Building		HSP1
Heater for ACC(HOT) Piping											
(A1)	1	4.3	200		3	"	SCR×4 (A1–A15)		Inside of Building		ACC-H
(A2)	1	7.5	200		3	"			"		
(A3)	1	7.2	200		3	"			"		
(A4)	1	11.2	200		3	"			"		
(A5)	1	1.5	200		3	"			"		
(A6)	1	1.6	200		3	"			"		
(A7)	1	3.9	200		3	"			"		
(A8)	1	5.9	200		3	"			"		
(A9)	1	2.6	200		3	"			"		
(A10)	1	4.7	200		3	"			"		
Heater for ACC(COLD) Piping											
(A11)	1	1.6	200		3	"			Inside of Building		ACC-C
(A12)	1	5.8	200		3	"			"		
(A13)	1	2.2	200		3	"			"		
(A14)	1	5.0	200		3	"			"		
(A15)	1	4.2	200		3	"			"		

Table 5.6.1 (Cont'd) (3/4)

Heater	Number	Rating				Type of Heater	Temperature		Attaching		Remarks
		Power (kW)	Voltage (V)	Current (A)	Phase		Control System	Temperature	Location	Connection Form	
Heater for HL(A) Piping	1	3.5	200		3	Sheath Heater	SCR		Inside of Building		HLA1
Heater for CL(A) Piping	1	1.5	200		3	"	SCR		"		HLA4
Heater for COL(A) Piping	1	4.8	200		3	"	SCR		"		HLA2
Heater for SG(A) Piping	4	1.5	200		3	"	SCR		"		
Heater for SG(B) Piping	4	1.5	200		3	"	SCR		"		
Heater for HL(B) Piping	1	3.5	200		3	"	SCR		"		HLB1
Heater for CL(B) Piping	1	1.5	200		3	"	SCR		"		HLB4
Heater for COL(B) Piping	1	4.8	200		3	"	SCR		"		HLB2

Table 5.6.1 (Cont'd) (4/4)

Heater	Number	Rating				Type of Heater	Temperature		Attaching		Remarks
		Power (kW)	Voltage (V)	Current (A)	Phase		Control System	Temperature	Location	Connection Form	
Fuel Assembly	1	1700	400		3	Sheath Heater	SCR		PV		L1
"	1	1700	400		3	"	"		"		L2
"	1	1800	400		3	"	"		"		L3
"	1	1800	400		3	"	"		"		M
"	1	2700	400		3	"	"		"		H1
"	1	2700	400		3	"	"		"		H2

Table 5.6.2 Specifications of Thyristor Power Controller I for Fuel Assembly

Panel Type	Enclosed Type
Rated Voltage	AC 440 V 3 φ 50 Hz
Control System	Full-Wave Phase Control by Thyristor Controller
Rated Capacity	1700 kW 2 Block 1800 kW 2 Block 2700 kW 2 Block
Control Range	1 ∿ 100 %
Response Time	≤0.2 s (at Step Input ± 50 %)
Overshoot	5 %, 50 ms (at Step Input ± 50 %)
Surge Voltage	2400 V P-P
Accuracy of Power Control	±1 % FS at 30 ∿ 100 % load ±1.5 % FS at 1 ∿ 30 % load
Period of Power Control	30 hr (Max.)

Table 5.6.3 Specifications of Thyristor Power Controller IV for Thermal Insulation

Panel Type	Enclosed Type
Rated Voltage	220 V 3 φ 50 Hz
Control System	Full-Wave Phase Control by Thyristor Controller
Control Range	5 ∿ 100 %

Table 5.6.4 Specifications of Demineralizer (IECH)

Type	Completely Automatic Mixed Bed Type Ion Exchange Tower
Capacity	0.00083 m^3/s (60 m^3/cycle)
Outlet Water Purity	Specific Electric Resistance $\geq 10^6$ Ωcm (at 298K)
Inlet Water Purity	Total Cation ≤ 82 ppm as $CaCO_3$ Total Anion ≤ 94 ppm as $CaCO_3$
Amount of Resin	Amberlite 300 ℓ-R
Regeneration Time	2.5 h

Table 5.6.5 Specifications of Feedwater Pump (PS)

Type	Centrifugal Pump
Design Pressure	1.08 MPa
Design Temperature	317.2 K
Working Fluid	Warm Water
Capacity	0.0042 m^3/s
Head	80 mAq
Method of Shaft Seal	Mechanical Seal
Material	SUS13
Capacity of Motor	15 kW

Table 5.6.6 Specifications of Nitrogen Gas Supply System

Number of N_2 Gas Containor	120
Containor Pressure	14.8 MPa
Operating Pressure	9.9 MPa
Operating Temperature	Normal Temperature
Capacity of Supply	282 Nm^3 (at 9.9 MPa)
Accessories	Reducing Valves, Safety Valves, Stop Valves and Flowmeters (with Integrating Meters)

Table 5.6.7 Specifications of Compressor

Type	Compressor	Compressor
Design Pressure	1.068MPa	1.026MPa
Design Temperature	Normal Temperature	Normal Temperature
Normal Air Supply Pressure	0.9MPa	0.9MPa
Flow Rate	66Nm^3/h	88Nm^3/h
Dew Point	≦243.2k (at Atmospheric Pressure)	≦243.2k (at Atmospheric Pressure)
Capacity of Motor	5.5kw x 2 set	7.5kw x 2 set

Table 5.6.8 Specifications of Cooling Water Storage Tank (CWT)

Type	Vertical Cylinder Type Vessel
Major Dimensions	2600 (Inner Diameter) × 6000 (Height) × 6 (Thickness)
Design Pressure	Atmospheric Pressure + Head
Design Temperature	333.2 K
Capacity	∿30 m^3
Water Chemistry	Filtrated Service Water
Material	SS41 (Epoxy resin coating on inner surface)
Temperature Control	Non

Table 5.6.9 Specifications of Cooling Water Pump (PW)

Type	Centrifugal Pump
Design Pressure	1.08 MPa
Design Temperature	333.2 K
Water Chemistry	Filtrated Service Water
Rated Flow Rate	0.0056 m^3/s
Head	80 mAq
Method of Shaft Seal	Gland Seal
Material	SUS13
Capacity of Motor	15 kW

Table 5.6.10 Specifications of Voltage Stabilizer

Type	Fixed Type CVCF Equipment
Capacity	40 kVA
Input Voltage	200 V 3 ϕ 50 Hz
Distortion Factor of Wave Form	≤10 %
Panelboard	Includes branch circuits required
Approximate Dimensions	4500 (Width) × 1000 (Diameter) × 2350 (Hight)

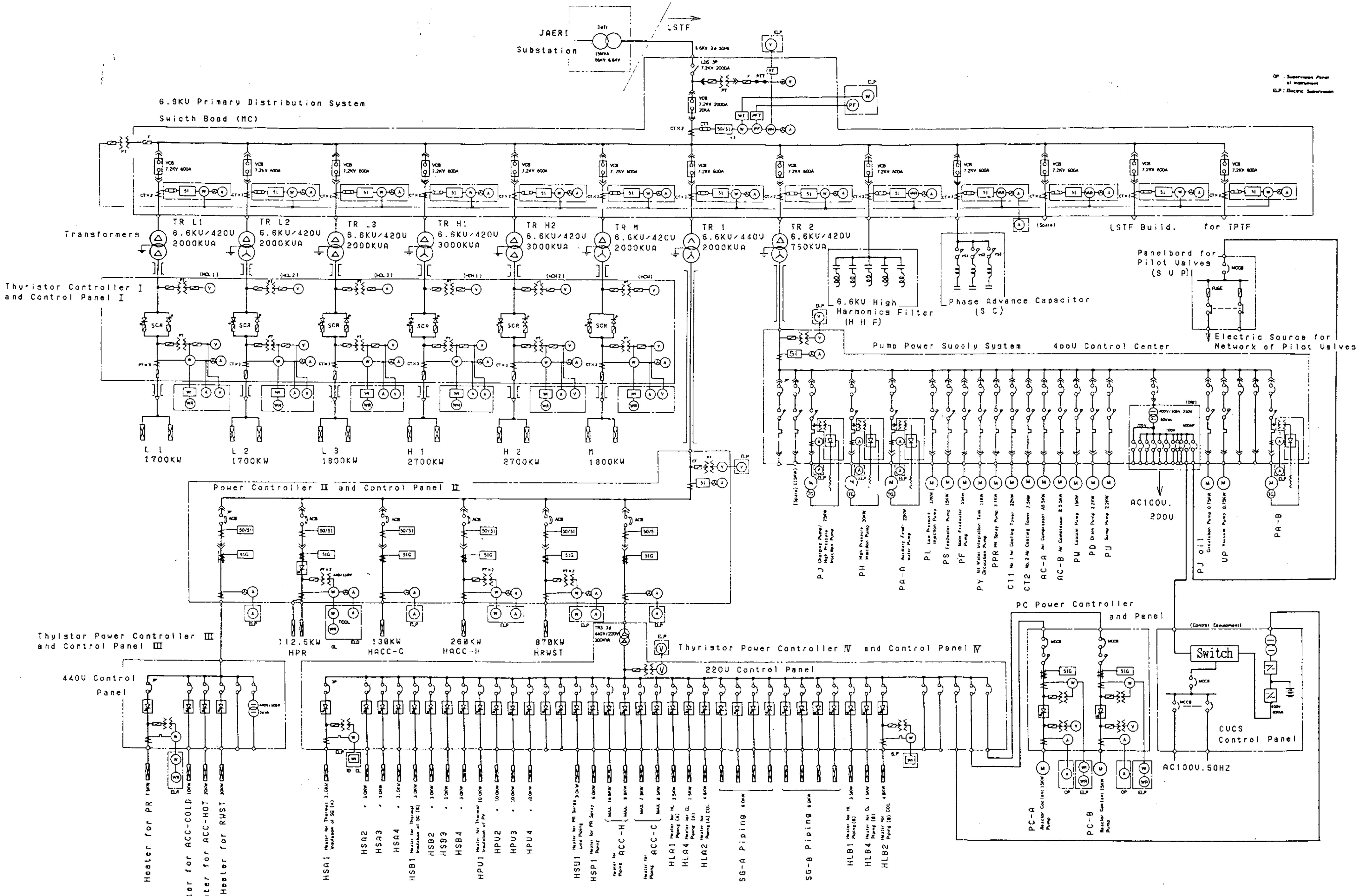
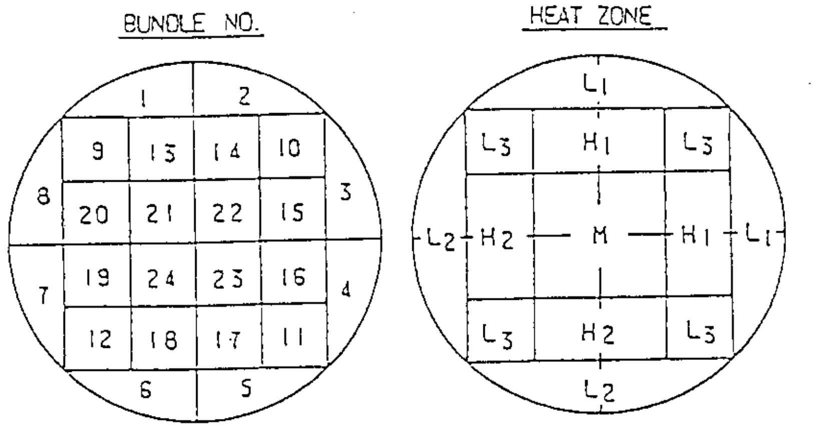


Fig. 5.6.1 Block Diagram of Power Supply System

LSTF IN-CORE HEAT ZONE AND SCR OUTPUT



HEAT ZONE		MAX. HEATER OUTPUT (DESIGN VALUE)	ELECT. POWER SUPPLY CAPACITY (SCR RATED OUTPUT)
LOW	L1 ~ L3	11. 0KW/ROD X468ROD=5. 148MW	1. 7MW/SCR X2SCR=3. 4MW 1. 8MW/SCR X1SCR=1. 8MW
HIGH	H1 H2	16. 6KW/ROD X360ROD=5. 976MW	2. 7MW/SCR X2SCR=5. 4MW
MEAN	M	11. 0KW/ROD X180ROD=1. 980MW	1. 8MW/SCR X1SCR=1. 8MW
TOTAL		1008 ROD 13. 104 MW	6 SCR 12. 4 MW

LSTF FUEL OUTPUT AND TRANSFORMER CAPACITY

HEAT ZONE	PIECE	CASE 1		CASE 2		CASE 3		MAX. HEATER OUTPUT	SCR (KVA)	TRANSFORMER CAPACITY (AT 440V)
		PEAK FACTOR	HEATER OUTPUT	PEAK FACTOR	HEATER OUTPUT	PEAK FACTOR	HEATER OUTPUT			
L 1	144	1. 00	9. 92KW/ROD X1. 00X144 = 1428 KW	0. 71	9. 72KW/ROD X0. 71X144 = 994 KW	0. 66	9. 69KW/ROD X0. 66X144 = 921 KW	1428 KW 9. 921KW/ROD	1700	2000 KVA
L 2	144		9. 92KW/ROD X1. 00X144 = 1428 KW		9. 72KW/ROD X0. 71X144 = 994 KW		9. 69KW/ROD X0. 66X144 = 921 KW	1428 KW 9. 921KW/ROD	1700	2000 KVA
L 3	180		9. 92KW/ROD X1. 00X180 = 1786 KW		9. 72KW/ROD X0. 71X180 = 1242 KW		9. 69KW/ROD X0. 66X180 = 1151 KW	1786 KW 9. 921KW/ROD	1800	2000 KVA
H 1	180	1. 00	9. 92KW/ROD X1. 00X180 = 1786 KW	1. 435	9. 72KW/ROD X1. 435X180 = 2511 KW	1. 51	9. 69KW/ROD X1. 51X180 = 2634 KW	2634 KW 14. 632KW/ROD	2700	3000 KVA
H 2	180		9. 92KW/ROD X1. 00X180 = 1786 KW		9. 72KW/ROD X1. 435X180 = 2511 KW		9. 69KW/ROD X1. 51X180 = 2634 KW	2634 KW 14. 632KW/ROD	2700	3000 KVA
M	180	1. 00	9. 92KW/ROD X1. 00X180 = 1786 KW	1. 00	9. 72KW/ROD X1. 00X180 = 1750 KW	1. 00	9. 69KW/ROD X1. 00X180 = 1744 KW	1786 KW 9. 921KW/ROD	1800	2000 KVA
TOTAL	1008	10. 000 MW		10. 002 MW		10. 005 MW		11. 696 MW	12400	14000 KVA

Fig. 5.6.2 Fuel Power Outputs and Transformer Capacities

5.7 Valves and Orifices

The specifications of control valves and air operated valves installed in the facility are presented in Tables 5.7.1 and 5.7.2, respectively. The list of hand-operated valves used in the test facility is presented in Table 5.7.3.

Flow meters and orifices installed in the facility act as flow resistance for fluid in piping. The list of contraction ratios for flow meters is presented in Table 5.7.4 and that for orifices is in Table 5.7.5.

Table 5.7.1 Specifications of Control Valves (1/4)

Valve No.*			FCV-430	FCV-510	FCV-470	FCV-440	FCV-441	FCV-442
Quantity			1	1	1	1	1	1
Use			SGA Main Feedwater Control Valve	Turbine Load Simulation Control Valve	SGB Main Feedwater Control Valve	Turbine Bypass Valve	SGA Escape FloW Control Valve	SGB Escape FloW Control Valve
Service Condition	Fluid		Hot Water	Steam	Hot Water	Steam	Steam	Steam
	Temperature(K) Max. / Nor.		576.7 495.4	576.7 560.1	576.7 495.4	576.7 560.1	576.7 560.1	576.7 560.1
	Pressure (MPa) Max. / Nor.		9.02 7.36	9.02 7.36	9.02 7.36	9.02 7.36	9.02 7.36	9.02 7.36
	Flow Capacity (kg/s)		Nor. 2.75	Nor. 5.5	Nor. 2.75	Nor. 3.85	Max. 10	Max.10
Body & Inner Valve	Nominal Bore (B)		2	4	2	4	3	3
	Material	Body	SCS14	SCS14	SCS14	SCS14	SCS14	SCS14
		Trim	SUS316-Stellite	SCS14-Stellite	SUS316-Stellite	SCS14-Stellite	SUS316-Stellite	SUS316-Stellite
	Cv No.	Calculation	9.0	97.6	9	60	45	45
		At Full Open	18	125	18	96	48	48
	Characteristic		Modified Parabolic	Parabolic	Modified Parabolic	Modified Parabolic	Parabolic	Parabolic
Opening Time(s) (Measured)			5.1	8.2	5.6	2.7	2.2	1.9
Closing Time(s) (Measured)			5.1	8.4	5.3	3.0	2.0	1.9

Table 5.7.1 (Cont'd) (2/4)

Valve No.*			FCV-820	PCV-300A	PCV-480	TCV-530	TCV-840	TCV-860
Quantity			1	1	1	1	1	1
Use			PL Feedwater Control Valve	PR Spray Control Valve	JC Pressure Control Valve	JC Temperature Control Valve	RHR Primary Side Control Valve	RHR Secondary Side Temperature Control Valve
Service Condition	Fluid		Water	Hot Water	Hot Water	Hot Water	Water	Water
	Temperature(K) Max. Nor.		468.2 403.2	630.2 562.4	576.7 473.2	576.7 478.4	468.2 391.2	333.2 327.7
	Pressure (MPa) Max. Nor.		17.95 4.22	17.95 15.51	9.02 7.36	9.02 7.36	17.95 4.22	1.08 0.59
	Flow Capacity (kg/s)		Max. 12.0	Max. 0.87	Nor. 19.87	Max. 25.37 Nor. 20.37	Max. 12.0	Nor. 3.36
Body & Inner Valve	Nominal Bore (B)		3	1	3	8	3	1 1/2
	Material	Body	SCS13	SCS13	SCS14	SCS14	SCS13	SCPH2
		Trim	SUS316-Stellite	SUS304-Stellite	SUS316-Stellite	SCS14-Stellite	SUS316-Stellite	SUS316-Stellite
	Cv No.	Calculation	51.7	6.0	65	258	52	23
		At Full Open	72	11	96	500	72	26
	Characteristic		Modified Parabolic	Parabolic	Modified Parabolic	Modified Parabolic	Modified Parabolic	Modified Parabolic
Opening Time(s) (Measured)			2.7	3.5			8.5	
Closing Time(s) (Measured)			2.9	3.3			8.4	

Table 5.7.1 (Cont'd) (3/4)

Valve No.*			HCV-010	HCV-150	HCV-270	HCV-730	HCV-740	HCV-750
Quantity			1	1	1	1	1	1
Use			HLA Leak Valve	HLB Leak Valve	PPR Flow Rate Control Valve	PJ Intact Loop Flow Rate Control Valve	PJ Broken Loop Flow Rate Control Valve	PH Intact Loop Flow Rate Control Valve
Service Condition	Fluid		Hot Water	Hot Water	Hot Water	Water	Water	Water
	Temperature(K) Max. Nor.		630.2 562.4	630.2 562.4	630.2 562.4	317.2 313.2	317.2 313.2	317.2 313.2
	Pressure (MPa) Max. Nor.		17.95	17.95	17.95	21.67 19.51	21.67 19.51	21.67 10.55
	Flow Capacity (kg/s)		Nor. 0.24	Nor. 0.24	Nor. 0.011	Max. 2.22	Max. 2.22	Max. 1.78
Body & Inner Valve	Nominal Bore (B)		1	1	1/2	1 1/2	1	1
	Material	Body	SCS13	SCS13	SCS13	SCS13	SCS13	SCS13
		Trim	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
	Cv No.	Calculation	3.9	3.9	0.076	7.7	7.7	6.2
		At Full Open	5.4	5.4	0.13	11	9.5	9.5
	Characteristic		Parabolic	Parabolic	Parabolic	Parabolic	Parabolic	Parabolic
Opening Time(s) (Measured)					3.8			
Closing Time(s) (Measured)					3.5			

Table 5.7.1 (Cont'd) (4/4)

Valve No.*			HCV-760	HCV-770	HCV-020	HCV-160
Quantity			1	1	1	1
Use			PH Broken Loop Flow Rate Control Valve	PY Return Line Control Valve	LSA Flow Rate Control Valve	LSB Flow Rate Control Valve
Service Condition	Fluid		Water	Water	Hot Water	Hot Water
	Temperature(K) Max. / Nor.		317.2 / 313.2	456.2	630.2 / 562.4	630.2 / 562.4
	Pressure (MPa) Max. / Nor.		21.67 / 10.55	1.08	17.95	17.95
	Flow Capacity (kg/s)		Max. 1.78	Max. 14.0	Nor. 24.5	Nor. 24.5
Body & Inner Valve	Nominal Bore (B)		1	3	8	8
	Material	Body	SCS13	SCS13	SCS13	SCS13
		Trim	SUS304-Stellite	SUS316-Stellite	SUS304-Stellite	SUS304-Stellite
	Cv No.	Calculation	6.2	62.2		
		At Full Open	9.5	96	2000	2000
	Characteristic		Parabolic	Modified Parabolic		
Opening Time(s) (Measured)					0.68	0.73
Closing Time(s) (Measured)					30.00	32.25

* · FCV : Flow Control Valve
PCV : Pressure Control Valve
TCV : Thermostatic Control Valve
HCV : Hand Control Valve
· In FCV, PCV and TCV valves, the valve opening can be programmed to vary from 0% to 100% to control the desired variable.
· In HCV-020 and -160 valves, the amount of valve opening is set to a certain value manually.
The valve opening can take this value or can be programmed to open fully when a certain condition is satisfied.
· In the other HCV valves, the amount of valve opening is also set to a certain value beforehand.
The valve opening can be set this value or 0%.

Table 5.7.2 Specifications of Air Actuating Valves (1/12)

Name of Process			PV Vent Line	PV Auto Bleed	PV Auto Bleed	PV Auto Bleed	SGA Drain Line	SGB Drain Line	PR Surge Line
Tag or Valve No.			AOV-010	AOV-040	AOV-050	AOV-060	AOV-070	AOV-080	AOV-090
Nominal Bore			1/2B	1B	1B	1/2B	1/2B	1/2B	3B
Class			2500	2500	1500	1500	2500	2500	2500
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe	Gate
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Steam	Hot Water	Warm Water	Warm Water	Warm Water	Hot Water	Hot Water
Pressure (MPa)	Inlet	Max.	17.95	17.95	17.95	17.95	17.95	17.95	17.95
		Nor.	15.51	15.51	15.51	15.51	15.51	15.51	15.51
	Shut-Off Pressure of Cilinder		17.95	17.95	17.95	17.95	17.95	17.95	0.1
Temperature (K)		Max.	630.2	630.2	373.2	373.2	630.2	630.2	630.2
		Nor.	598.1	598.1	-	-	598.1	598.1	615.4
Opening Time(s) (Measured)			0.36	0.35	0.45	0.34	0.32	0.32	2.13
Closing Time(s) (Measured)			0.32	0.32	0.52	0.46	0.33	0.33	0.84

Table 5.7.2 (Cont'd) (2/12)

Name of Process			PR Relief Valve Simulation Line	PR Safety Valve Simulation Line	PR-PV Vent Line	SGA Escape Valve	SGA Escape Valve Simulation Line	SGA Safety Valve Simulation Line	SGA Main Steam Isolation Valve
Tag or Valve No.			AOV-100	AOV-110	AOV-120	AOV-150	AOV-151	AOV-160	AOV-170
Nominal Bore			1 1/2B	2B	2B	3B	3 B	6B	3B
Class			2500	2500	2500	900	900	900	900
Valve Type			Gate	Gate	Globe	Gate	Globe	Gate	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS14	SCS14	SCS14	SCS14
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS316-Stellite	SUS316-Stellite	SUS316-Stellite	SUS316-Stellite
Fluid			Steam	Steam	Steam	Steam	Steam	Steam	Steam
Pressure (MPa)	Inlet	Max.	17.95	17.95	17.95	9.02	9.02	9.02	9.06
		Nor.	16.17	17.26	15.51	7.86	7.36	7.86	7.36
	Shut-Off Pressure of Cilinder		17.95	17.95	17.95	9.02	9.02	9.02	1.0 (Counter Pressure 9.02)
Temperature (K)		Max.	649.6	649.6	649.6	576.7	576.7	576.7	576.7
		Nor.	621.4	626.7	615.4	510.1	568.3	510.1	560.1
Opening Time(s) (Measured)			0.65	2.24	0.97	4.14	1.4	0.52	0.52
Closing Time(s) (Measured)			0.69	1.63	0.72	4.17	0.2	7.17	0.63

Table 5.7.2 (Cont'd) (3/12)

Name of Process			SGB Escape Valve	SGB Escape Valve Simulation Line	SGB Safety Valve Simulation Line	SGB Main Steam Isolation Valve	Steam Header	Main Steam Isolation Valve	JC Vent Line
Tag or Valve No.			AOV-180	AOV-181	AOV-190	AOV-200	AOV-210	AOV-220	AOV-230
Nominal Bore			3B	3B	6B	3B	4B	4B	1B
Class			900	900	900	900	900	900	1500
Valve Type			Gate	Globe	Gate	Globe	Gate	Globe	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS14	SCS14	SCS14	SCS14	SCS14	SCS14	SCS13
	Trim		SUS316-Stellite	SUS316-Stellite	SUS316-Stellite	SUS316-Stellite	SUS316-Stellite	SUS316-Stellite	SUS304-Stellite
Fluid			Steam	Steam	Steam	Steam	Steam	Steam	Steam
Pressure (MPa)	Inlet	Max.	9.02	9.02	9.02	9.06	9.02	9.02	9.02
		Nor.	7.86	7.36	7.86	7.36	7.36	7.36	7.86
	Shut-Off Pressure of Cilinder		9.02	9.02	9.02	1.0 (Counter Pressure 9.02)	9.02	9.02 (Counter Pressure 9.02)	9.02
Temperature (K)	Max.		576.7	576.7	576.7	576.7	576.7	576.7	576.7
	Nor.		510.1	568.3	510.1	560.1	560.1	560.1	560.1
Opening Time(s) (Measured)			3.63	2.0	0.52	0.49	0.13	0.155	0.59
Closing Time(s) (Measured)			1.21	0.2	6.90	0.64	0.07	0.10	0.91

Table 5.7.2 (Cont'd) (4/12)

Name of Process			JC Auto Bleed	PF Bypass	Main Feedwater Line	Auxiliary Feedwater Line (To SGA)	Auxiliary Feedwater Line (To SGB)	PA-A Return Line	Break Unit (I)
Tag or Valve No.			AOV-240	AOV-250	AOV-260	AOV-270	AOV-280	AOV-290	AOV-300
Nominal Bore			1B	2B	3B	2B	2B	1 1/2B	4B
Class			1500	1500	900	1500	1500	900	2500
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe	Gate
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS14	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS316-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	Water	Hot Water or Steam
Pressure (MPa)	Inlet	Max.	9.02	9.02	9.02	9.91	9.91	9.91	17.95
		Nor.	7.86	7.36	7.36	9.41	9.41	9.41	-
	Shut-Off Pressure of Cilinder		9.02	1.0	1.0 (Counter Pressure 9.02)	9.91	9.91	9.91	17.95
Temperature (K)	Max.		576.7	576.7	576.7	576.7	576.7	317.2	630.2
	Nor.		560.1	495.4	495.4	313.2	313.2	313.2	-
Opening Time(s) (Measured)			0.31	0.35	0.73	0.47	0.44	1.325	longitudinal 0.06 lateral 0.055
Closing Time(s) (Measured)			0.52	0.22	0.61	0.28	0.205	0.27	longitudinal 3.23 lateral 3.225

Table 5.7.2 (Cont'd) (5/12)

Name of Process			Break Unit (II)	ST Drain Line	Break Line Air Seal	ACC (Cold) Vent Line	ACC (Cold) Injection Line (1)	ACC (Cold) Injection Line (2)	ACC (Hot) Vent Line
Tag or Valve No.			AOV-310	AOV-320	AOV-330	AOV-400	AOV-410	AOV-420	AOV-430
Nominal Bore			4B	3B	1/2B	1B	4B	4B	1B
Class			2500	JIS10K	JPI300	1500	1500	1500	1500
Valve Type			Gate	Globe	Globe	Globe	Gate	Gate	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCPH2	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Hot Water or Steam	Water	Air	N_2	Warm Water	Warm Water	N_2
Pressure (MPa)	Inlet	Max.	17.95	1.08	1.0	11.38	11.37	11.37	11.38
		Nor.	-	-	-	9.91	-	-	9.91
	Shut-Off Pressure of Cilinder		17.95	0.5	1.0	11.38	6.86 (Counter Pressure 11.37)	6.86 (Counter Pressure 11.37)	11.38
Temperature (K)		Max.	630.2	456.2	-	423.2	593.7	593.7	423.2
		Nor.	-	373.2	Amb.	373.2	562.4	562.4	373.2
Opening Time(s) (Measured)			longitudinal 0.06 lateral 0.055	0.61	0.04	0.65	5.64	7.43	0.68
Closing Time(s) (Measured)			longitudinal 3.33 lateral 3.495	1.17	0.11	0.78	6.80	7.61	0.91

Table 5.7.2 (Cont'd) (6/12)

Name of Process			ACC (Hot) Injection Line (1)	ACC (Hot) Injection Line (2)	ECCS to HLA	ECCS to LSA	ECCS to CLA	ECCS to HLB	ECCS to LSB
Tag or Valve No.			AOV-440	AOV-450	AOV-460	AOV-470	AOV-480	AOV-490	AOV-500
Nominal Bore			4B	4B	2 1/2B	2 1/2B	2 1/2B	1 1/2B	1 1/2B
Class			1500	1500	2500	2500	2500	2500	2500
Valve Type			Gate	Gate	Globe	Globe	Globe	Globe	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Warm Water	Warm Water	Water	Water	Water	Water	Water
Pressure (MPa)	Inlet	Max.	11.37	11.37	21.67	21.67	21.67	21.67	21.67
		Nor.	-	-	19.51	19.51	19.51	19.51	19.51
	Shut-Off Pressure of Cilinder		6.86 (Counter Pressure 11.37)	6.86 (Counter Pressure 11.37)	9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)
Temperature (K)		Max.	593.7	593.7	630.2	630.2	630.2	630.2	630.2
		Nor.	562.4	562.4	-	-	-	-	-
Opening Time(s) (Measured)			5.93	1.40	0.735	0.70	0.655	0.22	0.33
Closing Time(s) (Measured)			8.15	6.66	0.30	0.35	0.285	0.29	0.39

Table 5.7.2 (Cont'd) (7/12)

Name of Process			ECCS to CLB	ECCS to PV (Lower Part)	ECCS to PV (Upper Part)	PJ Return Line	PH Return Line	PJ Line	PJ Line (To JC)
Tag or Valve No.			AOV-510	AOV-520	AOV-530	AOV-540	AOV-550	AOV-560	AOV-570
Nominal Bore			1 1/2B	1 1/2B	1 1/2B	1B	1B	1/2B	1B
Class			2500	2500	2500	2500	1500	2500	2500
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Water	Water	Water	Water	Water	Water	Water
Pressure (MPa)	Inlet	Max.	21.67	21.67	21.67	21.67	21.67	21.67	21.67
		Nor.	19.51	19.51	19.51	19.51	10.55	19.51	19.51
	Shut-Off Pressure of Cilinder		9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)	9.8 (Counter Pressure 17.95)	21.67	11.87	9.8 (Counter Pressure 17.95)	9.8
Temperature (K)		Max.	630.2	630.2	630.2	630.2	317.2	630.2	576.7
		Nor.	-	-	-	-	313.2	-	-
Opening Time(s) (Measured)			0.29	0.26	0.245	0.625	0.625	0.42	0.38
Closing Time (s) (Measured)			0.35	0.27	0.30	0.17	0.14	0.37	0.33

Table 5.7.2 (Cont'd) (8/12)

Name of Process			PL Suction	PL Line (To HLA)	PL Line (To CLA)	PL Line (To HLB)	PL Line (To CLB)	PL Return Line	RHR Line (From HLA)
Tag or Valve No.			AOV-580	AOV-590	AOV-600	AOV-610	AOV-620	AOV-630	AOV-640
Nominal Bore			4B	4B	4B	4B	4B	2B	4B
Class			2500	2500	2500	2500	2500	2500	2500
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Water	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water	Hot Water
Pressure (MPa)	Inlet	Max.	17.95	17.95	17.95	17.95	17.95	17.95	17.95
		Nor.	15.51	4.22	4.22	4.22	4.22	4.22	4.22
	Shut-Off Pressure of Cilinder		1.47 (Counter Pressure 17.95)	1.47 (Counter Pressure 17.95)	1.47 (Counter Pressure 17.95)	1.47 (Counter Pressure 17.95)	1.47 (Counter Pressure 17.95)	1.47 (Counter Pressure 17.95)	17.95
Temperature (K)		Max.	468.2	630.2	630.2	630.2	630.2	450.2	630.2
		Nor.	450.2	-	-	-	-	-	-
Opening Time(s) (Measured)			3.24	0.885	0.735	0.795	0.82	0.475	4.70
Closing Time(s) (Measured)			1.20	12.12	9.18	9.96	11.445	0.10	3.96

Table 5.7.2 (Cont'd) (9/12)

Name of Process			RHR Line (From HLB)	RHR HX Vent Line (Primary Side)	JC Feedwater Line	ACC (Cold) Feedwater Line	ACC (Hot) Feedwater Line	N_2 Main Line	N_2 Seal Line (To ACC (Cold))
Tag or Valve No.			AOV-650	AOV-660	AOV-700	AOV-710	AOV-720	AOV-750	AOV-760
Nominal Bore			4B	1/2B	1B	1B	1B	1/2B	1B
Class			2500	2500	1500	1500	1500	1500	1500
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe	Globe
Quantity			1	1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCPH2	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Warm Water	Warm Water	Hot Water	Water	Water	N_2	N_2
Pressure (MPa)	Inlet	Max.	17.95	17.95	9.02	11.38	11.38	17.8	11.38
		Nor.	4.22	-	-	-	-	-	-
	Shut-Off Pressure of Cilinder		17.95	17.95	1.5 (Counter Pressure 9.02)	0.98 (Counter Pressure 11.38)	0.98 (Counter Pressure 11.38)	17.8(Max.)	11.38 (Counter Pressure 9.91)
Temperature (K)	Max.		630.2	468.2	576.7	423.2	493.2	-	423.2
	Nor.		-	416.2	-	-	-	Amb.	-
Opening Time(s) (Measured)			4.44	0.37	0.32	0.65	0.36	0.91	0.69
Closing Time(s) (Measured)			4.17	0.33	0.52	0.87	0.41	0.90	0.85

Table 5.7.2 (Cont'd) (10/12)

Name of Process			N_2 Seal Line (To ACC (Hot))	N_2 Seal Line (To PV Upper Part)	ST Feedwater Line	RWST Feedwater Line	CWT Feedwater Line	Primary System (PV) Auto Bleed Cooling Water
Tag or Valve No.			AOV-770	AOV-790	AOV-800	AOV-810	AOV-820	AOV-830
Nominal Bore			1B	1/2B	2B	1 1/2B	1 1/2B	1 1/2B
Class			1500	2500	JIS10K	JIS10K	JIS10K	JIS10K
Valve Type			Globe	Globe	Globe	Globe	Globe	Globe
Quantity			1	1	1	1	1	1
Material	Body		SCS13	SCS13	SCS13	SCS13	SCS13	SCPH2
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			N_2	N_2	Water	Water	Water	Water
Pressure (MPa)	Inlet	Max.	11.38	17.95	1.08	-	-	-
		Nor.	-	-	-	0.5	0.5	1.0
	Shut-Off Pressure of Cilinder		10.8 (Counter Pressure 11.38)	10.8 (Counter Pressure 17.95)	0.5	0.5	0.5	1.0
Temperature (K)	Max.		493.2	630.2	456.2	317.2	317.2	317.2
	Nor.		-	-	-	313.2	313.2	313.2
Opening Time(s) (Measured)			0.63	0.35	0.21	0.07	0.10	0.15
Closing Time(s) (Measured)			0.84	0.32	0.43	0.18	0.23	0.32

Table 5.7.2 (Cont'd) (11/12)

Name of Process			Secondary System (JC) Auto Bleed Cooling Water	CWT Drain Line	VS Motor (for PJ) Cooling Water	Water Purifier Inlet	N_2 Seal Line (To PV Lower Part)	PA-A,PA-B Shutout Valve	PA-B Return Line
Tag or Valve No.			AOV-840	AOV-850	AOV-860	AOV-870	AOV-781∿784	AOV-275	AOV-295
Nominal Bore			1 1/2B	2B	1B	1 1/2B	1/2B	2 B	1 1/2 B
Class			JIS10K	JIS10K	JIS10K	JIS10K	2500	1500	900
Valve Type			Globe	Globe	Globe	Globe	Globe	Gate	Globe
Quantity			1	1	1	1	4	1	1
Material	Body		SCPH2	SCPH2	SCS13	SCS13	SCS13	SCS13	SCS13
	Trim		SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Water	Water	Water	Water	N_2	Water	Water
Pressure (MPa)	Inlet	Max.	-	-	-	-	17.95	9.91	9.91
		Nor.	1.0	0.5	0.5	0.5	-	9.41	9.41
	Shut-Off Pressure of Cilinder		1.0	0.5	0.5	0.5	10.8 (Counter Pressure 17.95)	9.91	9.91
Temperature (K)		Max.	317.2	317.2	317.2	317.2	630.2	576.7	317
		Nor.	313.2	313.2	313.2	313.2	-	317.2	313.2
Opening Time(s) (Measured)			0.13	0.23	0.04	0.09	781(0.47),782(0.46) 783(0.23),784(0.47)	<1.0	<1.0
Closing Time(s) (Measured)			0.26	0.47	0.11	0.18	781(0.29),782(0.32) 783(0.21),784(0.37)	<1.0	<1.0

Table 5.7.2 (Cont'd) (12/12)

Name of Process			Turbine Bypass Isolation Valve	SGA Main Feedwater Isolation Valve	SGB Main Feedwater Isolation Valve
Tag or Valve No.			AOV-221	AOV-261	AOV-262
Nominal Bore			4B	2B	2B
Class			900	1500	1500
Valve Type			Globe	Globe	Globe
Quantity			1	1	1
Material	Body		SCS14	SCS13	SCS13
	Trim		SUS316-Stellite	SUS304-Stellite	SUS304-Stellite
Fluid			Steam	Hot Water	Hot Water
Pressure (MPa)	Inlet	Max.	9.02	9.02	9.02
		Nor.	7.36	7.36	7.36
	Shut-Off Pressure of Cilinder		9.02	9.02	9.02
Temperature (K)		Max.	576.7	576.7	576.7
		Nor.	560.1	495.4	495.4
Opening Time(s) (Measured)			6.42	1.00	0.93
Closing Time(s) (Measured)			3.87	0.72	0.62

Table 5.7.3 List of Hand-Operated Valves (1/10)

Valve Number	Valve Name	Nominal Bore (B)	Valve Type*	Body Material
VS102	PR(SV) Simulation Stop Valve	2	VG	SUS316L/STL
VS103	PR(RV) Simulation Stop Valve	1 1/2	VG	SUS316L/STL
VD105	PV Drain Valve	1	VO	SUS316L/STL
VV106	PV Vent Stop Valve	1/2	VO	SUS316L/STL
VS107	Safety Valve for PR	1-1/2	RC	A351CF8
VS108	Safety Valve for PV	2	RC	A351CF8
VS109	Safety Valve for PV	2	RC	A351CF8
VV110A	Vent Stop Valve on SG-A Primary Side	1/2	VO	SUS316L/STL
VV110B	Vent Stop Valve on SG-B Primary Side	1/2	VO	SUS316L/STL
VD111A	COL-A Drain Valve	1	VO	SUS316L/STL
VD111B	COL-B Drain Valve	1	VO	SUS316L/STL
VD112A	COL-A Drain Valve	1	VO	SUS316L/STL
VD112B	COL-B Drain Valve	1	VO	SUS316L/STL
VV113A	PC-A Vent Valve	1/2	VO	SUS316L/STL
VV113B	PC-B Vent Valve	1/2	VO	SUS316L/STL
VV114A	PC-A Vent Valve	1/2	VO	SUS316L/STL
VV114B	PC-B Vent Valve	1/2	VO	SUS316L/STL
VV115	Primary Loop Air Escape Valve	1	VO	SUS316L/STL
VV116	Primary Loop Air Escape Valve	1	VO	SUS316L/STL
V117	Vacuum Pump Block Valve	1	VO	SUS304
V118	PG1-1 Block Valve	1/2	VO	SUS316L/STL
V119	PG1-2 Block Valve	1/2	VO	SUS316L/STL
V120	PG1-3 Block Valve	1/2	VO	SUS316L/STL
V121	PG1-4 Block Valve	1/2	VO	SUS304
VV122	Primary Loop Vent Valve (used at filled up condition)	1/2	VO	SUS304
VV123	Vacuum Break Valve	1/2	VO	SUS304
VV124	PPR Vent Valve	1/2	VO	SUS316L/STL
VV125	PPR Vent Valve	1/2	VO	SUS316L/STL
VD126	PV Drain Valve	1/2	VO	SUS316L/STL
VD127	PV Drain Valve	1/2	VO	SUS316L/STL
VD128	Drain Valve	1/2	VO	SUS316L/STL

Table 5.7.3 (Cont'd) (2/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Tupe*	Body Material
VC201	A Main Steam Check Valve	3	VC	SCS13/STL
VC202	B Main Steam Check Valve	3	VC	SCS13/STL
V203	JC Outlet Valve	8	VG	SCS13/STL
VN204	Needle Valve (CT_1 Outlet Valve)	6	NV	SCS13/STL
VC205	PF Outlet Check Valve	6	VC	SCS13/STL
VC206	Main Feedwater Check Valve	3	VC	SCS13/STL
VS207	SG-A(RV) Simulation Stop Valve	3	VG	SCS13/STL
VS208	SG-B(RV) Simulation Stop Valve	3	VG	SCS13/STL
VS209	SG-A(SV) Simulation Stop Valve	6	VG	SCS13/STL
VS210	SG-B(SV) Simulation Stop Valve	6	VG	SCS13/STL
V211	PA-A Suction Valve	2	VG	SCS13
VC212	SG-A Auxiliary Feedwater Check Valve	2	VC	SCS13/STL
VS213	Safety Valve for SG-A	2	RC	A351CF8
VS214	Safety Valve for SG-B	2	RC	A351CF8
VD215	Secondary Loop Auto-Bleed Outlet Valve	1	VO	SUS316L/STL
VV216	Vent Condenser Stop Valve	1	VO	SUS316L/STL
VD217	JC Drain Valve	1	VO	SUS316L/STL
VD218	JC Drain Valve	1	VO	SUS316L/STL
VD219	Piping Drain Valve	1/2	VO	SUS316L/STL
VD220	Piping Drain Valve	1/2	VO	SUS316L/STL

Table 5.7.3 (Cont'd) (3/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
VD221	Piping Drain Valve	1/2	VO	SUS316L/STL
VD222	Piping Drain Valve	1/2	VO	SUS316L/STL
VD223	PA-A Drain Valve	1/2	VO	SUS304/STL
VD224	PA-A Drain Valve	1/2	VO	SUS304/STL
VD225	SG-A Drain Valve	1	VO	SUS316L/STL
VD226	SG-A Drain Valve	1	VO	SUS316L/STL
VD227	SG-B Drain Valve	1	VO	SUS316L/STL
VD228	SG-B Drain Valve	1	VO	SUS316L/STL
VC229	SG-B Auxiliary Feedwater Check Valve	2	VC	SCS13/STL
VD230	Drain Valve	1/2	VO	SUS316L/STL
V231A/B	PG2-1A/B Block Valve	1/2	VG	SUS316L/STL
V232	PG2-2 Block Valve	1/2	VG	SUS316L/STL
V233	PG2-3 Block Valve	1/2	VG	SUS316L/STL
V234	PG2-4 Block Valve	1/2	VG	SUS316L/STL
V235	PG2-5 Block Valve	1/2	VG	SUS316L/STL
V236	PG2-6 Block Valve	1/2	VG	SUS316L/STL
VV237	CT1 Vent Valve	1/2	VO	SUS316L/STL
VD238	CT1 Drain Valve	1/2	VO	SUS316L/STL
VV239	CT2 Vent Valve	1/2	VO	SUS316L/STL
VD240	CT2 Drain Valve	1/2	VO	SUS316L/STL
VD241	2P40 Drain Valve	1/2	VO	SUS316L/STL
VD242	Piping Drain Valve	1/2	VO	SUS316L/STL
V251	PA-B Suction Valve	2	VG	SCS13
VD252	PA-B Drain Valve	1/2	VO	SUS304/STL
VD253	PA-B Drain Valve	1/2	VO	SUS304/STL
VD254	PG2-8 Block Valve	1/2	VO	SUS304/STL

Table 5.7.3 (Cont'd) (4/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type *	Body Material
V301	PH Suction Valve	2	VG	SCS13
VC302	HPIS-A Check Valve (PH)	1-1/2	VL	SUS304/STL
VC303	HPIS-B Check Valve (PH)	1	VL	SUS304/STL
V304	PJ Suction Valve	3	VG	SCS13
VC305	HPIS-A Check Valve (PJ)	1-1/2	VL	SUS304/STL
VC306	HPIS-B Check Valve (PJ)	1	VL	SUS304/STL
VC307	PJ Check Valve for Filling-up	1	VL	SUS316L/STL
VC308	Primary Loop Check Valve for Filling-up	1/2	VL	SUS316L/STL
VD309	PH Drain Valve	1/2	VO	SUS304/STL
VD310	PH Drain Valve	1/2	VO	SUS304/STL
VD311	PJ Drain Valve	1/2	VO	SUS304/STL
VD312	PJ Drain Valve	1/2	VO	SUS304/STL
VD313	3P04 Drain Valve	1/2	VO	SUS304/STL
VD314	3P32 Drain Valve	1/2	VO	SUS304/STL
VD315	3P20 Drain Valve	1/2	VO	SUS316L/STL
VC401	AIS Check Valve	4	VC	SCS13/STL
VC402	AIS Check Valve	4	VC	SCS13/STL
VC403	AIS Check Valve	4	VC	SCS13/STL
VC404	AIS Check Valve	4	VC	SCS13/STL
VV405	RV for ACC-Cold	1	VO	SUS316L/STL
VS406	Safety Valve for ACC-Cold	1-1/2	RC	A351CF8
VV407	RV for ACC-Hot	1	VO	SUS316L/STL
VS408	Safety Valve for ACC-Hot	1-1/2	RC	A351CF8
VD409	ACC-Cold Drain Valve	1	VO	SUS316L/STL
VD410	ACC-Cold Drain Valve	1	VO	SUS316L/STL
VD411	ACC-Hot Drain Valve	1	VO	SUS316L/STL
VD412	ACC-Hot Drain Valve	1	VO	SUS316L/STL
VV414	Piping Vent Valve	1/2	VO	SUS316L/STL
V415	PG4-1 Block Valve (ACC-Cold)	1/2	VG	SUS316L/STL
V416	PG4-2 Block Valve (ACC-Hot)	1/2	VG	SUS316L/STL

Table 5.7.3 (Cont'd) (5/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
V501	RWST Outlet Valve	6	VG	SCS13
VC502	PL Suction Check	4	VC	SCS13/STL
VC503A	A Loop Check Valve	4	VC	SCS13/STL
VC503B	B Loop Check Valve	4	VC	SCS13/STL
VN504	Flow Rate Control Valve (PL Return)	2	VN	SCS13/STL
VV505	RHR.Hx Vent Stop Valve	1/2	VO	SUS316L/STL
VD506	RWST Drain Valve	1	VO	SCS13
VD507	Feed Header Drain Valve	1/2	VO	SCS13
VD508	Piping Drain Valve	1/2	VO	SUS316L/STL
VD510	Piping Drain Valve	1/2	VO	SUS316L/STL
VD511	Return Header Drain Valve	1/2	VO	SCS13
VV512A	Piping Vent Valve	1/2	VO	SUS316L/STL
VV512B	Piping Vent Valve	1/2	VO	SUS316L/STL
V513	PG5-1 Block Valve	1/2	VO	SUS316L/STL
V514	PG5-2 Block Valve	1/2	VO	SUS316L/STL
V515A/B	Piping Vent	1/2	VO	SUS316L/STL
VD516A/B	Piping Drain Valve	1/2	VO	SUS316L/STL
VV517A/B	Piping Vent Valve	1/2	VO	SUS316L/STL
V601	PS Suction Valve	2	VG	SCS13
VC602	PS Check Valve	2	VC	SCS13
VC603	JC Feedwater Check Valve	1	VL	SUS316L/STL
VC604	ACC-Hot Feedwater Check Valve	1	VL	SUS316L/STL
VC605	ACC-Cold Feedwater Check Valve	1	VL	SUS316L/STL
V606	PS Return Valve	1	VO	SCS13
VD607	PS Drain Valve	1/2	VO	SCS13
V608	PG6-1 Block Valve	1/2	VO	SCS13

Table 5.7.3 (Cont'd) (6/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
V701	CWT Outlet Valve	3	VO	FC20
VC702	PW Outlet Check Valve	3	VC	FC20
VC703	PW Feed Header Stop Valve	3	VO	FC20
V704	PD Inlet Valve	2	VG	FC20
VC705	PD Outlet Check Valve	2	VC	FC20
V706	PD Outlet Valve	2	VG	FC20
VC707	PU Inlet Check Valve	2	VC	FC20
VC708	PU Outlet Check Valve	2	VC	FC20
V709	PU Outlet Valve	2	VG	FC20
V710	PD Priming Water Stop Valve	1/2	VO	BC6
V711	PU Priming Water Stop Valve	1/2	VO	BC6
V712	PC-A Cooling Water Inlet Valve	1	VO	BC6
V713	PC-A Cooling Water Outlet Valve	1	VO	BC6
V714	PC-B Cooling Water Inlet Valve	1	VO	BC6
V715	PC-B Cooling Water Outlet Valve	1	VO	BC6
V716	Primary Loop Auto-Bleed Inlet Valve	1-1/2	VO	BC6
VC717	RHR.HX Outlet Check Valve	2	VC	FC20
V718	Secondary Loop Auto-Bleed Inlet Valve	1-1/2	VO	BC6
V719	Vent Condenser Inlet Valve	1/2	VO	BC6
V720	Vent Condenser Outlet Valve	1/2	VO	BC6
V721	PPR Cooling Water Inlet Valve	1/2	VO	BC6

Table 5.7.3 (Cont'd) (7/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
V722	PPR Cooling Water Outlet Valve	1/2	VO	BC6
V723	PF Cooling Water Inlet Valve	1/2	VO	BC6
V724	PF Cooling Water Outlet Valve	1/2	VO	BC6
V725	PJ Cooling Water Inlet Valve	1/2	VO	BC6
V726	PJ Cooling Water Outlet Valve	1/2	VO	BC6
V727	PH Cooling Water Inlet Valve	1/2	VO	BC6
V728	PH Cooling Water Outlet Valve	1/2	VO	BC6
V729	PL Cooling Water Inlet Valve	1/2	VO	BC6
V730	PL Cooling Water Outlet Valve	1/2	VO	BC6
V731	PA-A Cooling Water Inlet Valve	1/2	VO	BC6
V732	PA-A Cooling Water Outlet Valve	1/2	VO	BC6
V733	PY Cooling Water Inlet Valve	1/2	VO	BC6
V734	PY Cooling Water Outlet Valve	1/2	VO	BC6
V735	Clean Air Unit Inlet Valve	1/4	VO	BC6
VN736	PJ-VSM Inlet Control Valve	1	VN	BC6
V737	PG7-1 Block Valve	1/2	VO	BC6
V738	PG7-2 Block Valve	1/2	VO	BC6
V739	PG7-3 Block Valve	1/2	VO	BC6
V740	Clean Air Unit Outlet Valve	1/2	VO	BC6
VV741	Piping Vent	3/8	VO	BC6
V742	Nozzle for Cleaning (Spare)	1	VO	BC6
VD743	CWP Manhole Drain	1/2	VO	BC6

Table 5.7.3 (Cont'd) (8/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
VV750	Piping Vent	3/8	VO	BC6
VV751	Piping Vent	3/8	VO	BC6
VV752	Piping Vent	3/8	VO	BC6
VD753	Piping Drain	1/2	VO	BC6
VD754	Piping Drain	1/2	VO	BC6
VV755	Piping Vent	1/2	VO	BC6
VD756	Piping Drain	1/2	VO	BC6
VD757	Piping Drain	1/2	VO	BC6
VD758	Piping Drain	1/2	VO	BC6
VD759	Piping Drain	3/8	VO	BC6
VV760	Piping Vent	3/8	VO	BC6
VD761	Piping Drain/Vent(PC-A)	3/8	VO	BC6
VV762	Piping Vent	3/8	VO	BC6
VD763	Piping Drain/Vent(PC-B)	3/8	VO	BC6
VV764	Piping Vent	1/2	VO	BC6
VD765	RHR.Hx Drain Valve	1/2	VO	BC6
VD766	Piping Drain	1/2	VO	BC6
V771	PA-B Cooling Water Inlet Valve	1/2	VO	BC6
VV772	Piping Vent	1/2	VO	BC6
V773	PA-B Cooling Water Outlet Valve	1/2	VO	BC6
VD774	Piping Drain	1/2	VO	BC6
V801	Break Line Stop Valve	8	VG	SCS13
V802	ST Outlet Valve	4	VG	SCS13
VC803	PY Check Valve	3	VC	SCS13
VC804	Air Blow-in Check Valve	1/2	VL	SUS304
V805	Break Line Drain Valve	1/2	VO	SUS304
V806	Piping Drain Valve	1/2	VO	SUS304
V807	PG8-1 Block Valve	1/2	VG	SUS304
VD808	Piping Drain Valve	1/2	VO	SUS316L
VV809	Piping Vent Valve	1/2	VO	SUS316L
VD810	Piping Drain Valve	1/2	VO	BC6
VD811	Piping Drain Valve	1	VO	SUS304
V812	Valve for JP-Flashing (Spare)	1	VO	SUS304

Table 5.7.3 (Cont'd) (9/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
V901	Bomb Curdle Block Valve			
V902	Bomb Curdle Block Valve			
V903	Bomb Curdle Block Valve			
V904	Bomb Curdle Block Valve			
V905	Reducing Stand Block Valve	1		
VR906	Reducing Valve for ACC Cold, Hot	1		
VC907	Gas Injection Check Valve for ACC-Hot	1	VL	SUS316L/STL
VC908	Gas Injection Check Valve for ACC-Cold	1	VL	SUS316L/STL
VR909	Reducing Valve for PV			
VC910	Gas Injection Check Valve at PV Lower Part	1/2	VL	SUS316L/STL
VC911	Gas Injection Check Valve at PV Upper Part	1/2	VL	SUS316L/STL
VV912	Injection Header Vent Valve	1/2	VO	SUS316L/STL
VV913	Injection Header Vent Valve	1/2	VO	SUS316L/STL
V914	Bomb Curdle Block Valve			
V915	Bomb Curdle Block Valve			
VV916	Vent Valve			
VV917	Vent Valve			
VV918	Vent Valve			
V919	PG9-4 Block Valve			
V920	PG9-5 Block Valve			
V921	Valve for Pressure Resisting (Spare)	1/2	VO	SUS316L/STL
V922	Valve for Pressure Resisting (Spare)	1/2	VO	SUS316L/STL

Table 5.7.3 (Cont'd) (10/10)

Valve Number	Valve Name	Nominal Bore(B)	Valve Type*	Body Material
V001	Baby-Compressor Block Valve	——		
V002	Baby-Compressor Block Valve	——		
VR003	Air Tank (No.1) Outlet Reducing Valve	1	RU	ZDC-2
V004	Block Valve for Control Valve	1	VO	BC6
V005	Block Valve for Remote Control Valve	1-1/2	VO	BC6
V006	Block Valve for Resin Mixing	3/4	VO	BC6
V007	Block Valve for Building Ventilation Damper	1/2	VO	BC6
V008	Block Valve for Gamma-Densitometer	1/2	VO	BC6
V009	Block Valve for Break Line Suction	1/2	VO	BC6
VR010	Reducing Valve for Break Line Suction	1/2	RU	ZDC-2
VN011	Regulating Valve for Break Line Suction	1/2	VN	BC6
VC012	Air Tank (No.2) Check Valve	1/2	VO	BC6
VR013	Air Tank (No.2) Outlet Reducing Valve	1/2	AR	ADC-2
V014	Spare Nozzle Block Valve	1/2	VO	BC6
VD015	Air Tank (No.1) Drain Valve	1/2	VO	BC6
VD016	Air Tank (No.2) Drain Valve	1/2	VO	BC6
V017	PG-03 Block Valve	1/2	VO	BC6
V018	PG-04 Block Valve	1/2	VO	BC6
VN019	Regulating Valve for Neutralization Tank Mixing	1	VO	BC6
VS020	Air Tank (No.1) Safety Valve	——		

* Valve Type

VG	Gate
VO	Globe Valve
VC	Check Valve (Swing Type)
VL	Check Valve (Lift Type)
VN	Needle Valve
RC	Safety Valve

Table 5.7.4 List of Contraction Ratios for Flow Meters (1/4)

Tag No.	Location	Type	Fluid	Contraction Ratio
FE-010A/010B-HLA	Intact Loop (PV Downcomer to Hot Leg; Leak Flow Rate)	Orifice (1B)	Hot Water	0.687
FE-020A/020B-LSA	Intact Loop Crossover Leg	Venturi (I.D.=168.2)	Hot Water	0.505
FE-150A/150B-HLB	Broken Loop (PV Downcomer to Hot Leg; Leak Flow Rate)	Orifice (1B)	Hot Water	0.687
FE-160A/160B-LSB	Broken Loop Crossover Leg	Venturi (I.D.=168.2)	Hot Water	0.505
FE-270-PR	PR Spray Line	Venturi	Hot Water	0.559
FE-290-PR	PR Relief Valve Line	Venturi	Steam	0.484
FE-300-PR	PR Safety Valve Line	Venturi	Steam	0.592
FE-310-PV	PV to PR Vent Line	Flow Nozzle (2B)	Steam	0.733
FE-320-PV	PV Auto Bleed Line	Orifice (1B)	Hot Water	0.6857
FE-430-SGA	Feedwater Line of Intact Loop SG	Orifice (2B)	Hot Water	0.589
FE-440/440B-SGA	Main Steam Line of Intact Loop SG	Flow Nozzle (3B)	Steam	0.732
FE-450/451-SGA	Relief Valve and Turbine Bypass Line of Intact Loop SG	Flow Nozzle (3B)	Steam	0.653

Table 5.7.4 (Cont'd) (2/4)

Tag No.	Location	Type	Fluid	Contraction Ratio
FE-460-SGA	Safety Valve Line of Intact Loop SG	Flow Nozzle (8B)	Steam	0.752
FE-470-SGB	Feedwater Line of Broken Loop SG	Orifice (2B)	Hot Water	0.589
FE-480/480B-SGB	Main Steam Line of Broken Loop SG	Flow Nozzle (3B)	Steam	0.732
FE-490/491-SGB	Relief Valve and Turbine Bypass Line of Broken Loop SG	Flow Nozzle (3B)	Steam	0.653
FE-500-SGB	Safety Valve Line of Intact Loop SG	Flow Nozzle (8B)	Steam	0.752
FE-510-SH	Outlet of Maim Steam Header	Flow Nozzle (4B)	Steam	0.761
FE-431～434-SGA	Outer Downcomer of Intact Loop SG	Orifice (4B)	Hot Water	0.422
FE-471～474-SGB	Outer Downcomer of Broken Loop SG	Orifice (4B)	Hot Water	0.422
FE-515-JC	JC Bleed Line	Orifice (2B)	Hot Water	0.3354
FE-520/520B-PAA	Auxiliary Feedwater Inlet of SGA	Orifice (2B)	Warm Water	0.3024
FE-530B-PAB	Auxiliary Feedwater Inlet of SGB	Orifice (2B)	Warm Water	0.3024
FE-560A/560B-BU	Break Flow Rate (I)	Venturi	Hot Water	0.739

Table 5.7.4 (Cont'd) (3/4)

Tag No.	Location	Type	Fluid	Contraction Ratio
FE-570A/570B-BU	Break Flow Rate (II)	Venturi	Hot Water	0.381
FE-580-ST	ST Vent Line	Vortex Flow Meter	Steam	—
FE-590-ST	ST Discharge Line	Vortex Flow Meter	Warm Water	—
FE-650-ACC	AIS → ACC	Orifice (4B)	Warm Water	0.4078
FE-660-ACC	AIS → ACC	Flow Nozzle (4B)	Warm Water	0.746
FE-670-ACH	AIS → ACC	Flow Nozzle (4B)	Warm Water	0.759
FE-680-ACH	AIS → ACC	Orifice (4B)	Warm Water	0.3348
FE-730/730B-PJ	PJ Line/HPIS	Orifice (2B)	Warm Water	0.2835
FE-740-PJ	HPIS	Orifice (1 1/2B)	Warm Water	0.354
FE-750/750B-PJ	HPIS	Orifice (1B)	Warm Water	0.2312
FE-760/760B-PH	HPIS	Orifice (2B)	Warm Water	0.2839
FE-770-PH	HPIS	Orifice (1 1/2B)	Warm Water	0.686
FE-780/780B-PH	HPIS	Orifice (1B)	Warm Water	0.3151

Table 5.7.4 (Cont'd) (4/4)

Tag No.	Location	Type	Fluid	Contraction Ratio
FE-790-PJ	HPIS	Orifice (1/2B)	Warm Water	0.756
FE-820/820B-PL	LPIS(Main)	Flow Nozzle (4B)	Warm Water	0.506
FE-830/830B-PL	LPIS(Intact Loop)	Flow Nozzle (4B)	Warm Water	0.506
FE-831-PL	LPIS(Intact Loop)	Orifice (4B)	Warm Water	0.568
FE-840/840B-PL	LPIS(Broken Loop)	Flow Nozzle (4B)	Warm Water	0.506
FE-841-PL	LPIS(Broken Loop)	Orifice (4B)	Warm Water	0.568
FE-900-NL	N2 Supply (to PV)	Orifice	N2	0.788

Table 5.7.5　List of Contraction Ratios for Orifices (1/2)

Section	Orifice No.	Location or Use	Tube Size (B)	Number	Contraction Ratio
Primary System	R01-1	PR Safety Valve Simulation	2	1 1	0.224 0.334
	R01-2	PR Escape Valve Simulation	1 1/2	1 1 1 1	0.199 0.281 0.305 0.344
	R01-4	Outlet of Primary Loop Auto Bleed	1/2	1	0.244
	R01-5	Outlet of Primary Loop Auto Bleed	1	1	0.142
Secondary System	R02-1A/B	SG Escape Valve Simulation	3	2 2	0.219 0.263
	R02-2A/B	SG Safety Valve Simulation	8	2 2	0.139 0.261
	R02-3A/B	SG Flow Restrictor Simulation	8	1	1.0
	R02-4	Outlet of Secondary Loop Auto Bleed	1	1	0.120
	R02-5	Outlet of Vent Condenser	1	1	0.240
	R02-6A/B	PA Bypass	1 1/2	2	0.115
	R02-7A～C	Silencer Drain	1/2	3	0.311
	R02-8	PF Minimum Flow	2	1	0.323
	R02-9A/B	SG Turbine Bypass	3	2	1.0

Table 5.7.5 (Cont'd) (2/2)

Section	Orifice No.	Location or Use	Tube Size (B)	Number	Contraction Ratio
ACC	R04-1	Outlet of ACC-Cold (for 4P01)	4	1	0.393
	R04-2	Outlet of ACC-Cold (for 4P02)	4	1	0.268
				1	0.379
				1	0.520
				1	0.535
	R04-3	Outlet of ACC-Hot (for 4P06)	4	1	0.380
				1	0.383
				1	0.471
				1	0.483
				1	0.549
	R04-4	Outlet of ACC-Hot (for 4P10)	4	1	0.267
				1	0.276
				1	0.360
				1	0.373
				1	0.536
Break Unit	R08-1A～I 8-2A～E	Break	Refer to Fig.5.4.4		
	R09A～I	Break	Refer to Fig.5.4.4		
	R08-2	Drain Line	3	1	0.562
HPIS	R03-0	PH FT Adaptor	1 1/2	5	1.0
	R03-1	PJ Bypass	1	1	0.226
	R03-2	PH Bypass	1	1	0.142
LPIS	R0831,841	LPIS	4	2	1.0

6. Instrumentation and Data Acquisition System

6.1 Introduction

This section describes the instrumentation and data acquisition systems. There are two types of data or measurements of interest in the LSTF, directly measured quantities and derived quantities. Direct measurements include pressure, differential pressure and temperature etc. Derived quantities result from the combination of two or more direct measurements and include fluid density, mass velocity and quality.

The measurement systems have been developed to measure the various thermal hydraulic phenomena associated with the experiment.

Many different methods are used to measure the parameters of interest. Examples of some of the measurement methods used are:

a. Pressure - pressure transducers
b. Differential pressure - differential pressure transducers
c. Temperature - thermocouples
d. Flow rate - orifice / venturi / flow nozzle flowmeters
e. Liquid level - differential pressure / conduction probes
f. Density (or void fraction) - gamma-ray densitometers / conduction probes
g. Velocity - turbines / drag disks / pitto tubes
h. Visual observation of flow - video proves

6.2 Instrument Systems

Measurement types and locations are summarized in Table 6.1 All signals except for video probe signal are sent to data acquisition systems and recorded on magnetic disks with a digital form. The video signals are recorded on video cassette tapes.

6.2.1 Thermocouples

The temperatures of the fluid, structural materials and fuel rod cladding are measured with ungrounded Type K, Chromel-Alumel thermocouples (CA T/C) of 1.6 mm , or 0.5 mm . Ungrounded sheathed thermocouples of 1.0 mm are used as one of the electrodes in the conductivity liquid level detector described in Section 6.2.2.

6.2.2 Conduction Probes

Mixture levels are measured by needle type electrical conduction probes. The conduction probe detects the existence of water or vapor.

Two basic configurations of conduction probes are used, a conduction probe without a thermocouple (CP) and a conduction probe with a thermocouple (CPT).

6.2.3 Flow Meters

Flow measurements are made with several different instrument systems. Single phase flows are measured using differential pressures across calibrated orifices, venturies or flow nozzles. Drag disk and turbine flow meters are also used to measure both single and two-phase flow.

6.2.4 Liquid Level (Differential Pressure) Sensors

Liquid level measurements are made with differential pressure transducers. The signal represents the fluid head or height (liquid level) between two locations. In a water/steam mixture the signal represents the collapsed liquid level when the frictional and acceleration losses are neglected.

6.2.5 Pressure and Differential Pressure Transducers

Pressure and differential pressure transducers are two-wire, direct-current type which convert diaphragm displacement to electric capacitance. The pressure lead pipes are single cylindrical pipes used in conjunction with condensate pots.

6.2.6 Power Meters

Electric power for the simulated fuel rods is measured by fast response electric power meters.

6.2.7 Densitometers

Densitometers are used to measure single and two-phase fluid density. All densitometers, both single and three beam types, are gamma densitometers, using ^{137}Cs sources and water cooled sodium iodide scintillation detectors. All measure the attenuation of gamma radiation through the pipe walls and the fluid within the pipe. The average density of the fluid within the gamma ray beam can be determined.

6.2.8 Drag Disk FLow Meters

Drag disk flow meters measure fluid momentum flux and direction. These devices have a target or disk located in the fluid stream where the fluid momentum flux is translated to a force on the target. The force is converted to an electrical signal proportional to momentum flux.

6.2.9 Core Differential Pressure Measurements

The core differential pressure is measured for nine vertical segments by using a special system developed for the second core. This system consists of 8 triple-coaxial pressure tubes and cooling oil loops as shown in Fig. 6.8(b)-(d). The pressure tubes were vertically inserted from the bottom of pressure vessel. The tube is cooled by oil to prevent boiling of water in the pressure sensing line. At the center of the triple-coaxial tube is the pressure sensing line, the inner annulus is for the inlet side of the cooling oil and the outer annulus is for the outlet side of the cooling oil. The fluid temperatures in the pressure sensing lines are kept subcooled (by approx. 5K) by controlling the flow rate of the cooling oil. The differential pressures are measured between two of these pressure tube and corrected by considering the fluid temperature distribution along pressure sensing lines.

6.2.10 Pitot Tubes

Bi-directional water-purged pitot tubes are used to measure liquid and vapor velocities. Each pitot tube is attached to a traversing mechanism which drive the tube along the vertical diameter of the pipe cross section. Purging with subcooled water is done to prevent boiling in the pressure sensing line. This device is especially useful to measure counter-current separated two-phase flow during quasi-steady state reflux condenser mode.

6.2.11 Video Probes

Eight video probes are used for visual observation of the flow. Each video probe consists of a periscope with a high-pressure and high-temperature resitstant window made of sapphire, a light source, a light guide and a high sensitive TV camera equipped with an electronic image intensifier device. The pictures from 5 out of 8 video probes are edited to a form quadruple picture by video mixer. Two mixed pictures and two original pictures selected from the 8 video probe images are recorded by 3/4 inch video cassette recorders.

6.3 Data Acquisition System

Data acquision (recording) of LSTF data is accomplished with a computer for all measurements except video probes. Video probe images are recorded by means of a video recorder. The computer Systems, YEWCOM 7000 and FACOM S-3300, stores digital information. The functions of YEWCOM and FACOM are explained in Fig. 7.3 of Chapter 7.

The YEWCOM has 2000 input channels. These are separated into 3 groups. Group 1, used for thermocouples, is sampled at a maximum rate of 2 Hz. Group 2, used for all measurements except thermocuples and conduction probes, is sampled at a maximum rate of 5 Hz. Group 3, used for conduction probes, is sampled at a maximum rate of 10 Hz. The FACOM has 400 input channels, which are used for supplemental measurements and sampled at a maximum rate of 10 Hz (Group 4). Because the data storage capacity of the magnetic disk will be exceeded if these sampling rates are used in long duration (30 hour) experiments, lower sample rates will be used some time after the start of an experiment.

DATA LOGGER SAMPLING RATES

System	Group	Fast	Middle	Slow	Channel
	1	2 Hz	0.4 Hz	0.1 Hz	
YEWCOM	2	5 Hz	1 Hz	0.25 Hz	2000
	3	10 Hz	2 Hz	0.5 Hz	
FACOM	4	10 Hz	2 Hz	0.5 Hz	400

6.4 Instrument Locations

6.4.1 Overview of Instrument Location

Figures 6.1 through 6.6 show the instrument locations at the primary coolant loops A and B, the pressurizer and the associated lines, the break units (type I and II) and the suppression tank, and the steam generator feedwater and steam lines. The specific locations of the instruments such as the elevation in the pressure vessel, the core, the primary coolant loops, the steam generators, and the pressurizer are presented in the following figures.

Two-phase flow measurements are done in the break unit by using a spool piece. The spool piece instruments consist of three-beam gamma-densitometers, the drag-disk flow meters, the pressure and differential pressure transducers, and the thermo-couples to measure the two-phase flow mass velocity, the void fraction, etc. Such spool-pieces for two-phase flow measurement have been also installed to the primary coolant loops, the pressure vessel-pressurizer vent line, the pressurizer safety valve line and the pressurizer relief valve line. The orientations of the gamma beam(s) of the single- and three-beam gamma densitometers are shown in Fig. 6.7.

6.4.2 Pressure Vessel Instrumentations

The vertical instrument locations in the pressure vessel are shown in Fig. 6.8(a) to (c). The horizontal locations in the pressure vessel cross-section are shown in Fig. 6.9(a) to (e).

Figure 6.10 shows the instrument location in the simulated core except the differential pressure measurement. The differential pressure measurements at the upper head and along the core were newly added for the second core. The locations of the temperature measurements around these pressure tubes are shown in Fig. 6.8(d).

The core cladding temperatures are measured at nine elevations of the heating and non-heating rods. The conductivity probes for measurement of the mixture level in the core are installed also at nine elevations of non-heated rods. In Fig. 6.10, method to build the tag number for the core instruments are indicated. Number in the core cross-section represents the bundle number. The LSTF core thus consists of 24 bundles in total.

6.4.3 Primary Loops Instruments

Figures 6.11(a) to (d) show the total locations in the primary coolant loops A and B. There are six spool-pieces in the hot, cold and cross-over legs in the loops A and B for the two-phase flow measurement. Pitot tubes to measure the mass velocity distribution in the pipe are installed in the hot, cold and cross-over legs of the loop A. Venturi flow meters are installed at each cross-over leg to measure the flow rate of the single-phase liquid. Conductivity probes are installed in the down-flow side of the cross-over legs to measure the mixture level.

6.4.4 Steam Generator Instruments

The instruments are installed to both the primary and secondary side of the steam generators (SGs). Six out of 141 U-tubes, which are 2 longest, 2 middle and 2 shortest tubes, have the instruments in the primary side. By employing the new structure of the steam generator (SG) outlet plenum, associated instruments were changed and/or added to the SG plena.

Figures 6.12(a) and (b) show the locations of the temperature and the differential temperature measurements in SG A and B. Tag-number specific to the SG U-tubes is described by the SG cross section in the upper left part in the figure.

Figures 6.13 and 6.14 show the locations of the pressure, the differential pressure, the collapsed liquid level and the flow rate measurements in SG A and B. Top elevation of the differential pressure measurements, which is higher than the top elevation of the SG, is the elevation of the horizontal-leg of the condense-pot to keep the water at the room temperature and the water level in the pressure tube constant.

Figure 6.15 shows the locations of the conductivity proves in SG A and B.

6.4.5 Pressurizer Instruments

Figures 6.16(a) and (b) show the total locations of the instruments on the pressurizer. Top elevation of the differential pressure measurements is the elevation of the condense-pot horizontal-leg.

6.5 Tag-number Information

In Table 6.2, tag-number, locations, measuring ranges, units and estimated accuracy of the all instruments are listed. Function I.D. for the data plot is also noted in the table.

6.6 Data Reduction Process

Outline of the data reduction process is shown in Fig. 6.17.

When the test is finished, data recorded on the data loggers, YEWCOM 7000 and FACOM S3300, are first backed up on magnetic tapes. Then, all the data are sent to the JAERI main frame computer, FACOM M780, where the remaining data processes, the engineering unit conversion and the secondary data preparation, are performed as follows.

6.6.1 Engineering Unit Conversion

Engineering unit conversion of the data is performed for each measurement. Table 6.3 shows the contents of these conversions.

The data after unit conversion process are called "primary data".

The data from two-phase flow instruments such as the water cooled and modular drag disk transducers, the turbine flow meter transducers and the gamma-ray densitometers are converted with the algorithms specific to the each instrument. Outline of these conversion algorithms are as follows.

(a) Water cooled drag disk transducers

Momentum flux is calculated from the difference between the output voltage data during experiment and those at zero flow.

Instrument sensitivity constants are derived from force calibration data obtained at the LSTF.

(b) Modular drag disk transducers

There is no calibration work required for these instruments.

The temperature sensitivity of each transducer is approximated to polynomial function. Each constant of this function is given different values for forward and reverse flow and it is defined for each instrument by EG&G.

Momentum flux is calculated forward and reverse flow with this equation and some constants (zero coefficient, slope coefficient and gain correction factor).

(c) Turbine flow meter transducers

There is no calibration work necessary on these instruments.

Momentum flux is calculated from the difference between the output voltage data during experiment and those at zero flow. However, to date, output voltage at zero flow has been assumed to be zero and this has given good results.

Zero intercept calibration constant and instrument sensitivity constant have different values for forward and reverse flow and they are defined for each transducer by EG&G.

(d) 3-beam gamma-ray densitometers

The data conversion is performed with the following equation.

$$pc = A - B \ln[(E-E0)(1 + TK(E-E0))]$$

where E and E0 are the instrument output voltage with and without the gamma-ray sources respectively. A and B are calibration constants.

K is ratemeter calibration constant. it is defined for each beam path length, i.e., K is 5000 cts/V for the A and C beams and 10000 cts/V for beam B. The beam orientation of the three-beam gamma-ray densitometers is shown in Fig. 6.7.

T is dead time constant.

Because the gamma-ray sources decay (become weaker), the calibration constants change for each experiment.

6.6.2 Secondary Data Calculation

Following "secondary data" are calculated from "primary data".

Secondary Data		Primary Data
Break flow rate	<--	Catch tank level
Accumulator injection rate	<--	Accumulator tank level
Average density	<--	Fluid density
Average momentum flux	<--	Momentum flux
Average velocity	<--	Velocity
Mass flow rate	<--	Density and momentum flux
Peak cladding temperature	<--	Rod temperature

"Secondary data" are joined to the LSTF primary data files.

Break flow rate and accumulator injection rate are calculated with differential of catch tank level and accumulator tank level respectively.

Maximum of all rods temperature is traced to give peak cladding temperature.

Average fluid density, average velocity, average momentum flux and mass flow rate are defined as follows.

(a) Average density

Four tentative models are considered to estimate density profile of the fluid in the pipe from densitometer data.

These models are as follows.

i) Homogeneous flow model

This model assumes a circular region of low density fluid near the middle of the pipe and this region does not touch the pipe wall at more than one point.

ii) Tilted continuous stratified model

This model assumes the complete phase separation model as in the stratified flow with a tilt parameter. The surface tilt angle is determined by trying each of several discrete values.

iii) Eccentric thin annulus model

This model assumes a circular region of low density fluid near the middle of the pipe and this region does not touch the pipe wall at more than one point.

iv) Concentric annular model

This model assumes a circular low density region concentric to the pipe axis.

Best model, which gives a good fit to the three measured fluid density data, is selected form these four models and is used as the estimated density profile.

If none of them give a good fit, the process checks to determine whether the best-fitting model gives an "acceptable fit". An acceptable fit means that the model is expected to be at least an approximately correct representation of the actual density profile.

If no model gives an acceptable fit to the densitometer data, the beam length weighted average procedure is used to calculate the average density.

(b) Velocity and momentum flux

Velocity profile is assumed to conform to the prandtl 1/7 power law, and the important feature of the Prandtl profile--the 1/7 power law behavior at the pipe wall--is expected to be retained in the final profile estimate even if the point measurements do not conform exactly to the Prandtl profile.

The expected profile is as follows.

$$v = C[1-r/R]^{1/7}$$

where, R is the pipe radius and r is the radial coordinate.

A single local velocity value v_1 measured at any radial position r_1 is sufficient to determine the value of the constant C, assumed that this 1/7 power low equation is valid for the measuring flow. In LSTF, three local velocity measurements are made at different locations in the same flow cross section. When each of 3 measurements yields different values of C, the prandtl profile is considered to be distorted to conform to the measured local velocity values.

Then the distorted Prandtl profile is described by

$$v(w,\ u) = c(w)\left[1 - \left(w^2 + u^2\right)^{1/2} / R\right]$$

where w and u are linear spatial coordinate. C(w) is a smooth function of w, which is defined as follows.

$$c(w) = c_i + 0.5\left(c_{i+1} - c_i\right)\left(1 - \cos\left(\pi \frac{w - w_i}{w_{i+1} - w_i}\right)\right)$$

where, w_i and w_{i+1} are two different measuring points.

The momentum flux profile is treated in exactly the same manner, except that the exponent is 2/7 for the momentum flux profile instead of 1/7 for the velocity profiles.

(c) Mass flow rate

The mass flow rate of a two-phase fluid flowing through a pipe can be expressed as follows.

$$m = \iint \rho(x, y)\ v(x, y)\ dxdy$$

From density and velocity profile, it is easily calculated if those profiles are defined in the same coordinate system.

For pipes with circular cross section, an obvious choice is a polar coordinate system. The only ambiguity in this coordinate system is the reference direction, the σ = 0 direction. It must be the same in describing the two profiles used to calculate the mass flow.

For LSTF data calculation, this reference direction is defined as the direction of gravity for the horizontal pipe and the same geometry is used for the vertical pipe.

Table 6.1 Summary of measurement Types and Locations

Instrument/Measurement	Symbol	Pressure Vessel	Primary System	Steam Generators	Pressurizer	Secondary System	Surpression Tank and Break Units	Other	Total
Fluid Temperature	TE	191	60	246	17	15	17	97	643
Wall Temperature	TW	485	50	92	16		4	9	656
Differential Temperature	DT	112	24	70	2				208
Conductance Probe	CP	143	20	20	4		1		188
Conductance Probe with TC	CPT		10	224					234
Flow Rate	F	2	4	12	3	8	4	25	58
Pitot-tube Velocimeter	PIT		3						3
Liquid Level	L	1		8	1	1	4	4	19
Pressure	P	3	10	2	8	5	10	4	42
Differential Pressure	DP	24	62	22	9		6	2	125
Gamma Densitometer(1 Beam)	GD_1		3	1	3				7
Gamma Densitometer(3 Beam)	GD_3		6	1			3		10
Drag Disk Flow Meter	DD		26		6		4		36
Video Probe	VP	2	6						8
Rotation Speed	RE		2						2
Pump oscillation	VE		2						2
Pump Torque	TQ		2						2
Power	WE	11	8	16	4			4	43
Total		974	298	714	73	29	53	145	2286

Table 6.2 Experimental Instrument Tag List (1/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1	TE	1	TE010A-HLA	HLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
2	TE	2	TE010B-HLA	HLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
3	TE	3	TE010C-HLA	HLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
4	TE	4	TE010D-HLA	HLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
5	TE	5	TE010E-HLA	HLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
6	TE	6	TE020C-HLA	HLA Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
7	TE	7	TE020D-HLA	HLA Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
8	TE	8	TE030C-HLA	HLA Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
9	TE	9	TE030D-HLA	HLA Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
14	TE	14	TE040E-HLA	HLA SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
15	TE	15	TE050C-LSA	LSA Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
16	TE	16	TE070C-CLA	CLA Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
17	TE	17	TE070D-CLA	CLA Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
18	TE	18	TE080C-CLA	CLA Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
19	TE	19	TE080D-CLA	CLA Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
20	TE	20	TE090A-CLA	CLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
21	TE	21	TE090B-CLA	CLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
22	TE	22	TE090C-CLA	CLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
23	TE	23	TE090D-CLA	CLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
24	TE	24	TE090E-CLA	CLA Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
25	TE	25	TE100-HLA	HLA-CLA Average	2.700+2	7.200+2	K	3.307+0	7.350-1
26	TE	26	TE150A-HLB	HLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
27	TE	27	TE150B-HLB	HLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
28	TE	28	TE150C-HLB	HLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
29	TE	29	TE150D-HLB	HLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
30	TE	30	TE150E-HLB	HLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
31	TE	31	TE160C-HLB	HLB Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
32	TE	32	TE160D-HLB	HLB Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
33	TE	33	TE170C-HLB	HLB Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
34	TE	34	TE170D-HLB	HLB Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
35	TE	35	TE180A-HLB	HLB SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
36	TE	36	TE180B-HLB	HLB SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
37	TE	37	TE180C-HLB	HLB SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
38	TE	38	TE180D-HLB	HLB SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
39	TE	39	TE180E-HLB	HLB SG Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
40	TE	40	TE190C-LSB	LSB Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
41	TE	41	TE210C-CLB	CLB Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
42	TE	42	TE210D-CLB	CLB Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
43	TE	43	TE220C-CLB	CLB Fluid at Pipe Top	2.700+2	7.200+2	K	3.307+0	7.350-1
44	TE	44	TE220D-CLB	CLB Fluid at Pipe Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
45	TE	45	TE230A-CLB	CLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
46	TE	46	TE230B-CLB	CLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
47	TE	47	TE230C-CLB	CLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
48	TE	48	TE230D-CLB	CLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
49	TE	49	TE230E-CLB	CLB Vessel Side CPT	2.700+2	7.200+2	K	3.307+0	7.350-1
50	TE	50	TE240-HLB	HLB-CLB Average	2.700+2	7.200+2	K	3.307+0	7.350-1
51	TE	51	TE270C-PR	PR Spray Line	2.700+2	7.200+2	K	3.307+0	7.350-1
52	TE	52	TE280C-PR	PR Surge Line	2.700+2	7.200+2	K	3.307+0	7.350-1
53	TE	53	TE290-PR	PR Relief Valve	2.700+2	7.200+2	K	3.307+0	7.350-1
54	TE	54	TE300-PR	PR Safety Valve	2.700+2	7.200+2	K	3.307+0	7.350-1
55	TE	55	TE430-SGA	SGA Feedwater Line	2.700+2	6.700+2	K	3.108+0	7.770-1
56	TE	56	TE440-SGA	SGA Main Steam Line	2.700+2	6.700+2	K	3.108+0	7.770-1
57	TE	57	TE450-SGA	SGA Relief Valve Line	2.700+2	6.700+2	K	3.108+0	7.770-1
58	TE	58	TE460-SGA	SGA Safety Valve Line	2.700+2	6.700+2	K	3.108+0	7.770-1
59	TE	59	TE470-SGB	SGB Feedwater Line	2.700+2	6.700+2	K	3.108+0	7.770-1
60	TE	60	TE480-SGB	SGB Main Steam Line	2.700+2	6.700+2	K	3.108+0	7.770-1
61	TE	61	TE490-SGB	SGB Relief Valve Line	2.700+2	6.700+2	K	3.108+0	7.770-1
62	TE	62	TE500-SGB	SGB Safety Valve Line	2.700+2	6.700+2	K	3.108+0	7.770-1
63	TE	63	TE510-SH	MSL Steam Header	2.700+2	6.700+2	K	3.108+0	7.770-1
64	TE	64	TE520-JC	JC Hot Water	2.700+2	6.700+2	K	3.108+0	7.770-1

Table 6.2 (Cont'd) (2/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
65	TE	65	TE530-JC	PF Suction Line	2.700+2	6.700+2	K	3.108+0	7.770-1
66	TE	66	TE540-JC	JC Spray Water	2.700+2	6.700+2	K	3.108+0	7.770-1
67	TE	67	TE550-JC	JC Steam Vent Line	2.700+2	6.700+2	K	3.108+0	7.770-1
68	TE	68	TE431-SGA	SGA Downcomer A	2.700+2	6.700+2	K	3.108+0	7.770-1
69	TE	69	TE432-SGA	SGA Downcomer B	2.700+2	6.700+2	K	3.108+0	7.770-1
70	TE	70	TE433-SGA	SGA Downcomer C	2.700+2	6.700+2	K	3.108+0	7.770-1
71	TE	71	TE434-SGA	SGA Downcomer D	2.700+2	6.700+2	K	3.108+0	7.770-1
72	TE	72	TE471-SGB	SGB Downcomer A	2.700+2	6.700+2	K	3.108+0	7.770-1
73	TE	73	TE472-SGB	SGB Downcomer B	2.700+2	6.700+2	K	3.108+0	7.770-1
74	TE	74	TE473-SGB	SGB Downcomer C	2.700+2	6.700+2	K	3.108+0	7.770-1
75	TE	75	TE474-SGB	SGB Downcomer D	2.700+2	6.700+2	K	3.108+0	7.770-1
76	TE	76	TE560C-BU	BU No.1 Upstream Top	2.700+2	7.200+2	K	3.307+0	7.350-1
77	TE	77	TE560D-BU	BU No.1 Upstream Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
78	TE	78	TE570C-BU	BU No.1 Downstream Top	2.700+2	7.200+2	K	3.307+0	7.350-1
79	TE	79	TE570D-BU	BU No.1 Downstream Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
80	TE	80	TE580C-BU	BU No.2 Upstream Top	2.700+2	7.200+2	K	3.307+0	7.350-1
81	TE	81	TE580D-BU	BU No.2 Upstream Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
82	TE	82	TE590C-BU	BU No.2 Downstream Top	2.700+2	7.200+2	K	3.307+0	7.350-1
83	TE	83	TE590D-BU	BU No.2 Downstream Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
84	TE	84	TE600-ST	ST Inlet Line	2.700+2	4.700+2	K	2.304+0	1.152+0
85	TE	85	TE610-ST	ST Bottom Region	2.700+2	4.700+2	K	2.304+0	1.152+0
86	TE	86	TE620-ST	ST Middle Region	2.700+2	4.700+2	K	2.304+0	1.152+0
87	TE	87	TE630-ST	ST Top Region	2.700+2	4.700+2	K	2.304+0	1.152+0
88	TE	88	TE640-ST	ST Spray Line	2.700+2	4.700+2	K	2.304+0	1.152+0
89	TE	89	TE650-ACC	Cold Acc Tank Bottom	2.700+2	4.700+2	K	2.304+0	1.152+0
90	TE	90	TE660-ACC	Cold Acc Tank Top	2.700+2	4.700+2	K	2.304+0	1.152+0
91	TE	91	TE670-ACC	Cold Acc Line to CLA	2.700+2	4.700+2	K	2.304+0	1.152+0
92	TE	92	TE680-ACC	Cold Acc Line to CLB	2.700+2	4.700+2	K	2.304+0	1.152+0
93	TE	93	TE690-ACH	Hot Acc Tank Bottom	2.700+2	5.700+2	K	2.706+0	9.020-1
94	TE	94	TE700-ACH	Hot Acc Tank Top	2.700+2	5.700+2	K	2.706+0	9.020-1
95	TE	95	TE710-ACH	Hot Acc Line to HLA	2.700+2	5.700+2	K	2.706+0	9.020-1
96	TE	96	TE720-ACH	Hot Acc Line to HLB	2.700+2	5.700+2	K	2.706+0	9.020-1
97	TE	97	TE730-HLA	HLA ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
98	TE	98	TE740-LSA	LSA ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
99	TE	99	TE750-CLA	CLA ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
100	TE	100	TE760-HLB	HLB ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
101	TE	101	TE770-LSB	LSB ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
102	TE	102	TE780-CLB	CLB ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
103	TE	103	TE790-PV	PV Bottom ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
104	TE	104	TE800-PV	PV Top ECCS Nozzle	2.700+2	6.700+2	K	3.108+0	7.770-1
106	TE	106	TE820-PL	RHR Inlet Region	2.700+2	6.700+2	K	3.108+0	7.770-1
107	TE	107	TE830-PL	RHR Outlet Region	2.700+2	6.700+2	K	3.108+0	7.770-1
108	TE	108	TE840-PL	RHR Injection Line	2.700+2	6.700+2	K	3.108+0	7.770-1
109	TE	109	TE850-PL	RHR Sec. Inlet Line	2.700+2	4.700+2	K	2.304+0	1.152+0
110	TE	110	TE860-PL	RHR Sec. Upper Region	2.700+2	4.700+2	K	2.304+0	1.152+0
111	TE	111	TE870-PL	RHR Sec. Steam Vent Line	2.700+2	4.700+2	K	2.304+0	1.152+0
112	TE	112	TE880-RWST	RWST Tank Lower Region	2.700+2	3.700+2	K	1.902+0	1.902+0
113	TE	113	TE890-RWST	RWST Tank Middle Region	2.700+2	3.700+2	K	1.902+0	1.902+0
114	TE	114	TE900-EX	N2 Gas Line	2.700+2	3.700+2	K	1.902+0	1.902+0
115	TE	115	TE-E066F-PV	Upper Head Bottom	2.700+2	9.700+2	K	4.312+0	6.160-1
116	TE	116	TE-W066F-PV	Upper Head Bottom	2.700+2	9.700+2	K	4.312+0	6.160-1
117	TE	117	TE-E075F-PV	Upper Head Middle	2.700+2	9.700+2	K	4.312+0	6.160-1
118	TE	118	TE-W075F-PV	Upper Head Middle	2.700+2	9.700+2	K	4.312+0	6.160-1
119	TE	119	TE-E081F-PV	Upper Head Top	2.700+2	9.700+2	K	4.312+0	6.160-1
120	TE	120	TE-W081F-PV	Upper Head Top	2.700+2	9.700+2	K	4.312+0	6.160-1
121	TE	121	TE-E080H-PV	CR Guide Tube Top	2.700+2	9.700+2	K	4.312+0	6.160-1
122	TE	122	TE-W080H-PV	CR Guide Tube Top	2.700+2	9.700+2	K	4.312+0	6.160-1
123	TE	123	TE-E049F-PV	Upper Plenum Bottom	2.700+2	9.700+2	K	4.312+0	6.160-1
124	TE	124	TE-W049F-PV	Upper Plenum Bottom	2.700+2	9.700+2	K	4.312+0	6.160-1
125	TE	125	TE-E055F-PV	Upper Plenum Middle	2.700+2	9.700+2	K	4.312+0	6.160-1

Table 6.2 (Cont'd) (3/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
126	TE 126	TE-W055F-PV	Upper Plenum Middle	2.700+2	9.700+2	K	4.312+0	6.160-1
127	TE 127	TE-E060F-PV	Upper Plenum Top	2.700+2	9.700+2	K	4.312+0	6.160-1
128	TE 128	TE-W060F-PV	Upper Plenum Top	2.700+2	9.700+2	K	4.312+0	6.160-1
129	TE 129	TE-IN038-B09-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
130	TE 130	TE-IN038-B11-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
131	TE 131	TE-IN038-B01-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
132	TE 132	TE-IN038-B03-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
133	TE 133	TE-IN038-B05-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
134	TE 134	TE-IN038-B07-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
135	TE 135	TE-IN038-B21-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
136	TE 136	TE-IN038-B23-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
137	TE 137	TE-IN038-B02-UCP	Below Upper core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
138	TE 138	TE-IN038-B06-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
139	TE 139	TE-IN038-B14-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
140	TE 140	TE-IN038-B15-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
141	TE 141	TE-IN038-B18-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
142	TE 142	TE-IN038-B19-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
143	TE 143	TE-IN038-B10-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
144	TE 144	TE-IN038-B12-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
145	TE 145	TE-IN038-B04-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
146	TE 146	TE-IN038-B08-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
147	TE 147	TE-IN038-B22-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
148	TE 148	TE-IN038-B24-UCP	Below Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
149	TE 149	TE-EX040-B09-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
150	TE 150	TE-EX040-B11-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
151	TE 151	TE-EX040-B01-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
152	TE 152	TE-EX040-B03-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
153	TE 153	TE-EX040-B05-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
154	TE 154	TE-EX040-B07-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
155	TE 155	TE-EX040-B21-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
156	TE 156	TE-EX040-B23-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
157	TE 157	TE-EX040-B02-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
158	TE 158	TE-EX040-B06-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
159	TE 159	TE-EX040-B14-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
160	TE 160	TE-EX040-B15-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
161	TE 161	TE-EX040-B18-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
162	TE 162	TE-EX040-B19-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
163	TE 163	TE-EX040-B10-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
164	TE 164	TE-EX040-B12-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
165	TE 165	TE-EX040-B04-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
166	TE 166	TE-EX040-B08-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
167	TE 167	TE-EX040-B22-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
168	TE 168	TE-EX040-B24-UCP	Above Upper Core Plate	2.700+2	9.700+2	K	4.312+0	6.160-1
169	TE 169	TE-IN-002B02-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
170	TE 170	TE-IN-002B03-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
171	TE 171	TE-IN-002B06-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
172	TE 172	TE-IN-002B07-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
173	TE 173	TE-IN-002B09-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
174	TE 174	TE-IN-002B11-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
175	TE 175	TE-IN-002B14-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
176	TE 176	TE-IN-002B16-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
177	TE 177	TE-IN-002B18-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
178	TE 178	TE-IN-002B20-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
179	TE 179	TE-IN-002B21-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
180	TE 180	TE-IN-002B23-LCPP	Below Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
181	TE 181	TE-EX-000B02-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
182	TE 182	TE-EX-000B03-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
183	TE 183	TE-EX-000B06-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
184	TE 184	TE-EX-000B07-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
185	TE 185	TE-EX-000B09-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (4/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
186	TE 186	TE-EX-000B11-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
187	TE 187	TE-EX-000B14-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
188	TE 188	TE-EX-000B16-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
189	TE 189	TE-EX-000B18-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
190	TE 190	TE-EX-000B20-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
191	TE 191	TE-EX-000B21-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
192	TE 192	TE-EX-000B23-LCPP	Above Lower Core Plate	2.700+2	7.200+2	K	3.307+0	7.350-1
193	TE 193	TE-N000C-DC	Downcomer EL.0.0m,North	2.700+2	7.200+2	K	3.307+0	7.350-1
194	TE 194	TE-S000C-DC	Downcomer EL.0.0m,South	2.700+2	7.200+2	K	3.307+0	7.350-1
195	TE 195	TE-E000C-DC	Downcomer EL.0.0m,East	2.700+2	7.200+2	K	3.307+0	7.350-1
196	TE 196	TE-W000C-DC	Downcomer EL.0.0m,West	2.700+2	7.200+2	K	3.307+0	7.350-1
197	TE 197	TE-N018C-DC	Downcomer EL.1.8m,North	2.700+2	7.200+2	K	3.307+0	7.350-1
198	TE 198	TE-S018C-DC	Downcomer EL.1.8m,South	2.700+2	7.200+2	K	3.307+0	7.350-1
199	TE 199	TE-E018C-DC	Downcomer EL.1.8m,East	2.700+2	7.200+2	K	3.307+0	7.350-1
200	TE 200	TE-W018C-DC	Downcomer EL.1.8m,West	2.700+2	7.200+2	K	3.307+0	7.350-1
201	TE 201	TE-N036C-DC	Downcomer EL.3.6m,North	2.700+2	7.200+2	K	3.307+0	7.350-1
202	TE 202	TE-S036C-DC	Downcomer EL.3.6m,South	2.700+2	7.200+2	K	3.307+0	7.350-1
203	TE 203	TE-E036C-DC	Downcomer EL.3.6m,East	2.700+2	7.200+2	K	3.307+0	7.350-1
204	TE 204	TE-W036C-DC	Downcomer EL.3.6m,West	2.700+2	7.200+2	K	3.307+0	7.350-1
205	TE 205	TE-N060C-DC	Downcomer EL.6.0m,North	2.700+2	7.200+2	K	3.307+0	7.350-1
206	TE 206	TE-S060C-DC	Downcomer EL.6.0m,South	2.700+2	7.200+2	K	3.307+0	7.350-1
207	TE 207	TE-E060C-DC	Downcomer EL.6.0m,East	2.700+2	7.200+2	K	3.307+0	7.350-1
208	TE 208	TE-W060C-DC	Downcomer EL.6.0m,West	2.700+2	7.200+2	K	3.307+0	7.350-1
209	TE 209	TE-N055C-DC	Downcomer EL.5.5m,North	2.700+2	7.200+2	K	3.307+0	7.350-1
210	TE 210	TE-S055C-DC	Downcomer EL.5.5m,South	2.700+2	7.200+2	K	3.307+0	7.350-1
211	TE 211	TE-C-021-LP	Lower Plenum EL.-2.1m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
212	TE 212	TE-C-018-LP	Lower Plenum EL.-1.8m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
213	TE 213	TE-C-015-LP	Lower Plenum EL.-1.5m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
214	TE 214	TE-C-012-LP	Lower Plenum EL.-1.2m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
215	TE 215	TE-C-009-LP	Lower Plenum EL.-0.9m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
216	TE 216	TE-C-006-LP	Lower Plenum EL.-0.6m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
217	TE 217	TE-C-005-LP	Lower Plenum EL.-0.5m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
218	TE 218	TE-C-003-LP	Lower Plenum EL.-0.3m,C	2.700+2	7.200+2	K	3.307+0	7.350-1
219	TE 219	TE-B18621	B18 Rod(6.2) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
220	TE 220	TE-B18622	B18 Rod(6,2) Pos.2,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
221	TE 221	TE-B18623	B18 Rod(6,2) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
222	TE 222	TE-B18624	B18 Rod(6,2) Pos.4,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
223	TE 223	TE-B18625	B18 Rod(6,2) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
224	TE 224	TE-B18626	B18 Rod(6,2) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
225	TE 225	TE-B18627	B18 Rod(6,2) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
226	TE 226	TE-B18628	B18 Rod(6,2) Pos.8,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
227	TE 227	TE-B18629	B18 Rod(6,2) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
234	TE 234	TE-B14262	B14 Rod(2,6) Pos.2,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
235	TE 235	TE-B14264	B14 Rod(2,6) Pos.4,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
236	TE 236	TE-B14268	B14 Rod(2,6) Pos.8,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
255	TE 255	TE-B09661	B09 Rod(6,6) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
256	TE 256	TE-B09663	B09 Rod(6,6) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
257	TE 257	TE-B09665	B09 Rod(6,6) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
258	TE 258	TE-B09666	B09 Rod(6,6) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
259	TE 259	TE-B09667	B09 Rod(6,6) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
260	TE 260	TE-B09669	B09 Rod(6,6) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
273	TE 273	TE-B14261	B14 Rod(2,6) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
274	TE 274	TE-B14263	B14 Rod(2,6) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
275	TE 275	TE-B14265	B14 Rod(2,6) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
276	TE 276	TE-B14266	B14 Rod(2,6) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
277	TE 277	TE-B14267	B14 Rod(2,6) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
278	TE 278	TE-B14269	B14 Rod(2,6) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
279	TE 279	TE-B15261	B15 Rod(2,6) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
280	TE 280	TE-B15263	B15 Rod(2,6) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
281	TE 281	TE-B15265	B15 Rod(2,6) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1

Table 6.2 (Cont'd) (5/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
282	TE 282	TE-B15266	B15 Rod(2,6) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
283	TE 283	TE-B15267	B15 Rod(2,6) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
284	TE 284	TE-B15269	B15 Rod(2,6) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
291	TE 291	TE-B15262	B15 Rod(2,6) Pos.2,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
292	TE 292	TE-B15264	B15 Rod(2,6) Pos.4,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
293	TE 293	TE-B15268	B15 Rod(2,6) Pos.8,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
294	TE 294	TE-B23221	B23 Rod(2,2) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
295	TE 295	TE-B23223	B23 Rod(2,2) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
296	TE 296	TE-B23225	B23 Rod(2,2) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
297	TE 297	TE-B23226	B23 Rod(2,2) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
298	TE 298	TE-B23227	B23 Rod(2,2) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
299	TE 299	TE-B23229	B23 Rod(2,2) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
300	TE 300	TE-B20661	B20 Rod(6,6) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
301	TE 301	TE-B20662	B20 Rod(6,6) Pos.2,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
302	TE 302	TE-B20663	B20 Rod(6,6) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
303	TE 303	TE-B20664	B20 Rod(6,6) Pos.4,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
304	TE 304	TE-B20665	B20 Rod(6,6) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
305	TE 305	TE-B20666	B20 Rod(6,6) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
306	TE 306	TE-B20667	B20 Rod(6,6) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
307	TE 307	TE-B20668	B20 Rod(6,6) Pos.8,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
308	TE 308	TE-B20669	B20 Rod(6,6) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
309	TE 309	TE-B22661	B22 Rod(6,6) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
310	TE 310	TE-B22662	B22 Rod(6,6) Pos.2,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
311	TE 311	TE-B22663	B22 Rod(6,6) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
312	TE 312	TE-B22664	B22 Rod(6,6) Pos.4,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
313	TE 313	TE-B22665	B22 Rod(6,6) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
314	TE 314	TE-B22666	B22 Rod(6,6) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
315	TE 315	TE-B22667	B22 Rod(6,6) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
316	TE 316	TE-B22668	B22 Rod(6,6) Pos.8,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
317	TE 317	TE-B22669	B22 Rod(6,6) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
318	TE 318	TE-B24621	B24 Rod(6,2) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
319	TE 319	TE-B24623	B24 Rod(6,2) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
320	TE 320	TE-B24625	B24 Rod(6,2) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
321	TE 321	TE-B24626	B24 Rod(6,2) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
322	TE 322	TE-B24627	B24 Rod(6,2) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
323	TE 323	TE-B24629	B24 Rod(6,2) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
324	TE 324	TE-IN0641-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
325	TE 325	TE-IN0642-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
326	TE 326	TE-IN0643-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
330	TE 330	TE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
331	TE 331	TE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
332	TE 332	TE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
333	TE 333	TE-IN0864-SGA	SGA U-Tube(4,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
334	TE 334	TE-IN0865-SGA	SGA U-Tube(5,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
335	TE 335	TE-IN0866-SGA	SGA U-Tube(6,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
336	TE 336	TE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
337	TE 337	TE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
338	TE 338	TE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
339	TE 339	TE-EX0864-SGA	SGA U-Tube(4,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
340	TE 340	TE-EX0865-SGA	SGA U-Tube(5,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
341	TE 341	TE-EX0866-SGA	SGA U-Tube(6,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
342	TE 342	TE-IN0931-SGA	SGA U-Tube(1,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
343	TE 343	TE-IN0932-SGA	SGA U-Tube(2,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
344	TE 344	TE-IN0933-SGA	SGA U-Tube(3,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
345	TE 345	TE-IN0934-SGA	SGA U-Tube(4,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
346	TE 346	TE-IN0935-SGA	SGA U-Tube(5,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
347	TE 347	TE-IN0936-SGA	SGA U-Tube(6,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
348	TE 348	TE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
349	TE 349	TE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
350	TE 350	TE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (6/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
351	TE 351	TE-EX0992-SGA	SGA U-Tube(2,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
352	TE 352	TE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
353	TE 353	TE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
354	TE 354	TE-IN0994-SGA	SGA U-Tube(4,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
355	TE 355	TE-EX0994-SGA	SGA U-Tube(4,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
356	TE 356	TE-IN0995-SGA	SGA U-Tube(5,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
357	TE 357	TE-EX0995-SGA	SGA U-Tube(5,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
358	TE 358	TE-IN0996-SGA	SGA U-Tube(6,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
359	TE 359	TE-EX0996-SGA	SGA U-Tube(6,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
360	TE 360	TE-IN1051-SGA	SGA U-Tube(1,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
361	TE 361	TE-IN1052-SGA	SGA U-Tube(2,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
362	TE 362	TE-IN1053-SGA	SGA U-Tube(3,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
363	TE 363	TE-IN1054-SGA	SGA U-Tube(4,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
364	TE 364	TE-IN1055-SGA	SGA U-Tube(5,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
365	TE 365	TE-IN1056-SGA	SGA U-Tube(6,IN) Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
366	TE 366	TE-IN1121-SGA	SGA U-Tube(1,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
367	TE 367	TE-EX1121-SGA	SGA U-Tube(1,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
368	TE 368	TE-IN1122-SGA	SGA U-Tube(2,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
369	TE 369	TE-EX1122-SGA	SGA U-Tube(2,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
370	TE 370	TE-IN1123-SGA	SGA U-Tube(3,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
371	TE 371	TE-EX1123-SGA	SGA U-Tube(3,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
372	TE 372	TE-IN1124-SGA	SGA U-Tube(4,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
373	TE 373	TE-EX1124-SGA	SGA U-Tbue(4,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
374	TE 374	TE-IN1125-SGA	SGA U-Tube(5,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
375	TE 375	TE-EX1125-SGA	SGA U-Tube(5,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
376	TE 376	TE-IN1126-SGA	SGA U-Tube(6,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
377	TE 377	TE-EX1126-SGA	SGA U-Tube(6,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
378	TE 378	TE-IN1251-SGA	SGA U-Tube(1,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
379	TE 379	TE-EX1251-SGA	SGA U-Tube(1,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
380	TE 380	TE-IN1252-SGA	SGA U-Tube(2,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
381	TE 381	TE-EX1252-SGA	SGA U-Tube(2,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
382	TE 382	TE-IN1253-SGA	SGA U-Tube(3,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
383	TE 383	TE-EX1253-SGA	SGA U-Tube(3,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
384	TE 384	TE-IN1254-SGA	SGA U-Tube(4,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
385	TE 385	TE-EX1254-SGA	SGA U-Tube(4,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
386	TE 386	TE-IN1255-SGA	SGA U-Tube(5,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
387	TE 387	TE-EX1255-SGA	SGA U-Tube(5,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
388	TE 388	TE-IN1256-SGA	SGA U-Tube(6,IN) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
389	TE 389	TE-EX1256-SGA	SGA U-Tube(6,EX) Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
390	TE 390	TE-IN1371-SGA	SGA U-Tube(1,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
391	TE 391	TE-EX1371-SGA	SGA U-Tube(1,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
392	TE 392	TE-IN1372-SGA	SGA U-Tube(2,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
393	TE 393	TE-EX1372-SGA	SGA U-Tube(2,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
394	TE 394	TE-IN1373-SGA	SGA U-Tube(3,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
395	TE 395	TE-EX1373-SGA	SGA U-Tube(3,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
396	TE 396	TE-IN1374-SGA	SGA U-Tube(4,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
397	TE 397	TE-EX1374-SGA	SGA U-Tube(4,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
398	TE 398	TE-IN1375-SGA	SGA U-Tube(5,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
399	TE 399	TE-EX1375-SGA	SGA U-Tube(5,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
400	TE 400	TE-IN1376-SGA	SGA U-Tube(6,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
401	TE 401	TE-EX1376-SGA	SGA U-Tube(6,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
402	TE 402	TE-IN1501-SGA	SGA U-Tube(1,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
403	TE 403	TE-EX1501-SGA	SGA U-Tube(1,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
404	TE 404	TE-IN1502-SGA	SGA U-Tube(2,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
405	TE 405	TE-EX1502-SGA	SGA U-Tube(2,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
406	TE 406	TE-IN1503-SGA	SGA U-Tube(3,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
407	TE 407	TE-EX1503-SGA	SGA U-Tube(3,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
408	TE 408	TE-IN1504-SGA	SGA U-Tube(4,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
409	TE 409	TE-EX1504-SGA	SGA U-Tube(4,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
410	TE 410	TE-IN1505-SGA	SGA U-Tube(5,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (7/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
411	TE 411	TE-EX1505-SGA	SGA U-Tube(5,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
412	TE 412	TE-IN1506-SGA	SGA U-Tube(6,IN) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
413	TE 413	TE-EX1506-SGA	SGA U-Tube(6,EX) Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
414	TE 414	TE-IN1632-SGA	SGA U-Tube(2,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
415	TE 415	TE-EX1632-SGA	SGA U-Tube(2,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
416	TE 416	TE-IN1633-SGA	SGA U-Tube(3,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
417	TE 417	TE-EX1633-SGA	SGA U-Tube(3,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
418	TE 418	TE-IN1634-SGA	SGA U-Tube(4,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
419	TE 419	TE-EX1634-SGA	SGA U-Tube(4,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
420	TE 420	TE-IN1635-SGA	SGA U-Tube(5,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
421	TE 421	TE-EX1635-SGA	SGA U-Tube(5,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
422	TE 422	TE-IN1701-SGA	SGA U-Tube(1,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
423	TE 423	TE-IN1706-SGA	SGA U-Tube(6,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
424	TE 424	TE-IN1782-SGA	SGA U-Tube(2,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
425	TE 425	TE-IN1785-SGA	SGA U-Tube(5,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
426	TE 426	TE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
427	TE 427	TE-IN1864-SGA	SGA U-Tube(4,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
428	TE 428	TE-223D-SGA	SGA Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
429	TE 429	TE-086C-SGA	SGA Boiling Section Pos.1	2.700+2	6.700+2	K	3.108+0	7.770-1
430	TE 430	TE-099C-SGA	SGA Boiling Section Pos.3	2.700+2	6.700+2	K	3.108+0	7.770-1
431	TE 431	TE-112C-SGA	SGA Boiling Section Pos.5	2.700+2	6.700+2	K	3.108+0	7.770-1
432	TE 432	TE-125C-SGA	SGA Boiling Section Pos.6	2.700+2	6.700+2	K	3.108+0	7.770-1
433	TE 433	TE-137C-SGA	SGA Boiling Section Pos.7	2.700+2	6.700+2	K	3.108+0	7.770-1
434	TE 434	TE-150C-SGA	SGA Boiling Section Pos.8	2.700+2	6.700+2	K	3.108+0	7.770-1
435	TE 435	TE-163C-SGA	SGA Boiling Section Pos.9	2.700+2	6.700+2	K	3.108+0	7.770-1
436	TE 436	TE-178C-SGA	SGA Boiling Section Pos.10	2.700+2	6.700+2	K	3.108+0	7.770-1
437	TE 437	TE-192F-SGA	SGA Boiling Section	2.700+2	6.700+2	K	3.108+0	7.770-1
438	TE 438	TE-208F-SGA	SGA Separator	2.700+2	6.700+2	K	3.108+0	7.770-1
439	TE 439	TE-192C-SGA	SGA Downcomer	2.700+2	6.700+2	K	3.108+0	7.770-1
440	TE 440	TE-208C-SGA	SGA Downcomer	2.700+2	6.700+2	K	3.108+0	7.770-1
441	TE 441	TE-223C-SGA	SGA Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
442	TE 442	TE-245C-SGA	SGA Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
443	TE 443	TE-IN0641-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
444	TE 444	TE-IN0642-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
445	TE 445	TE-IN0643-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
449	TE 449	TE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
450	TE 450	TE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
451	TE 451	TE-IN0863-SGB	SGB U-Tube(3,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
452	TE 452	TE-IN0864-SGB	SGB U-Tube(4,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
453	TE 453	TE-IN0865-SGB	SGB U-Tube(5,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
454	TE 454	TE-IN0866-SGB	SGB U-Tube(6,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
455	TE 455	TE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
456	TE 456	TE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
457	TE 457	TE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
458	TE 458	TE-EX0864-SGB	SGB U-Tube(4,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
459	TE 459	TE-EX0865-SGB	SGB U-Tube(5,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
460	TE 460	TE-EX0866-SGB	SGB U-Tube(6,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
461	TE 461	TE-IN0931-SGB	SGB U-Tube(1,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
462	TE 462	TE-IN0932-SGB	SGB U-Tube(2,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
463	TE 463	TE-IN0933-SGB	SGB U-Tube(3,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
464	TE 464	TE-IN0934-SGB	SGB U-Tube(4,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
465	TE 465	TE-IN0935-SGB	SGB U-Tube(5,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
466	TE 466	TE-IN0936-SGB	SGB U-Tube(6,IN) Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
467	TE 467	TE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
468	TE 468	TE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
469	TE 469	TE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
470	TE 470	TE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
471	TE 471	TE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
472	TE 472	TE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
473	TE 473	TE-IN0994-SGB	SGB U-Tube(4,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (8/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION		SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
474	TE 474	TE-EX0994-SGB	SGB U-Tube(4,EX)	Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
475	TE 475	TE-IN0995-SGB	SGB U-Tube(5,IN)	Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
476	TE 476	TE-EX0995-SGB	SGB U-Tube(5,EX)	Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
477	TE 477	TE-IN0996-SGB	SGB U-Tube(6,IN)	Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
478	TE 478	TE-EX0996-SGB	SGB U-Tube(6,EX)	Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
479	TE 479	TE-IN1051-SGB	SGB U-Tube(1,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
480	TE 480	TE-IN1052-SGB	SGB U-Tube(2,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
481	TE 481	TE-IN1053-SGB	SGB U-Tube(3,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
482	TE 482	TE-IN1054-SGB	SGB U-Tube(4,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
483	TE 483	TE-IN1055-SGB	SGB U-Tube(5,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
484	TE 484	TE-IN1056-SGB	SGB U-Tube(6,IN)	Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
485	TE 485	TE-IN1121-SGB	SGB U-Tube(1,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
486	TE 486	TE-EX1121-SGB	SGB U-Tube(1,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
487	TE 487	TE-IN1122-SGB	SGB U-Tube(2,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
488	TE 488	TE-EX1122-SGB	SGB U-Tube(2,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
489	TE 489	TE-IN1123-SGB	SGB U-Tube(3,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
490	TE 490	TE-EX1123-SGB	SGB U-Tube(3,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
491	TE 491	TE-IN1124-SGB	SGB U-Tube(4,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
492	TE 492	TE-EX1124-SGB	SGB U-Tube(4,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
493	TE 493	TE-IN1125-SGB	SGB U-Tube(5,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
494	TE 494	TE-EX1125-SGB	SGB U-Tube(5,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
495	TE 495	TE-IN1126-SGB	SGB U-Tube(6,IN)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
496	TE 496	TE-EX1126-SGB	SGB U-Tube(6,EX)	Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
497	TE 497	TE-IN1251-SGB	SGB U-Tube(1,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
498	TE 498	TE-EX1251-SGB	SGB U-Tube(1,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
499	TE 499	TE-IN1252-SGB	SGB U-Tube(2,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
500	TE 500	TE-EX1252-SGB	SGB U-Tube(2,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
501	TE 501	TE-IN1253-SGB	SGB U-Tube(3,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
502	TE 502	TE-EX1253-SGB	SGB U-Tube(3,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
503	TE 503	TE-IN1254-SGB	SGB U-Tube(4,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
504	TE 504	TE-EX1254-SGB	SGB U-Tube(4,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
505	TE 505	TE-IN1255-SGB	SGB U-Tube(5,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
506	TE 506	TE-EX1255-SGB	SGB U-Tube(5,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
507	TE 507	TE-IN1256-SGB	SGB U-Tube(6,IN)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
508	TE 508	TE-EX1256-SGB	SGB U-Tube(6,EX)	Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
509	TE 509	TE-IN1371-SGB	SGB U-Tube(1,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
510	TE 510	TE-EX1371-SGB	SGB U-Tube(1,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
511	TE 511	TE-IN1372-SGB	SGB U-Tube(2,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
512	TE 512	TE-EX1372-SGB	SGB U-Tube(2,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
513	TE 513	TE-IN1373-SGB	SGB U-Tube(3,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
514	TE 514	TE-EX1373-SGB	SGB U-Tube(3,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
515	TE 515	TE-IN1374-SGB	SGB U-Tube(4,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
516	TE 516	TE-EX1374-SGB	SGB U-Tube(4,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
517	TE 517	TE-IN1375-SGB	SGB U-Tube(5,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
518	TE 518	TE-EX1375-SGB	SGB U-Tube(5,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
519	TE 519	TE-IN1376-SGB	SGB U-Tube(6,IN)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
520	TE 520	TE-EX1376-SGB	SGB U-Tube(6,EX)	Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
521	TE 521	TE-IN1501-SGB	SGB U-Tube(1,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
522	TE 522	TE-EX1501-SGB	SGB U-Tube(1,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
523	TE 523	TE-IN1502-SGB	SGB U-Tube(2,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
524	TE 524	TE-EX1502-SGB	SGB U-Tube(2,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
525	TE 525	TE-IN1503-SGB	SGB U-Tube(3,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
526	TE 526	TE-EX1503-SGB	SGB U-Tube(3,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
527	TE 527	TE-IN1504-SGB	SGB U-Tube(4,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
528	TE 528	TE-EX1504-SGB	SGB U-Tube(4,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
529	TE 529	TE-IN1505-SGB	SGB U-Tube(5,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
530	TE 530	TE-EX1505-SGB	SGB U-Tube(5,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
531	TE 531	TE-IN1506-SGB	SGB U-Tube(6,IN)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
532	TE 532	TE-EX1506-SGB	SGB U-Tube(6,EX)	Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
533	TE 533	TE-IN1632-SGB	SGB U-Tube(2,IN)	Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (9/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
534	TE 534	TE-EX1632-SGB	SGB U-Tube(2,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
535	TE 535	TE-IN1633-SGB	SGB U-Tube(3,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
536	TE 536	TE-EX1633-SGB	SGB U-Tube(3,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
537	TE 537	TE-IN1634-SGB	SGB U-Tube(4,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
538	TE 538	TE-EX1634-SGB	SGB U-Tube(4,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
539	TE 539	TE-IN1635-SGB	SGB U-Tube(5,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
540	TE 540	TE-EX1635-SGB	SGB U-Tube(5,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
541	TE 541	TE-IN1701-SGB	SGB U-Tube(1,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
542	TE 542	TE-IN1706-SGB	SGB U-Tube(6,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
543	TE 543	TE-IN1782-SGB	SGB U-Tube(2,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
544	TE 544	TE-IN1785-SGB	SGB U-Tube(5,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
545	TE 545	TE-IN1863-SGB	SGB U-Tube(3,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
546	TE 546	TE-IN1864-SGB	SGB U-Tube(4,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
547	TE 547	TE-223D-SGB	SGB Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
548	TE 548	TE-086C-SGB	SGB Boiling Section Pos.1	2.700+2	6.700+2	K	3.108+0	7.770-1
549	TE 549	TE-099C-SGB	SGB Boiling Section Pos.3	2.700+2	6.700+2	K	3.108+0	7.770-1
550	TE 550	TE-112C-SGB	SGB Boiling Section Pos.5	2.700+2	6.700+2	K	3.108+0	7.770-1
551	TE 551	TE-125C-SGB	SGB Boiling Section Pos.6	2.700+2	6.700+2	K	3.108+0	7.770-1
552	TE 552	TE-137C-SGB	SGB Boiling Section Pos.7	2.700+2	6.700+2	K	3.108+0	7.770-1
553	TE 553	TE-150C-SGB	SGB Boiling Section Pos.8	2.700+2	6.700+2	K	3.108+0	7.770-1
554	TE 554	TE-163C-SGB	SGB Boiling Section Pos.9	2.700+2	6.700+2	K	3.108+0	7.770-1
555	TE 555	TE-178C-SGB	SGB Boiling Section Pos.10	2.700+2	6.700+2	K	3.108+0	7.770-1
556	TE 556	TE-192F-SGB	SGB Boiling Section	2.700+2	6.700+2	K	3.108+0	7.770-1
557	TE 557	TE-208F-SGB	SGB Separator	2.700+2	6.700+2	K	3.108+0	7.770-1
558	TE 558	TE-192C-SGB	SGB Downcomer	2.700+2	6.700+2	K	3.108+0	7.770-1
559	TE 559	TE-208C-SGB	SGB Downcomer	2.700+2	6.700+2	K	3.108+0	7.770-1
560	TE 560	TE-223C-SGB	SGB Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
561	TE 561	TE-245C-SGB	SGB Steam Dome	2.700+2	6.700+2	K	3.108+0	7.770-1
562	TE 562	TE-211C-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
563	TE 563	TE-194C-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
564	TE 564	TE-177C-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
565	TE 565	TE-980		0.0	5.000+1	K	5.100-1	1.020+0
566	TE 566	TE-981		0.0	5.000+1	K	5.100-1	1.020+0
567	TE 567	TE-982		0.0	5.000+1	K	5.100-1	1.020+0
568	TE 568	TE-983		0.0	5.000+1	K	5.100-1	1.020+0
569	TE 569	TE-984		0.0	5.000+1	K	5.100-1	1.020+0
570	TE 570	TE-985		0.0	5.000+1	K	5.100-1	1.020+0
571	TE 571	TE986		0.0	5.000+1	K	5.100-1	1.020+0
572	TE 572	TE-990		0.0	5.000+1	K	5.100-1	1.020+0
573	TE 573	TE-991		0.0	5.000+1	K	5.100-1	1.020+0
574	TE 574	TE-992		0.0	5.000+1	K	5.100-1	1.020+0
575	TE 575	TE-993		0.0	5.000+1	K	5.100-1	1.020+0
576	TE 576	TE-994		0.0	5.000+1	K	5.100-1	1.020+0
577	TE 577	TE-995		0.0	5.000+1	K	5.100-1	1.020+0
578	TE 578	TE-996		0.0	5.000+1	K	5.100-1	1.020+0
579	TE 579	TE-997		0.0	5.000+1	K	5.100-1	1.020+0
596	TE 596	TE-177D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
597	TE 597	TE-181D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
598	TE 598	TE-185D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
599	TE 599	TE-189D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
600	TE 600	TE-192D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
601	TE 601	TE-196D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
602	TE 602	TE-200D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
603	TE 603	TE-204D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
604	TE 604	TE-207D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
605	TE 605	TE-211D-PR	PR Fluid	2.700+2	7.200+2	K	3.307+0	7.350-1
606	TE 606	TE011A-HLA	HLA Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
607	TE 607	TE011B-HLA	HLA Spool Piece Side	2.700+2	7.200+2	K	3.307+0	7.350-1
608	TE 608	TE011C-HLA	HLA Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
609	TE 609	TE012C-HLA	HLA Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (10/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
610	TE 610	TE012D-HLA	HLA Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
611	TE 611	TE051A-LSA	LSA Spool Piece East	2.700+2	7.200+2	K	3.307+0	7.350-1
612	TE 612	TE051B-LSA	LSA Spool Piece South	2.700+2	7.200+2	K	3.307+0	7.350-1
613	TE 613	TE051C-LSA	LSA Spool Piece West	2.700+2	7.200+2	K	3.307+0	7.350-1
614	TE 614	TE051D-LSA	LSA Spool Piece North	2.700+2	7.200+2	K	3.307+0	7.350-1
615	TE 615	TE052-LSA	LSA Spool Piece	2.700+2	7.200+2	K	3.307+0	7.350-1
616	TE 616	TE071A-CLA	CLA Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
617	TE 617	TE071B-CLA	CLA Spool Piece Side	2.700+2	7.200+2	K	3.307+0	7.350-1
618	TE 618	TE071C-CLA	CLA Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
619	TE 619	TE072C-CLA	CLA Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
620	TE 620	TE072D-CLA	CLA Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
621	TE 621	TE151A-HLB	HLB Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
622	TE 622	TE151B-HLB	HLB Spool Piece Side	2.700+2	7.200+2	K	3.307+0	7.350-1
623	TE 623	TE151C-HLB	HLB Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
624	TE 624	TE152C-HLB	HLB Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
625	TE 625	TE152D-HLB	HLB Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
626	TE 626	TE191A-LSB	LSB Spool Piece West	2.700+2	7.200+2	K	3.307+0	7.350-1
627	TE 627	TE191B-LSB	LSB Spool Piece North	2.700+2	7.200+2	K	3.307+0	7.350-1
628	TE 628	TE191C-LSB	LSB Spool Piece East	2.700+2	7.200+2	K	3.307+0	7.350-1
629	TE 629	TE191D-LSB	LSB Spool Piece South	2.700+2	7.200+2	K	3.307+0	7.350-1
630	TE 630	TE192-LSB	LSB Spool Piece	2.700+2	7.200+2	K	3.307+0	7.350-1
631	TE 631	TE211A-CLB	CLB Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
632	TE 632	TE211B-CLB	CLB Spool Piece Side	2.700+2	7.200+2	K	3.307+0	7.350-1
633	TE 633	TE211C-CLB	CLB Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
634	TE 634	TE212C-CLB	CLB Spool Piece Top	2.700+2	7.200+2	K	3.307+0	7.350-1
635	TE 635	TE212D-CLB	CLB Spool Piece Bottom	2.700+2	7.200+2	K	3.307+0	7.350-1
636	TE 636	TE291C-PR	PR Relief Valve Line	2.700+2	7.200+2	K	3.307+0	7.350-1
637	TE 637	TE291D-PR	PR Relief Valve Line	2.700+2	7.200+2	K	3.307+0	7.350-1
638	TE 638	TE301C-PR	PR Safety Valve Line	2.700+2	7.200+2	K	3.307+0	7.350-1
639	TE 639	TE301D-PR	PR Safety Valve Line	2.700+2	7.200+2	K	3.307+0	7.350-1
640	TE 640	TE311C-PR	PV-PR Vent Line	2.700+2	7.200+2	K	3.307+0	7.350-1
641	TE 641	TE311D-PR	PV-PR Vent Line	2.700+2	7.200+2	K	3.307+0	7.350-1
644	TE 644	TE571C-BU	BU No.1 SP	2.700+2	7.200+2	K	3.307+0	7.350-1
645	TE 645	TE571D-BU	BU No.1 SP	2.700+2	7.200+2	K	3.307+0	7.350-1
651	TE 651	TE591C-BU	BU No.2 SP	2.700+2	7.200+2	K	3.307+0	7.350-1
652	TE 652	TE591D-BU	BU No.2 SP	2.700+2	7.200+2	K	3.307+0	7.350-1
662	TE 662	TE-N-006-DC	PV Downcomer DTT North	2.700+2	7.200+2	K	3.307+0	7.350-1
663	TE 663	TE-S-006-DC	PV Downcomer DTT South	2.700+2	7.200+2	K	3.307+0	7.350-1
664	TE 664	TE-E-006-DC	PV Downcomer DTT East	2.700+2	7.200+2	K	3.307+0	7.350-1
665	TE 665	TE-W-006-DC	PV Downcomer DTT West	2.700+2	7.200+2	K	3.307+0	7.350-1
666	TE 666	TE451C-SGA	SGA Safety Valve S.P	2.700+2	6.700+2	K	3.108+0	7.770-1
667	TE 667	TE451D-SGA	SGA Safety Valve S.P	2.700+2	6.700+2	K	3.108+0	7.770-1
668	TE 668	TE595-BU		-2.500+1	2.500+1	mV	2.000-1	4.000-1
669	TE 669	TE596-BU		-2.500+1	2.500+1	mV	2.000-1	4.000-1
670	TE 670	TE-111A-CDP	PLR-02-1 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
671	TE 671	TE-111B-CDP	PLR-02-1 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
672	TE 672	TE-112A-CDP	PLR-01-2 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
673	TE 673	TE-112B-CDP	PLR-01-2 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
674	TE 674	TE-113A-CDP	PLR-08-3 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
675	TE 675	TE-113B-CDP	PLR-08-3 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
676	TE 676	TE-114A-CDP	PLR-07-4 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
677	TE 677	TE-114B-CDP	PLR-07-4 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
678	TE 678	TE-115A-CDP	PLR-06-5 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
679	TE 679	TE-115B-CDP	PLR-06-5 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
680	TE 680	TE-115C-CDP	PLR-06-5 Fluid Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
681	TE 681	TE-116A-CDP	PLR-05-6 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
682	TE 682	TE-116B-CDP	PLR-05-6 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
683	TE 683	TE-116C-CDP	PLR-05-6 Fluid Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
684	TE 684	TE-117A-CDP	PLR-04-7 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
685	TE 685	TE-117B-CDP	PLR-04-7 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (11/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
686	TE 686	TE-117C-CDP	PLR-04-7 Fluid Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
687	TE 687	TE-118A-CDP	PLR-03-8 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
688	TE 688	TE-118B-CDP	PLR-03-8 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
689	TE 689	TE-118C-CDP	PLR-03-8 Fluid Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
690	TE 690	TE-131-CDP	PLR-03-8 Oil Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
691	TE 691	TE-132-CDP	PLR-03-8 Oil Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
692	TE 692	TE-133-CDP	PLR-03-8 Oil Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
693	TE 693	TE-134-CDP	PLR-03-8 Oil Pos.4	2.700+2	7.200+2	K	3.307+0	7.350-1
694	TE 694	TE-135-CDP	PLR-03-8 Oil Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
695	TE 695	TE-136-CDP	PLR-03-8 Oil Pos.6	2.700+2	7.200+2	K	3.307+0	7.350-1
696	TE 696	TE-137-CDP	PLR-03-8 Oil Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
697	TE 697	TE-138-CDP	PLR-03-8 Oil Pos.8	2.700+2	7.200+2	K	3.307+0	7.350-1
698	TE 698	TE-139-CDP	PLR-03-8 Oil Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
699	TE 699	TE-111E-CDP	PLR-02-1 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
700	TE 700	TE-112E-CDP	PLR-01-2 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
701	TE 701	TE-113E-CDP	PLR-08-3 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
702	TE 702	TE-114E-CDP	PLR-07-4 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
703	TE 703	TE-115E-CDP	PLR-06-5 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
704	TE 704	TE-116E-CDP	PLR-05-6 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
705	TE 705	TE-117E-CDP	PLR-04-7 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
706	TE 706	TE-118E-CDP	PLR-03-8 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
707	TE 707	TE-121E-UHDP	PLR-UH-9 Oil Out let	2.700+2	7.200+2	K	3.307+0	7.350-1
708	TE 708	TE-121A-UHDP	PLR-UH-9 Fluid Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
709	TE 709	TE-121B-UHDP	PLR-UH-9 Fluid Pos.2	2.700+2	7.200+2	K	3.307+0	7.350-1
710	TE 710	TE-121C-UHDP	PLR-UH-9 Fluid Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
711	TE 711	TE-E071C-DC	Downcomer EL7.1M,East	2.700+2	7.200+2	K	3.307+0	7.350-1
712	TE 712	TE-W071C-DC	Downcomer EL7.1M,West	2.700+2	7.200+2	K	3.307+0	7.350-1
713	TE 713	TE-E067C-DC	Downcomer EL6.7M,East	2.700+2	7.200+2	K	3.307+0	7.350-1
714	TE 714	TE-W067C-DC	Downcomer EL6.7M,West	2.700+2	7.200+2	K	3.307+0	7.350-1
715	TE 715	TE-951-CS	Oil Inlet-Main	2.700+2	7.200+2	K	3.307+0	7.350-1
716	TE 716	TE-952-CS	Oil Outlet-Main	2.700+2	7.200+2	K	3.307+0	7.350-1
717	TE 717	TE-953-CS	Heat exchanger Outlet	2.700+2	7.200+2	K	3.307+0	7.350-1
718	TE 718	TE-B05221	B05 Rod(2,2) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
719	TE 719	TE-B05223	B05 Rod(2,2) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
720	TE 720	TE-B05225	B05 Rod(2,2) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
721	TE 721	TE-B05226	B05 Rod(2,2) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
722	TE 722	TE-B05227	B05 Rod(2,2) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
723	TE 723	TE-B05229	B05 Rod(2,2) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
724	TE 724	TE-B07221	B07 Rod(2,2) Pos.1,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
725	TE 725	TE-B07223	B07 Rod(2,2) Pos.3,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
726	TE 726	TE-B07225	B07 Rod(2,2) Pos.5,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
727	TE 727	TE-B07226	B07 Rod(2,2) Pos.6,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
728	TE 728	TE-B07227	B07 Rod(2,2) Pos.7,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
729	TE 729	TE-B07229	B07 Rod(2,2) Pos.9,Fluid	2.700+2	9.700+2	K	4.312+0	6.160-1
730	TE 730	TE-EX0650-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
731	TE 731	TE-EX0680-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
732	TE 732	TE-EX0720-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
733	TE 733	TE-EX0650-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
734	TE 734	TE-EX0680-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
735	TE 735	TE-EX0720-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
736	TE 736	TE810-PJ	Charging Flow to CLA	2.700+2	3.700+2	K	1.902+0	1.902+0
737	TE 737	TE597-BU	Spool Piece Pos.2	-2.500+1	2.500+1	mV	2.000-1	4.000-1
738	TE 738	TE598-BU	Spool Piece Pos.3	-2.500+1	2.500+1	mV	2.000-1	4.000-1
751	DT 1	DTE020A-HLA	HLA Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
752	DT 2	DTE020B-HLA	HLA Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
753	DT 3	DTE030A-HLA	HLA Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
754	DT 4	DTE030B-HLA	HLA Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
755	DT 5	DTE050A-LSA	LSA Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
756	DT 6	DTE050B-LSA	LSA Pipe Wall Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
757	DT 7	DTE060A-PCA	PCA Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1

Table 6.2 (Cont'd) (12/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
758	DT	8	DTE070A-CLA	CLA Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
759	DT	9	DTE070B-CLA	CLA Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
760	DT	10	DTE080A-CLA	CLA Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
761	DT	11	DTE080B-CLA	CLA Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
762	DT	12	DTE100-HLA	HLA-CLA	-1.500+2	1.500+2	K	2.970+0	9.900-1
763	DT	13	DTE160A-HLB	HLB Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
764	DT	14	DTE160B-HLB	HLB Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
765	DT	15	DTE170A-HLB	HLB Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
766	DT	16	DTE170B-HLB	HLB Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
767	DT	17	DTE190A-LSB	LSB Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
768	DT	18	DTE190B-LSB	LSB Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
769	DT	19	DTE200A-PCB	PCB Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
770	DT	20	DTE210A-CLB	CLB Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
771	DT	21	DTE210B-CLB	CLB Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
772	DT	22	DTE220A-CLB	CLB Pipe Wall I/O	-1.500+2	1.500+2	K	1.665+0	5.550-1
773	DT	23	DTE220B-CLB	CLB Pipe Wall to Fluid	-1.500+2	1.500+2	K	1.665+0	5.550-1
774	DT	24	DTE240-HLB	HLB-CLB	-1.500+2	1.500+2	K	2.970+0	9.900-1
775	DT	25	DTE270A-PR	PR Spray Line	-1.500+2	1.500+2	K	1.665+0	5.550-1
776	DT	26	DTE280A-PR	PR Surge Line	-1.500+2	1.500+2	K	1.665+0	5.550-1
777	DT	27	DTE-E-015A-PV	PV Wall I/O-E at L. Plenum	-1.500+2	1.500+2	K	1.665+0	5.550-1
778	DT	28	DTE-W-015A-PV	PV Wall I/O-W at L. Plenum	-1.500+2	1.500+2	K	1.665+0	5.550-1
779	DT	29	DTE-N000A-PV	PV Wall I/O-N at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
780	DT	30	DTE-S000A-PV	PV Wall I/O-S at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
781	DT	31	DTE-E000A-PV	PV Wall I/O-E at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
782	DT	32	DTE-W000A-PV	PV Wall I/O-W at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
783	DT	33	DTE-N018A-PV	PV Wall I/O-N at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
784	DT	34	DTE-S018A-PV	PV Wall I/O-S at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
785	DT	35	DTE-E018A-PV	PV Wall I/O-E at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
786	DT	36	DTE-W018A-PV	PV Wall I/O-W at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
787	DT	37	DTE-N036A-PV	PV Wall I/O-N at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
788	DT	38	DTE-S036A-PV	PV Wall I/O-S at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
789	DT	39	DTE-E036A-PV	PV Wall I/O-E at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
790	DT	40	DTE-W036A-PV	PV Wall I/O-W at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
791	DT	41	DTE-N060A-PV	PV Wall I/O-N at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
792	DT	42	DTE-S060A-PV	PV Wall I/O-S at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
793	DT	43	DTE-E060A-PV	PV Wall I/O-E at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
794	DT	44	DTE-W060A-PV	PV Wall I/O-W at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
795	DT	45	DTE-E080A-PV	PV Wall I/O-E at DC Head	-1.500+2	1.500+2	K	1.665+0	5.550-1
796	DT	46	DTE-W080A-PV	PV Wall I/O-W at DC Head	-1.500+2	1.500+2	K	1.665+0	5.550-1
797	DT	47	DTE-N000B-PV	PV/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
798	DT	48	DTE-S000B-PV	PV/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
799	DT	49	DTE-E000B-PV	PV/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
800	DT	50	DTE-W000B-PV	PV/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
801	DT	51	DTE-N018B-PV	PV/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
802	DT	52	DTE-S018B-PV	PV/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
803	DT	53	DTE-E018B-PV	PV/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
804	DT	54	DTE-W018B-PV	PV/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
805	DT	55	DTE-N036B-PV	PV/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
806	DT	56	DTE-S036B-PV	PV/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
807	DT	57	DTE-E036B-PV	PV/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
808	DT	58	DTE-W036B-PV	PV/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
809	DT	59	DTE-N060B-PV	PV/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
810	DT	60	DTE-S060B-PV	PV/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
811	DT	61	DTE-E060B-PV	PV/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
812	DT	62	DTE-W060B-PV	PV/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
813	DT	63	DTE-N000C-PV	CB/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
814	DT	64	DTE-S000C-PV	CB/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
815	DT	65	DTE-E000C-PV	CB/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
816	DT	66	DTE-W000C-PV	CB/DC Fluid at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
817	DT	67	DTE-N018C-PV	CB/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1

Table 6.2 (Cont'd) (13/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
818	DT 68	DTE-S018C-PV	CB/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
819	DT 69	DTE-E018C-PV	CB/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
820	DT 70	DTE-W018C-PV	CB/DC Fluid at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
821	DT 71	DTE-N036C-PV	CB/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
822	DT 72	DTE-S036C-PV	CB/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
823	DT 73	DTE-E036C-PV	CB/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
824	DT 74	DTE-W036C-PV	CB/DC Fluid at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
825	DT 75	DTE-N060C-PV	CB/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
826	DT 76	DTE-S060C-PV	CB/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
827.	DT 77	DTE-E060C-PV	CB/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
828	DT 78	DTE-W060C-PV	CB/DC Fluid at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
829	DT 79	DTE-N000E-PV	CB Wall I/O at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
830	DT 80	DTE-S000E-PV	CB Wall I/O at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
831	DT 81	DTE-E000E-PV	CB Wall I/O at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
832	DT 82	DTE-W000E-PV	CB Wall I/O at DC Bottom	-1.500+2	1.500+2	K	1.665+0	5.550-1
833	DT 83	DTE-N010E-PV	CB Wall I/O at Lower DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
834	DT 84	DTE-S010E-PV	CB Wall I/O at Lower DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
835	DT 85	DTE-E010E-PV	CB Wall I/O at Lower DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
836	DT 86	DTE-W010E-PV	CB Wall I/O at Lower DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
837	DT 87	DTE-N018E-PV	CB Wall I/O at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
838	DT 88	DTE-S018E-PV	CB Wall I/O at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
839	DT 89	DTE-E018E-PV	CB Wall I/O at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
840	DT 90	DTE-W018E-PV	CB Wall I/O at DC Middle	-1.500+2	1.500+2	K	1.665+0	5.550-1
841	DT 91	DTE-N026E-PV	CB Wall I/O at DC Center	-1.500+2	1.500+2	K	1.665+0	5.550-1
842	DT 92	DTE-S026E-PV	CB Wall I/O at DC Center	-1.500+2	1.500+2	K	1.665+0	5.550-1
843	DT 93	DTE-E026E-PV	CB Wall I/O at DC Center	-1.500+2	1.500+2	K	1.665+0	5.550-1
844	DT 94	DTE-W026E-PV	CB Wall I/O at DC Center	-1.500+2	1.500+2	K	1.665+0	5.550-1
845	DT 95	DTE-N036E-PV	CB Wall I/O at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
846	DT 96	DTE-S036E-PV	CB Wall I/O at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
847	DT 97	DTE-E036E-PV	CB Wall I/O at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
848	DT 98	DTE-W036E-PV	CB Wall I/O at Upper DC	-1.500+2	1.500+2	K	1.665+0	5.550-1
849	DT 99	DTE-N049E-PV	CB Wall I/O below Nozzle	-1.500+2	1.500+2	K	1.665+0	5.550-1
850	DT 100	DTE-S049E-PV	CB Wall I/O below Nozzle	-1.500+2	1.500+2	K	1.665+0	5.550-1
851	DT 101	DTE-E049E-PV	CB Wall I/O below Nozzle	-1.500+2	1.500+2	K	1.665+0	5.550-1
852	DT 102	DTE-W049E-PV	CB Wall I/O below Nozzle	-1.500+2	1.500+2	K	1.665+0	5.550-1
853	DT 103	DTE-N060E-PV	CB Wall I/O at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
854	DT 104	DTE-S060E-PV	CB Wall I/O at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
855	DT 105	DTE-E060E-PV	CB Wall I/O at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
856	DT 106	DTE-W060E-PV	CB Wall I/O at DC Top	-1.500+2	1.500+2	K	1.665+0	5.550-1
857	DT 107	DTE-040-B09-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
858	DT 108	DTE-040-B11-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
859	DT 109	DTE-040-B01-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
860	DT 110	DTE-040-B03-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
861	DT 111	DTE-040-B05-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
862	DT 112	DTE-040-B07-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
863	DT 113	DTE-040-B21-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
864	DT 114	DTE-040-B23-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
865	DT 115	DTE-040-B02-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
866	DT 116	DTE-040-B15-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
867	DT 117	DTE-040-B06-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
868	DT 118	DTE-040-B14-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
869	DT 119	DTE-040-B18-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
870	DT 120	DTE-040-B19-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
871	DT 121	DTE-040-B10-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
872	DT 122	DTE-040-B12-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
873	DT 123	DTE-040-B04-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
874	DT 124	DTE-040-B08-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
875	DT 125	DTE-040-B22-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
876	DT 126	DTE-040-B24-UCP	In/Out Fluid across UCP	-1.500+2	1.500+2	K	1.665+0	5.550-1
877	DT 127	DTE-000-B02-LCP	In/Out Fluid across LCP	-4.000+1	4.000+1	K	1.664+0	2.080+0

Table 6.2 (Cont'd) (14/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION		SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
878	DT 128	DTE-000-B03-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
879	DT 129	DTE-000-B06-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
880	DT 130	DTE-000-B07-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
881	DT 131	DTE-000-B09-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
882	DT 132	DTE-000-B11-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
883	DT 133	DTE-000-B14-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
884	DT 134	DTE-000-B16-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
885	DT 135	DTE-000-B18-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
886	DT 136	DTE-000-B20-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
887	DT 137	DTE-000-B21-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
888	DT 138	DTE-000-B23-LCP	In/Out Fluid across LCP		-4.000+1	4.000+1	K	1.664+0	2.080+0
889	DT 139	DTE-086A-SGA	SGA Wall I/O	Pos.1	-4.000+1	4.000+1	K	1.664+0	2.080+0
890	DT 140	DTE-137A-SGA	SGA Wall I/O	Pos.7	-4.000+1	4.000+1	K	1.664+0	2.080+0
891	DT 141	DTE-178A-SGA	SGA Wall I/O	Pos.10	-4.000+1	4.000+1	K	1.664+0	2.080+0
892	DT 142	DTE-223A-SGA	SGA Steam Dome Wall I/O		-4.000+1	4.000+1	K	1.664+0	2.080+0
893	DT 143	DTE-IN0861-SGA	SGA U-Tube(1,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
894	DT 144	DTE-EX0861-SGA	SGA U-Tube(1,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
895	DT 145	DTE-IN0862-SGA	SGA U-Tube(2,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
896	DT 146	DTE-EX0862-SGA	SGA U-Tube(2,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
897	DT 147	DTE-IN0863-SGA	SGA U-Tube(3,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
898	DT 148	DTE-EX0863-SGA	SGA U-Tube(3,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
899	DT 149	DTE-IN0991-SGA	SGA U-Tube(1,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
900	DT 150	DTE-EX0991-SGA	SGA U-Tube(1,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
901	DT 151	DTE-IN0992-SGA	SGA U-Tube(2,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
902	DT 152	DTE-EX0992-SGA	SGA U-Tube(2,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
903	DT 153	DTE-IN0993-SGA	SGA U-Tube(3,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
904	DT 154	DTE-EX0993-SGA	SGA U-Tube(3,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
905	DT 155	DTE-IN1121-SGA	SGA U-Tube(1,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
906	DT 156	DTE-EX1121-SGA	SGA U-Tube(1,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
907	DT 157	DTE-IN1122-SGA	SGA U-Tube(2,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
908	DT 158	DTE-EX1122-SGA	SGA U-Tube(2,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
909	DT 159	DTE-IN1123-SGA	SGA U-Tube(3,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
910	DT 160	DTE-EX1123-SGA	SGA U-Tube(3,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
911	DT 161	DTE-IN1371-SGA	SGA U-Tube(1,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
912	DT 162	DTE-EX1371-SGA	SGA U-Tube(1,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
913	DT 163	DTE-IN1372-SGA	SGA U-Tube(2,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
914	DT 164	DTE-EX1372-SGA	SGA U-Tube(2,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
915	DT 165	DTE-IN1373-SGA	SGA U-Tube(3,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
916	DT 166	DTE-EX1373-SGA	SGA U-Tube(3,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
917	DT 167	DTE-IN1632-SGA	SGA U-Tube(2,IN)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
918	DT 168	DTE-EX1632-SGA	SGA U-Tube(2,EX)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
919	DT 169	DTE-IN1633-SGA	SGA U-Tube(3,IN)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
920	DT 170	DTE-EX1633-SGA	SGA U-Tube(3,EX)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
921	DT 171	DTE-IN1701-SGA	SGA U-Tube(1,IN)	Pos.10	-1.000+2	1.000+2	K	1.664+0	8.320-1
922	DT 172	DTE-IN1782-SGA	SGA U-Tube(2,IN)	Pos.10	-1.000+2	1.000+2	K	1.664+0	8.320-1
923	DT 173	DTE-IN1863-SGA	SGA U-Tube(3,IN)	Pos.11	-1.000+2	1.000+2	K	1.664+0	8.320-1
924	DT 174	DTE-086A-SGB	SGB Wall I/O	Pos.1	-4.000+1	4.000+1	K	1.664+0	2.080+0
925	DT 175	DTE-137A-SGB	SGB Wall I/O	Pos.7	-4.000+1	4.000+1	K	1.664+0	2.080+0
926	DT 176	DTE-178A-SGB	SGB Wall I/O	Pos.10	-4.000+1	4.000+1	K	1.664+0	2.080+0
927	DT 177	DTE-223A-SGB	SGB Steam Dome Wall I/O		-4.000+1	4.000+1	K	1.664+0	2.080+0
928	DT 178	DTE-IN0861-SGB	SGB U-Tube(1,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
929	DT 179	DTE-EX0861-SGB	SGB U-Tube(1,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
930	DT 180	DTE-IN0862-SGB	SGB U-Tube(2,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
931	DT 181	DTE-EX0862-SGB	SGB U-Tube(2,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
932	DT 182	DTE-IN0863-SGB	SGB U-Tube(3,IN)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
933	DT 183	DTE-EX0863-SGB	SGB U-Tube(3,EX)	Pos.1	-1.000+2	1.000+2	K	1.664+0	8.320-1
934	DT 184	DTE-IN0991-SGB	SGB U-Tube(1,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
935	DT 185	DTE-EX0991-SGB	SGB U-Tube(1,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
936	DT 186	DTE-IN0992-SGB	SGB U-Tube(2,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
937	DT 187	DTE-EX0992-SGB	SGB U-Tube(2,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1

Table 6.2 (Cont'd) (15/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION		SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
938	DT	188	DTE-IN0993-SGB	SGB U-Tube(3,IN)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
939	DT	189	DTE-EX0993-SGB	SGB U-Tube(3,EX)	Pos.3	-1.000+2	1.000+2	K	1.664+0	8.320-1
940	DT	190	DTE-IN1121-SGB	SGB U-Tube(1,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
941	DT	191	DTE-EX1121-SGB	SGB U-Tube(1,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
942	DT	192	DTE-IN1122-SGB	SGB U-Tube(2,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
943	DT	193	DTE-EX1122-SGB	SGB U-Tube(2,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
944	DT	194	DTE-IN1123-SGB	SGB U-Tube(3,IN)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
945	DT	195	DTE-EX1123-SGB	SGB U-Tube(3,EX)	Pos.5	-1.000+2	1.000+2	K	1.664+0	8.320-1
946	DT	196	DTE-IN1371-SGB	SGB U-Tube(1,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
947	DT	197	DTE-EX1371-SGB	SGB U-Tube(1,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
948	DT	198	DTE-IN1372-SGB	SGB U-Tube(2,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
949	DT	199	DTE-EX1372-SGB	SGB U-Tube(2,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
950	DT	200	DTE-IN1373-SGB	SGB U-Tube(3,IN)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
951	DT	201	DTE-EX1373-SGB	SGB U-Tube(3,EX)	Pos.7	-1.000+2	1.000+2	K	1.664+0	8.320-1
952	DT	202	DTE-IN1632-SGB	SGB U-Tube(2,IN)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
953	DT	203	DTE-EX1632-SGB	SGB U-Tube(2,EX)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
954	DT	204	DTE-IN1633-SGB	SGB U-Tube(3,IN)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
955	DT	205	DTE-EX1633-SGB	SGB U-Tube(3,EX)	Pos.9	-1.000+2	1.000+2	K	1.664+0	8.320-1
956	DT	206	DTE-IN1701-SGB	SGB U-Tube(1,IN)	Pos.10	-1.000+2	1.000+2	K	1.664+0	8.320-1
957	DT	207	DTE-IN1782-SGB	SGB U-Tube(2,IN)	Pos.10	-1.000+2	1.000+2	K	1.664+0	8.320-1
958	DT	208	DTE-IN1863-SGB	SGB U-Tube(3,IN)	Pos.11	-1.000+2	1.000+2	K	1.664+0	8.320-1
1051	TW	1	TWE020B-HLA	HLA Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1052	TW	2	TWE030B-HLA	HLA Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1053	TW	3	TWE050B-LSA	LSA Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1054	TW	4	TWE060B-PCA	PCA Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1055	TW	5	TWE070B-CLA	CLA Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1056	TW	6	TWE080B-CLA	CLA Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1057	TW	7	TWE160B-HLB	HLB Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1058	TW	8	TWE170B-HLB	HLB Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1059	TW	9	TWE190B-LSB	LSB Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1060	TW	10	TWE200B-PCB	PCB Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1061	TW	11	TWE210B-CLB	CLB Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1062	TW	12	TWE220B-CLB	CLB Pipe Inner Wall		2.700+2	7.200+2	K	3.307+0	7.350-1
1063	TW	13	TWE280B-PR	PR Surge Line		2.700+2	7.200+2	K	3.307+0	7.350-1
1064	TW	14	TWE431A-SGA	SGA Downcomer A Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1065	TW	15	TWE432A-SGA	SGA Downcomer B Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1066	TW	16	TWE433A-SGA	SGA Downcomer C Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1067	TW	17	TWE434A-SGA	SGA Downcomer D Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1068	TW	18	TWE471A-SGB	SGB Downcomer A Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1069	TW	19	TWE472A-SGB	SGB Downcomer B Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1070	TW	20	TWE473A-SGB	SGB Downcomer C Wsll		2.700+2	6.700+2	K	3.108+0	7.770-1
1071	TW	21	TWE474A-SGB	SGB Downcomer D Wall		2.700+2	6.700+2	K	3.108+0	7.770-1
1072	TW	22	TWE-E-015B-PV	PV Inner Wall EL.-1.5m,E		2.700+2	7.200+2	K	3.307+0	7.350-1
1073	TW	23	TWE-W-015B-PV	PV Inner Wall EL.-1.5m,W		2.700+2	7.200+2	K	3.307+0	7.350-1
1074	TW	24	TWE-N000B-PV	PV Inner Wall EL.0.0m,N		2.700+2	7.200+2	K	3.307+0	7.350-1
1075	TW	25	TWE-S000B-PV	PV Inner Wall EL.0.0m,S		2.700+2	7.200+2	K	3.307+0	7.350-1
1076	TW	26	TWE-E000B-PV	PV Inner Wall EL.0.0m,E		2.700+2	7.200+2	K	3.307+0	7.350-1
1077	TW	27	TWE-W000B-PV	PV Inner Wall EL.0.0m,W		2.700+2	7.200+2	K	3.307+0	7.350-1
1078	TW	28	TWE-N018B-PV	PV Inner Wall EL.1.8m,N		2.700+2	7.200+2	K	3.307+0	7.350-1
1079	TW	29	TWE-S018B-PV	PV Inner Wall EL.1.8m,S		2.700+2	7.200+2	K	3.307+0	7.350-1
1080	TW	30	TWE-E018B-PV	PV Inner Wall EL.1.8m,E		2.700+2	7.200+2	K	3.307+0	7.350-1
1081	TW	31	TWE-W018B-PV	PV Inner Wall EL.1.8m,W		2.700+2	7.200+2	K	3.307+0	7.350-1
1082	TW	32	TWE-N036B-PV	PV Inner Wall EL.3.6m,N		2.700+2	7.200+2	K	3.307+0	7.350-1
1083	TW	33	TWE-S036B-PV	PV Inner Wall EL.3.6m,S		2.700+2	7.200+2	K	3.307+0	7.350-1
1084	TW	34	TWE-E036B-PV	PV Inner Wall EL.3.6m,E		2.700+2	7.200+2	K	3.307+0	7.350-1
1085	TW	35	TWE-W036B-PV	PV Inner Wall EL.3.6m,W		2.700+2	7.200+2	K	3.307+0	7.350-1
1086	TW	36	TWE-N060B-PV	PV Inner Wall EL.6.0m,N		2.700+2	7.200+2	K	3.307+0	7.350-1
1087	TW	37	TWE-S060B-PV	PV Inner Wall EL.6.0m,S		2.700+2	7.200+2	K	3.307+0	7.350-1
1088	TW	38	TWE-E060B-PV	PV Inner Wall EL.6.0m,E		2.700+2	7.200+2	K	3.307+0	7.350-1
1089	TW	39	TWE-W060B-PV	PV Inner Wall EL.6.0m,W		2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (16/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1090	TW	40	TWE-E080B-PV	PV Inner Wall EL.8.0m,E	2.700+2	7.200+2	K	3.307+0	7.350-1
1091	TW	41	TWE-W080B-PV	PV Inner Wall EL.8.0m,W	2.700+2	7.200+2	K	3.307+0	7.350-1
1092	TW	42	TWE-N000D-CB	CB Outer Wall EL.0.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1093	TW	43	TWE-S000D-CB	CB Outer Wall EL.0.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1094	TW	44	TWE-E000D-CB	CB Outer Wall EL.0.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1095	TW	45	TWE-W000D-CB	CB Outer Wall EL.0.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1096	TW	46	TWE-N010D-CB	CB Outer Wall EL.1.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1097	TW	47	TWE-S010D-CB	CB Outer Wall EL.1.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1098	TW	48	TWE-E010D-CB	CB Outer Wall EL.1.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1099	TW	49	TWE-W010D-CB	CB Outer Wall EL.1.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1100	TW	50	TWE-N018D-CB	CB Outer Wall EL.1.8m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1101	TW	51	TWE-S018D-CB	CB Outer Wall EL.1.8m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1102	TW	52	TWE-E018D-CB	CB Outer Wall EL.1.8m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1103	TW	53	TWE-W018D-CB	CB Outer Wall EL.1.8m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1104	TW	54	TWE-N026D-CB	CB Outer Wall EL.2.6m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1105	TW	55	TWE-S026D-CB	CB Outer Wall EL.2.6m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1106	TW	56	TWE-E026D-CB	CB Outer Wall EL.2.6m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1107	TW	57	TWE-W026D-CB	CB Outer Wall EL.2.6m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1108	TW	58	TWE-N036D-CB	CB Outer Wall EL.3.6m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1109	TW	59	TWE-S036D-CB	CB Outer Wall EL.3.6m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1110	TW	60	TWE-E036D-CB	CB Outer Wall EL.3.6m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1111	TW	61	TWE-W036D-CB	CB Outer Wall EL.3.6m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1112	TW	62	TWE-N049D-CB	CB Outer Wall EL.4.9m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1113	TW	63	TWE-S049D-CB	CB Outer Wall EL.4.9m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1114	TW	64	TWE-E049D-CB	CB Outer Wall EL.4.9m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1115	TW	65	TWE-W049D-CB	CB Outer Wall EL.4.9m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1116	TW	66	TWE-N060D-CB	CB Outer Wall EL.6.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1117	TW	67	TWE-S060D-CB	CB Outer Wall EL.6.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1118	TW	68	TWE-E060D-CB	CB Outer Wall EL.6.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1119	TW	69	TWE-W060D-CB	CB Outer Wall EL.6.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1120	TW	70	TWE-N000E-CB	CB Inner Wall EL.0.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1121	TW	71	TWE-S000E-CB	CB Inner Wall EL.0.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1122	TW	72	TWE-E000E-CB	CB Inner Wall EL.0.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1123	TW	73	TWE-W000E-CB	CB Inner Wall EL.0.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1124	TW	74	TWE-N010E-CB	CB Inner Wall EL.1.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1125	TW	75	TWE-S010E-CB	CB Inner Wall EL.1.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1126	TW	76	TWE-E010E-CB	CB Inner Wall EL.1.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1127	TW	77	TWE-W010E-CB	CB Inner Wall EL.1.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1128	TW	78	TWE-N018E-CB	CB Inner Wall EL.1.8m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1129	TW	79	TWE-S018E-CB	CB Inner Wall EL.1.8m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1130	TW	80	TWE-E018E-CB	CB Inner Wall EL.1.8m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1131	TW	81	TWE-W018E-CB	CB Inner Wall EL.1.8m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1132	TW	82	TWE-N026E-CB	CB Inner Wall EL.2.6m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1133	TW	83	TWE-S026E-CB	CB Inner Wall EL.2.6m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1134	TW	84	TWE-E026E-CB	CB Inner Wall EL.2.6m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1135	TW	85	TWE-W026E-CB	CB Inner Wall EL.2.6m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1136	TW	86	TWE-N036E-CB	CB Inner Wall EL.3.6m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1137	TW	87	TWE-S036E-CB	CB Inner Wall EL.3.6m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1138	TW	88	TWE-E036E-CB	CB Inner Wall EL.3.6m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1139	TW	89	TWE-W036E-CB	CB Inner Wall EL.3.6m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1140	TW	90	TWE-N049E-CB	CB Inner Wall EL.4.9m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1141	TW	91	TWE-S049E-CB	CB Inner Wall EL.4.9m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1142	TW	92	TWE-E049E-CB	CB Inner Wall EL.4.9m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1143	TW	93	TWE-W049E-CB	CB Inner Wall EL.4.9m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1144	TW	94	TWE-N060E-CB	CB Inner Wall EL.6.0m,N	2.700+2	9.700+2	K	4.312+0	6.160-1
1145	TW	95	TWE-S060E-CB	CB Inner Wall EL.6.0m,S	2.700+2	9.700+2	K	4.312+0	6.160-1
1146	TW	96	TWE-E060E-CB	CB Inner Wall EL.6.0m,E	2.700+2	9.700+2	K	4.312+0	6.160-1
1147	TW	97	TWE-W060E-CB	CB Inner Wall EL.6.0m,W	2.700+2	9.700+2	K	4.312+0	6.160-1
1148	TW	98	TWE-IN038B02-UCPP	UCP L.Surf. EL.3.8m,B02	2.700+2	9.700+2	K	4.312+0	6.160-1
1149	TW	99	TWE-IN038B04-UCPP	UCP L.Surf. EL.3.8m,B04	2.700+2	9.700+2	K	4.312+0	6.160-1

Table 6.2 (Cont'd) (17/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1150	TW 100	TWE-IN038B06-UCPP	UCP L.Surf. EL.3.8m,B06	2.700+2	9.700+2	K	4.312+0	6.160-1
1151	TW 101	TWE-IN038B08-UCPP	UCP L.Surf. EL.3.8m,B08	2.700+2	9.700+2	K	4.312+0	6.160-1
1152	TW 102	TWE-IN038B21-UCPP	UCP L.Surf. EL.3.8m,C	2.700+2	9.700+2	K	4.312+0	6.160-1
1153	TW 103	TWE-EX040B02-UCPP	UCP U.Surf. EL.4.0m,B02	2.700+2	9.700+2	K	4.312+0	6.160-1
1154	TW 104	TWE-EX040B04-UCPP	UCP U.Surf. EL.4.0m,B04	2.700+2	9.700+2	K	4.312+0	6.160-1
1155	TW 105	TWE-EX040B06-UCPP	UCP U.Surf. EL.4.0m,B06	2.700+2	9.700+2	K	4.312+0	6.160-1
1156	TW 106	TWE-EX040B08-UCPP	UCP U.Surf. EL.4.0m,B08	2.700+2	9.700+2	K	4.312+0	6.160-1
1157	TW 107	TWE-EX040B21-UCPP	UCP U.Surf. EL.4.0m,C	2.700+2	9.700+2	K	4.312+0	6.160-1
1158	TW 108	TWE-063-B09-UCSP	UCSP L.Surf. EL.6.3m,B09	2.700+2	9.700+2	K	4.312+0	6.160-1
1159	TW 109	TWE-065-B09-UCSP	UCSP U.Surf. EL.6.5m,B09	2.700+2	9.700+2	K	4.312+0	6.160-1
1160	TW 110	TWE-E047G-UP	UP Str. Surf. EL.4.7m,East	2.700+2	9.700+2	K	4.312+0	6.160-1
1161	TW 111	TWE-W047G-UP	UP Str. Surf. EL.4.7m,West	2.700+2	9.700+2	K	4.312+0	6.160-1
1162	TW 112	TWE-E056G-UP	UP Str. Surf. EL.5.6m,East	2.700+2	9.700+2	K	4.312+0	6.160-1
1163	TW 113	TWE-W056G-UP	UP Str. Surf. EL.5.6m,West	2.700+2	9.700+2	K	4.312+0	6.160-1
1164	TW 114	TWE-080G-UH	UH Str. Surf. EL.8.0m,C	2.700+2	9.700+2	K	4.312+0	6.160-1
1165	TW 115	TWE-B01342	B01 Rod(3,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1166	TW 116	TWE-B01344	B01 Rod(3,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1167	TW 117	TWE-B01345	B01 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1168	TW 118	TWE-B01346	B01 Rod(3,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1169	TW 119	TWE-B01347	B01 Rod(3,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1170	TW 120	TWE-B01348	B01 Rod(3,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1171	TW 121	TWE-B20431	B20 Rod(4,3) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1172	TW 122	TWE-B20433	B20 Rod(4,3) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1173	TW 123	TWE-B20435	B20 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1174	TW 124	TWE-B20436	B20 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1175	TW 125	TWE-B20438	B20 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1176	TW 126	TWE-B20439	B20 Rod(4,3) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1177	TW 127	TWE-B02241	B02 Rod(2,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1178	TW 128	TWE-B02242	B02 Rod(2,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1179	TW 129	TWE-B02244	B02 Rod(2,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1180	TW 130	TWE-B02245	B02 Rod(2,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1181	TW 131	TWE-B02247	B02 Rod(2,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1182	TW 132	TWE-B02249	B02 Rod(2,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1183	TW 133	TWE-B02341	B02 Rod(3,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1184	TW 134	TWE-B02343	B02 Rod(3,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1185	TW 135	TWE-B02345	B02 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1186	TW 136	TWE-B02346	B02 Rod(3,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1187	TW 137	TWE-B02348	B02 Rod(3,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1188	TW 138	TWE-B02349	B02 Rod(3,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1195	TW 145	TWE-B03421	B03 Rod(4,2) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1196	TW 146	TWE-B03422	B03 Rod(4,2) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1197	TW 147	TWE-B03424	B03 Rod(4,2) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1198	TW 148	TWE-B03425	B03 Rod(4,2) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1199	TW 149	TWE-B03427	B03 Rod(4,2) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1200	TW 150	TWE-B03429	B03 Rod(4,2) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1201	TW 151	TWE-B03431	B03 Rod(4,3) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1202	TW 152	TWE-B03433	B03 Rod(4,3) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1203	TW 153	TWE-B03435	B03 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1204	TW 154	TWE-B03436	B03 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1205	TW 155	TWE-B03438	B03 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1206	TW 156	TWE-B03439	B03 Rod(4,3) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1213	TW 163	TWE-B04432	B04 Rod(4,3) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1214	TW 164	TWE-B04434	B04 Rod(4,3) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1215	TW 165	TWE-B04435	B04 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1216	TW 166	TWE-B04436	B04 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1217	TW 167	TWE-B04437	B04 Rod(4,3) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1218	TW 168	TWE-B04438	B04 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1219	TW 169	TWE-B05342	B05 Rod(3,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1220	TW 170	TWE-B05344	B05 Rod(3,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1221	TW 171	TWE-B05345	B05 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (18/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1222	TW 172	TWE-B05346	B05 Rod(3,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1223	TW 173	TWE-B05347	B05 Rod(3,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1224	TW 174	TWE-B05348	B05 Rod(3,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1231	TW 181	TWE-B06241	B06 Rod(2,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1232	TW 182	TWE-B06242	B06 Rod(2,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1233	TW 183	TWE-B06244	B06 Rod(2,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1234	TW 184	TWE-B06245	B06 Rod(2,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1235	TW 185	TWE-B06247	B06 Rod(2,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1236	TW 186	TWE-B06249	B06 Rod(2,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1237	TW 187	TWE-B06341	B06 Rod(3,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1238	TW 188	TWE-B06343	B06 Rod(3,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1239	TW 189	TWE-B06345	B06 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1240	TW 190	TWE-B06346	B06 Rod(3,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1241	TW 191	TWE-B06348	B06 Rod(3,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1242	TW 192	TWE-B06349	B06 Rod(3,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1249	TW 199	TWE-B07421	B07 Rod(4,2) Pos.1	2.700+2	1.470+3	K	6.444+0	5.370-1
1250	TW 200	TWE-B07422	B07 Rod(4,2) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1251	TW 201	TWE-B07424	B07 Rod(4,2) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1252	TW 202	TWE-B07425	B07 Rod(4,2) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1253	TW 203	TWE-B07427	B07 Rod(4,2) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1254	TW 204	TWE-B07429	B07 Rod(4,2) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1255	TW 205	TWE-B07431	B07 Rod(4,3) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1256	TW 206	TWE-B07433	B07 Rod(4,3) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1257	TW 207	TWE-B07435	B07 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1258	TW 208	TWE-B07436	B07 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1259	TW 209	TWE-B07438	B07 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1260	TW 210	TWE-B07439	B07 Rod(4,3) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1267	TW 217	TWE-B08222	B08 Rod(2,2) Pos.2	2.700+2	9.700+2	K	4.312+0	6.160-1
1268	TW 218	TWE-B08224	B08 Rod(2,2) Pos.4	2.700+2	9.700+2	K	4.312+0	6.160-1
1269	TW 219	TWE-B08225	B08 Rod(2,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1270	TW 220	TWE-B08226	B08 Rod(2,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1271	TW 221	TWE-B08227	B08 Rod(2,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1272	TW 222	TWE-B08228	B08 Rod(2,2) Pos.8	2.700+2	9.700+2	K	4.312+0	6.160-1
1273	TW 223	TWE-B08432	B08 Rod(4,3) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1274	TW 224	TWE-B08434	B08 Rod(4,3) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1275	TW 225	TWE-B08435	B08 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1276	TW 226	TWE-B08436	B08 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1277	TW 227	TWE-B08437	B08 Rod(4,3) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1278	TW 228	TWE-B08438	B08 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1279	TW 229	TWE-B09442	B09 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1280	TW 230	TWE-B09444	B09 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1281	TW 231	TWE-B09445	B09 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1282	TW 232	TWE-B09446	B09 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1283	TW 233	TWE-B09447	B09 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1284	TW 234	TWE-B09448	B09 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1285	TW 235	TWE-B10441	B10 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1286	TW 236	TWE-B10442	B10 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1287	TW 237	TWE-B10444	B10 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1288	TW 238	TWE-B10445	B10 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1289	TW 239	TWE-B10447	B10 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1290	TW 240	TWE-B10449	B10 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1291	TW 241	TWE-B10451	B10 Rod(4,5) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1292	TW 242	TWE-B10453	B10 Rod(4,5) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1293	TW 243	TWE-B10455	B10 Rod(4,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1294	TW 244	TWE-B10456	B10 Rod(4,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1295	TW 245	TWE-B10458	B10 Rod(4,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1296	TW 246	TWE-B10459	B10 Rod(4,5) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1297	TW 247	TWE-B11442	B11 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1298	TW 248	TWE-B11444	B11 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1299	TW 249	TWE-B11445	B11 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (19/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1300	TW 250	TWE-B11446	B11 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1301	TW 251	TWE-B11447	B11 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1302	TW 252	TWE-B11448	B11 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1303	TW 253	TWE-B11172	B11 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1304	TW 254	TWE-B11174	B11 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1305	TW 255	TWE-B11175	B11 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1306	TW 256	TWE-B11176	B11 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1307	TW 257	TWE-B11177	B11 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1308	TW 258	TWE-B11178	B11 Rod(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1309	TW 259	TWE-B12262	B12 Rod(2,6) Pos.2	2.700+2	9.700+2	K	4.312+0	6.160-1
1310	TW 260	TWE-B12264	B12 Rod(2,6) Pos.4	2.700+2	9.700+2	K	4.312+0	6.160-1
1311	TW 261	TWE-B12265	B12 Rod(2,6) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1312	TW 262	TWE-B12266	B12 Rod(2,6) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1313	TW 263	TWE-B12267	B12 Rod(2,6) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1314	TW 264	TWE-B12268	B12 Rod(2,6) Pos.8	2.700+2	9.700+2	K	4.312+0	6.160-1
1315	TW 265	TWE-B12441	B12 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1316	TW 266	TWE-B12442	B12 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1317	TW 267	TWE-B12444	B12 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1318	TW 268	TWE-B12445	B12 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1319	TW 269	TWE-B12447	B12 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1320	TW 270	TWE-B12449	B12 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1321	TW 271	TWE-B12431	B12 Rod(4,3) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1322	TW 272	TWE-B12433	B12 Rod(4,3) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1323	TW 273	TWE-B12435	B12 Rod(4,3) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1324	TW 274	TWE-B12436	B12 Rod(4,3) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1325	TW 275	TWE-B12438	B12 Rod(4,3) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1326	TW 276	TWE-B12439	B12 Rod(4,3) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1327	TW 277	TWE-B13662	B13 Rod(6,6) Pos.2	2.700+2	9.700+2	K	4.312+0	6.160-1
1328	TW 278	TWE-B13664	B13 Rod(6,6) Pos.4	2.700+2	9.700+2	K	4.312+0	6.160-1
1329	TW 279	TWE-B13665	B13 Rod(6,6) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1330	TW 280	TWE-B13666	B13 Rod(6,6) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1331	TW 281	TWE-B13667	B13 Rod(6,6) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1332	TW 282	TWE-B13668	B13 Rod(6,6) Pos.8	2.700+2	9.700+2	K	4.312+0	6.160-1
1333	TW 283	TWE-B13442	B13 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1334	TW 284	TWE-B13444	B13 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1335	TW 285	TWE-B13445	B13 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1336	TW 286	TWE-B13446	B13 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1337	TW 287	TWE-B13447	B13 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1338	TW 288	TWE-B13448	B13 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1339	TW 289	TWE-B14541	B14 Rod(5,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1340	TW 290	TWE-B14542	B14 Rod(5,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1341	TW 291	TWE-B14544	B14 Rod(5,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1342	TW 292	TWE-B14545	B14 Rod(5,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1343	TW 293	TWE-B14547	B14 Rod(5,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1344	TW 294	TWE-B14549	B14 Rod(5,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1345	TW 295	TWE-B14441	B14 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1346	TW 296	TWE-B14443	B14 Rod(4,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1347	TW 297	TWE-B14445	B14 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1348	TW 298	TWE-B14446	B14 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1349	TW 299	TWE-B14448	B14 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1350	TW 300	TWE-B14449	B14 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1351	TW 301	TWE-B14172	B14 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1352	TW 302	TWE-B14174	B14 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1353	TW 303	TWE-B14175	B14 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1354	TW 304	TWE-B14176	B14 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1355	TW 305	TWE-B14177	B14 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1356	TW 306	TWE-B14178	B14 Rod(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1357	TW 307	TWE-B15441	B15 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1358	TW 308	TWE-B15442	B15 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1359	TW 309	TWE-B15444	B15 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (20/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1360	TW 310	TWE-B15445	B15 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1361	TW 311	TWE-B15447	B15 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1362	TW 312	TWE-B15449	B15 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1363	TW 313	TWE-B15451	B15 Rod(4,5) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1364	TW 314	TWE-B15453	B15 Rod(4,5) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1365	TW 315	TWE-B15455	B15 Rod(4,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1366	TW 316	TWE-B15456	B15 Rod(4,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1367	TW 317	TWE-B15458	B15 Rod(4,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1368	TW 318	TWE-B15459	B15 Rod(4,5) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1369	TW 319	TWE-B15172	B15 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1370	TW 320	TWE-B15174	B15 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1371	TW 321	TWE-B15175	B15 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1372	TW 322	TWE-B15176	B15 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1373	TW 323	TWE-B15177	B15 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1374	TW 324	TWE-B15178	B15 Rod(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1375	TW 325	TWE-B16442	B16 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1376	TW 326	TWE-B16444	B16 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1377	TW 327	TWE-B16445	B16 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1378	TW 328	TWE-B16446	B16 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1379	TW 329	TWE-B16447	B16 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1380	TW 330	TWE-B16448	B16 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1381	TW 331	TWE-B16172	B16 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1382	TW 332	TWE-B16174	B16 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1383	TW 333	TWE-B16175	B16 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1384	TW 334	TWE-B16176	B16 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1385	TW 335	TWE-B16177	B16 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1386	TW 336	TWE-B16178	B16 Roc(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1387	TW 337	TWE-B17442	B17 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1388	TW 338	TWE-B17444	B17 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1389	TW 339	TWE-B17445	B17 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1390	TW 340	TWE-B17446	B17 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1391	TW 341	TWE-B17447	B17 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1392	TW 342	TWE-B17448	B17 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1393	TW 343	TWE-B17172	B17 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1394	TW 344	TWE-B17174	B17 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1395	TW 345	TWE-B17175	B17 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1396	TW 346	TWE-B17176	B17 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1397	TW 347	TWE-B17177	B17 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1398	TW 348	TWE-B17178	B17 Rod(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1399	TW 349	TWE-B18341	B18 Rod(3,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1400	TW 350	TWE-B18342	B18 Rod(3,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1401	TW 351	TWE-B18344	B18 Rod(3,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1402	TW 352	TWE-B18345	B18 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1403	TW 353	TWE-B18347	B18 Rod(3,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1404	TW 354	TWE-B18349	B18 Rod(3,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1405	TW 355	TWE-B18441	B18 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1406	TW 356	TWE-B18443	B18 Rod(4,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1407	TW 357	TWE-B18445	B18 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1408	TW 358	TWE-B18446	B18 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1409	TW 359	TWE-B18448	B18 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1410	TW 360	TWE-B18449	B18 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1411	TW 361	TWE-B19451	B19 Rod(4,5) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1412	TW 362	TWE-B19452	B19 Rod(4,5) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1413	TW 363	TWE-B19454	B19 Rod(4,5) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1414	TW 364	TWE-B19455	B19 Rod(4,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1415	TW 365	TWE-B19457	B19 Rod(4,5) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1416	TW 366	TWE-B19459	B19 Rod(4,5) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1417	TW 367	TWE-B19441	B19 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1418	TW 368	TWE-B19443	B19 Rod(4,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1419	TW 369	TWE-B19445	B19 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (21/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1420	TW 370	TWE-B19446	B19 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1421	TW 371	TWE-B19448	B19 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1422	TW 372	TWE-B19449	B19 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1423	TW 373	TWE-B20441	B20 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1424	TW 374	TWE-B20442	B20 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1425	TW 375	TWE-B20444	B20 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1426	TW 376	TWE-B20445	B20 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1427	TW 377	TWE-B20447	B20 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1428	TW 378	TWE-B20449	B20 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1429	TW 379	TWE-B21441	B21 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1430	TW 380	TWE-B21442	B21 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1431	TW 381	TWE-B21444	B21 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1432	TW 382	TWE-B21445	B21 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1433	TW 383	TWE-B21447	B21 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1434	TW 384	TWE-B21449	B21 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1435	TW 385	TWE-B21541	B21 Rod(5,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1436	TW 386	TWE-B21543	B21 Rod(5,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1437	TW 387	TWE-B21545	B21 Rod(5,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1438	TW 388	TWE-B21546	B21 Rod(5,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1439	TW 389	TWE-B21548	B21 Rod(5,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1440	TW 390	TWE-B21549	B21 Rod(5,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1441	TW 391	TWE-B21662	B21 Rod(6,6) Pos.2	2.700+2	9.700+2	K	4.312+0	6.160-1
1442	TW 392	TWE-B21664	B21 Rod(6,6) Pos.4	2.700+2	9.700+2	K	4.312+0	6.160-1
1443	TW 393	TWE-B21665	B21 Rod(6,6) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1444	TW 394	TWE-B21666	B21 Rod(6,6) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1445	TW 395	TWE-B21667	B21 Rod(6,6) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1446	TW 396	TWE-B21668	B21 Rod(6,6) Pos.8	2.700+2	9.700+2	K	4.312+0	6.160-1
1447	TW 397	TWE-B21112	B21 Rod(1,1) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1448	TW 398	TWE-B21114	B21 Rod(1,1) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1449	TW 399	TWE-B21115	B21 Rod(1,1) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1450	TW 400	TWE-B21116	B21 Rod(1,1) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1451	TW 401	TWE-B21117	B21 Rod(1,1) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1452	TW 402	TWE-B21118	B21 Rod(1,1) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1453	TW 403	TWE-B22541	B22 Rod(5,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1454	TW 404	TWE-B22542	B22 Rod(5,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1455	TW 405	TWE-B22544	B22 Rod(5,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1456	TW 406	TWE-B22545	B22 Rod(5,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1457	TW 407	TWE-B22547	B22 Rod(5,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1458	TW 408	TWE-B22549	B22 Rod(5,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1459	TW 409	TWE-B22441	B22 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1460	TW 410	TWE-B22443	B22 Rod(4,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1461	TW 411	TWE-B22445	B22 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1462	TW 412	TWE-B22446	B22 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1463	TW 413	TWE-B22448	B22 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1464	TW 414	TWE-B22449	B22 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1465	TW 415	TWE-B22172	B22 Rod(1,7) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1466	TW 416	TWE-B22174	B22 Rod(1,7) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1467	TW 417	TWE-B22175	B22 Rod(1,7) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1468	TW 418	TWE-B22176	B22 Rod(1,7) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1469	TW 419	TWE-B22177	B22 Rod(1,7) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1470	TW 420	TWE-B22178	B22 Rod(1,7) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1471	TW 421	TWE-B23441	B23 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1472	TW 422	TWE-B23442	B23 Rod(4,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1473	TW 423	TWE-B23444	B23 Rod(4,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1474	TW 424	TWE-B23445	B23 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1475	TW 425	TWE-B23447	B23 Rod(4,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1476	TW 426	TWE-B23449	B23 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1477	TW 427	TWE-B23451	B23 Rod(4,5) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1478	TW 428	TWE-B23453	B23 Rod(4,5) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1479	TW 429	TWE-B23455	B23 Rod(4,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (22/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1480	TW 430	TWE-B23456	B23 Rod(4,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1481	TW 431	TWE-B23458	B23 Rod(4,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1482	TW 432	TWE-B23459	B23 Rod(4,5) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1483	TW 433	TWE-B20112	B20 Rod(1,1) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1484	TW 434	TWE-B20114	B20 Rod(1,1) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1485	TW 435	TWE-B20115	B20 Rod(1,1) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1486	TW 436	TWE-B20116	B20 Rod(1,1) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1487	TW 437	TWE-B20117	B20 Rod(1,1) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1488	TW 438	TWE-B20118	B20 Rod(1,1) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1489	TW 439	TWE-B24341	B24 Rod(3,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1490	TW 440	TWE-B24342	B24 Rod(3,4) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1491	TW 441	TWE-B24344	B24 Rod(3,4) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1492	TW 442	TWE-B24345	B24 Rod(3,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1493	TW 443	TWE-B24347	B24 Rod(3,4) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1494	TW 444	TWE-B24349	B24 Rod(3,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1495	TW 445	TWE-B24441	B24 Rod(4,4) Pos.1	2.700+2	1.470+3	K	6.324+0	5.270-1
1496	TW 446	TWE-B24443	B24 Rod(4,4) Pos.3	2.700+2	1.470+3	K	6.324+0	5.270-1
1497	TW 447	TWE-B24445	B24 Rod(4,4) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1498	TW 448	TWE-B24446	B24 Rod(4,4) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1499	TW 449	TWE-B24448	B24 Rod(4,4) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1500	TW 450	TWE-B24449	B24 Rod(4,4) Pos.9	2.700+2	1.470+3	K	6.324+0	5.270-1
1501	TW 451	TWE-B24712	B24 Rod(7,1) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1502	TW 452	TWE-B24714	B24 Rod(7,1) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1503	TW 453	TWE-B24715	B24 Rod(7,1) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1504	TW 454	TWE-B24716	B24 Rod(7,1) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1505	TW 455	TWE-B24717	B24 Rod(7,1) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1506	TW 456	TWE-B24718	B24 Rod(7,1) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1507	TW 457	TWE-IN0641-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1508	TW 458	TWE-IN0642-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1509	TW 459	TWE-IN0643-SGA	SGA Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1510	TW 460	TWE-EX0641-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1511	TW 461	TWE-EX0642-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1512	TW 462	TWE-EX0643-SGA	SGA Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1513	TW 463	TWE-086B-SGA	SGA Inner Wall Pos.1	2.700+2	6.700+2	K	3.108+0	7.770-1
1514	TW 464	TWE-137B-SGA	SGA Inner Wall Pos.7	2.700+2	6.700+2	K	3.108+0	7.770-1
1515	TW 465	TWE-178B-SGA	SGA Inner Wall Pos.10	2.700+2	6.700+2	K	3.108+0	7.770-1
1516	TW 466	TWE-223B-SGA	SGA Inner Wall	2.700+2	6.700+2	K	3.108+0	7.770-1
1517	TW 467	TWE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1518	TW 468	TWE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1519	TW 469	TWE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1520	TW 470	TWE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1521	TW 471	TWE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1522	TW 472	TWE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1523	TW 473	TWE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1524	TW 474	TWE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1525	TW 475	TWE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1526	TW 476	TWE-EX0992-SGA	SGA U-Tube(2,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1527	TW 477	TWE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1528	TW 478	TWE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1529	TW 479	TWE-IN1121-SGA	SGA U-Tube(1,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1530	TW 480	TWE-EX1121-SGA	SGA U-Tube(1,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1531	TW 481	TWE-IN1122-SGA	SGA U-Tube(2,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1532	TW 482	TWE-EX1122-SGA	SGA U-Tube(2,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1533	TW 483	TWE-IN1123-SGA	SGA U-Tube(3,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1534	TW 484	TWE-EX1123-SGA	SGA U-Tube(3,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1535	TW 485	TWE-IN1371-SGA	SGA U-Tube(1,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1536	TW 486	TWE-EX1371-SGA	SGA U-Tube(1,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1537	TW 487	TWE-IN1372-SGA	SGA U-Tube(2,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1538	TW 488	TWE-EX1372-SGA	SGA U-Tube(2,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1539	TW 489	TWE-IN1373-SGA	SGA U-Tube(3,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1

Table 6.2 (Cont'd) (23/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1540	TW 490	TWE-EX1373-SGA	SGA U-Tube(3,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1541	TW 491	TWE-IN1632-SGA	SGA U-Tube(2,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1542	TW 492	TWE-EX1632-SGA	SGA U-Tube(2,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1543	TW 493	TWE-IN1633-SGA	SGA U-Tube(3,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1544	TW 494	TWE-EX1633-SGA	SGA U-Tube(3,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1545	TW 495	TWE-IN1701-SGA	SGA U-Tube(1,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
1546	TW 496	TWE-IN1782-SGA	SGA U-Tube(2,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
1547	TW 497	TWE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
1548	TW 498	TWE-IN0641-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1549	TW 499	TWE-IN0642-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1550	TW 500	TWE-IN0643-SGB	SGB Inlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1551	TW 501	TWE-EX0641-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1552	TW 502	TWE-EX0642-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1553	TW 503	TWE-EX0643-SGB	SGB Outlet Plenum	2.700+2	7.200+2	K	3.307+0	7.350-1
1554	TW 504	TWE-086B-SGB	SGB Inner Wall Pos.1	2.700+2	6.700+2	K	3.108+0	7.770-1
1555	TW 505	TWE-137B-SGB	SGB Inner Wall Pos.7	2.700+2	6.700+2	K	3.108+0	7.770-1
1556	TW 506	TWE-178B-SGB	SGB Inner Wall Pos.10	2.700+2	6.700+2	K	3.108+0	7.770-1
1557	TW 507	TWE-223B-SGB	SGB Inner Wall	2.700+2	6.700+2	K	3.108+0	7.770-1
1558	TW 508	TWE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1559	TW 509	TWE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1560	TW 510	TWE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1561	TW 511	TWE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1562	TW 512	TWE-IN0863-SGB	SGB U-Tube(3,IN) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1563	TW 513	TWE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	2.700+2	7.200+2	K	3.307+0	7.350-1
1564	TW 514	TWE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1565	TW 515	TWE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1566	TW 516	TWE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1567	TW 517	TWE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1568	TW 518	TWE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1569	TW 519	TWE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	2.700+2	7.200+2	K	3.307+0	7.350-1
1570	TW 520	TWE-IN1121-SGB	SGB U-Tube(1,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1571	TW 521	TWE-EX1121-SGB	SGB U-Tube(1,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1572	TW 522	TWE-IN1122-SGB	SGB U-Tube(2,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1573	TW 523	TWE-EX1122-SGB	SGB U-Tube(2,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1574	TW 524	TWE-IN1123-SGB	SGB U-Tube(3,IN) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1575	TW 525	TWE-EX1123-SGB	SGB U-Tube(3,EX) Pos.5	2.700+2	7.200+2	K	3.307+0	7.350-1
1576	TW 526	TWE-IN1371-SGB	SGB U-Tube(1,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1577	TW 527	TWE-EX1371-SGB	SGB U-Tube(1,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1578	TW 528	TWE-IN1372-SGB	SGB U-Tube(2,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1579	TW 529	TWE-EX1372-SGB	SGB U-Tube(2,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1580	TW 530	TWE-IN1373-SGB	SGB U-Tube(3,IN) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1581	TW 531	TWE-EX1373-SGB	SGB U-Tube(3,EX) Pos.7	2.700+2	7.200+2	K	3.307+0	7.350-1
1582	TW 532	TWE-IN1632-SGB	SGB U-Tube(2,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1583	TW 533	TWE-EX1632-SGB	SGB U-Tube(2,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1584	TW 534	TWE-IN1633-SGB	SGB U-Tube(3,IN) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1585	TW 535	TWE-EX1633-SGB	SGB U-Tube(3,EX) Pos.9	2.700+2	7.200+2	K	3.307+0	7.350-1
1586	TW 536	TWE-IN1701-SGB	SGB U-Tube(1,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
1587	TW 537	TWE-IN1782-SGB	SGB U-Tube(2,IN) Pos.10	2.700+2	7.200+2	K	3.307+0	7.350-1
1588	TW 538	TWE-IN1863-SGB	SGB U-Tube(3,IN) Pos.11	2.700+2	7.200+2	K	3.307+0	7.350-1
1589	TW 539	TWE-211A-PR	PR Outer Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1590	TW 540	TWE-211B-PR	PR Inner Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1591	TW 541	TWE-194A-PR	PR Outer Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1592	TW 542	TWE-194B-PR	PR Inner Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1593	TW 543	TWE-177A-PR	PR Outer Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1594	TW 544	TWE-177B-PR	PR Inner Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1595	TW 545	TWE270A-PR	PR Spray Line Outer Wall	2.700+2	7.200+2	K	3.307+0	7.350-1
1596	TW 546	TWE011A-HLA	HLA S.P Top	0.0	0.0	V	0.0	0.0
1597	TW 547	TWE011B-HLA	HLA S.P Side	0.0	0.0	V	0.0	0.0
1598	TW 548	TWE011C-HLA	HLA S.P Bottom	0.0	0.0	V	0.0	0.0
1599	TW 549	TWE021-HLA	SGA Inlet	0.0	0.0	V	0.0	0.0

Table 6.2 (Cont'd) (24/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1600	TW 550	TWE051A-LSA	LSA Line North	0.0	0.0	V	0.0	0.0
1601	TW 551	TWE051B-LSA	LSA Line South	0.0	0.0	V	0.0	0.0
1602	TW 552	TWE051C-LSA	LSA Line East	0.0	0.0	V	0.0	0.0
1603	TW 553	TWE051D-LSA	SGA Outlet	0.0	0.0	V	0.0	0.0
1604	TW 554	TWE071A-CLA	CLA S.P Top	0.0	0.0	V	0.0	0.0
1605	TW 555	TWE071B-CLA	CLA S.P Side	0.0	0.0	V	0.0	0.0
1606	TW 556	TWE071C-CLA	CLA S.P Bottom	0.0	0.0	V	0.0	0.0
1607	TW 557	TWE151A-HLB	HLB S.P Top	0.0	0.0	V	0.0	0.0
1608	TW 558	TWE151B-HLB	HLB S.P Side	0.0	0.0	V	0.0	0.0
1609	TW 559	TWE151C-HLB	HLB S.P Bottom	0.0	0.0	V	0.0	0.0
1610	TW 560	TWE161-HLB	SGB Inlet	0.0	0.0	V	0.0	0.0
1611	TW 561	TWE191A-LSB	LSB Line North	0.0	0.0	V	0.0	0.0
1612	TW 562	TWE191B-LSB	LSB Line South	0.0	0.0	V	0.0	0.0
1613	TW 563	TWE191C-LSB	LSB Line East	0.0	0.0	V	0.0	0.0
1614	TW 564	TWE191D-LSB	SGB Outlet	0.0	0.0	V	0.0	0.0
1615	TW 565	TWE211A-CLB	CLB S.P Top	0.0	0.0	V	0.0	0.0
1616	TW 566	TWE211B-CLB	CLB S.P Side	0.0	0.0	V	0.0	0.0
1617	TW 567	TWE211C-CLB	CLB S.P Bottom	0.0	0.0	V	0.0	0.0
1618	TW 568	TWE291A-PR	PR Relief Line S.P Top	0.0	0.0	V	0.0	0.0
1619	TW 569	TWE291B-PR	PR Relief Line S.P Bottom	0.0	0.0	V	0.0	0.0
1620	TW 570	TWE301A-PR	PR Safety S.P Top	0.0	0.0	V	0.0	0.0
1621	TW 571	TWE301B-PR	PR Safety S.P Bottom	0.0	0.0	V	0.0	0.0
1623	TW 573	TWE571A-BU	BU.1 S.P Up-Stream	0.0	0.0	V	0.0	0.0
1624	TW 574	TWE571B-BU	BU.1 S.P Down-Stream	0.0	0.0	V	0.0	0.0
1625	TW 575	TWE591A-BU	BU.2 S.P Up-Stream	0.0	0.0	V	0.0	0.0
1626	TW 576	TWE591B-BU	BU.2 S.P Down-Stream	0.0	0.0	V	0.0	0.0
1631	TW 581	TWE061A-LSA	LSA S.P North	0.0	0.0	V	0.0	0.0
1632	TW 582	TWE061B-LSA	LSA S.P South	0.0	0.0	V	0.0	0.0
1633	TW 583	TWE201A-LSB	LSB S.P South	0.0	0.0	V	0.0	0.0
1634	TW 584	TWE201B-LSB	LSB S.P North	0.0	0.0	V	0.0	0.0
1635	TW 585	TWE311A-PR	PV-PR Vent Line S.P Top	0.0	0.0	V	0.0	0.0
1636	TW 586	TWE311B-PR	PV-PR Vent Line S.P Bottom	0.0	0.0	V	0.0	0.0
1640	TW 590	TWE-111D-CDP	PLR-02-1 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1641	TW 591	TWE-112D-CDP	PLR-01-2 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1642	TW 592	TWE-113D-CDP	PLR-08-3 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1643	TW 593	TWE-114D-CDP	PLR-07-4 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1644	TW 594	TWE-115D-CDP	PLR-06-5 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1645	TW 595	TWE-116D-CDP	PLR-05-6 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1646	TW 596	TWE-117D-CDP	PLR-04-7 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1647	TW 597	TWE-118D-CDP	PLR-03-8 Outer Wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1648	TW 598	TWE-121D-UHDP	PLR-UH-9 Outer wall	2.700+2	9.700+2	K	4.312+0	6.160-1
1649	TW 599	TWE-B02552	B02 Rod(5,5) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1650	TW 600	TWE-B02554	B02 Rod(5,5) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1651	TW 601	TWE-B02555	B02 Rod(5,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1652	TW 602	TWE-B02556	B02 Rod(5,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1653	TW 603	TWE-B02557	B02 Rod(5,5) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1654	TW 604	TWE-B02558	B02 Rod(5,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1655	TW 605	TWE-B03552	B03 Rod(5,5) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1656	TW 606	TWE-B03554	B03 Rod(5,5) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1657	TW 607	TWE-B03555	B03 Rod(5,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1658	TW 608	TWE-B03556	B02 Rod(5,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1659	TW 609	TWE-B03557	B03 Rod(5,5) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1660	TW 610	TWE-B03558	B03 Rod(5,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1661	TW 611	TWE-B05112	B05 Rod(1,1) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1662	TW 612	TWE-B05114	B05 Rod(1,1) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1663	TW 613	TWE-B05115	B05 Rod(1,1) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1664	TW 614	TWE-B05116	B05 Rod(1,1) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1665	TW 615	TWE-B05117	B05 Rod(1,1) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1666	TW 616	TWE-B05118	B05 Rod(1,1) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1667	TW 617	TWE-B06552	B06 Rod(5,5) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1

Table 6.2 (Cont'd) (25/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
1668	TW 618	TWE-B06554	B06 Rod(5,5) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1669	TW 619	TWE-B06555	B06 Rod(5,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1670	TW 620	TWE-B06556	B06 Rod(5,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1671	TW 621	TWE-B06557	B06 Rod(5,5) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1672	TW 622	TWE-B06558	B06 Rod(5,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1673	TW 623	TWE-B07552	B07 Rod(5,5) Pos.2	2.700+2	1.470+3	K	6.324+0	5.270-1
1674	TW 624	TWE-B07554	B07 Rod(5,5) Pos.4	2.700+2	1.470+3	K	6.324+0	5.270-1
1675	TW 625	TWE-B07555	B07 Rod(5,5) Pos.5	2.700+2	1.470+3	K	6.324+0	5.270-1
1676	TW 626	TWE-B07556	B07 Rod(5,5) Pos.6	2.700+2	1.470+3	K	6.324+0	5.270-1
1677	TW 627	TWE-B07557	B07 Rod(5,5) Pos.7	2.700+2	1.470+3	K	6.324+0	5.270-1
1678	TW 628	TWE-B07558	B07 Rod(5,5) Pos.8	2.700+2	1.470+3	K	6.324+0	5.270-1
1679	TW 629	TWE-B01221	B01 Rod(2,2) Pos.1	2.700+2	9.700+2	K	4.312+0	6.160-1
1680	TW 630	TWE-B01223	B01 Rod(2,2) Pos.3	2.700+2	9.700+2	K	4.312+0	6.160-1
1681	TW 631	TWE-B01225	B01 Rod(2,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1682	TW 632	TWE-B01226	B01 Rod(2,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1683	TW 633	TWE-B01227	B01 Rod(2,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1684	TW 634	TWE-B01229	B01 Rod(2,2) Pos.9	2.700+2	9.700+2	K	4.312+0	6.160-1
1685	TW 635	TWE-B04221	B04 Rod(2,2) Pos.1	2.700+2	9.700+2	K	4.312+0	6.160-1
1686	TW 636	TWE-B04223	B04 Rod(2,2) Pos.3	2.700+2	9.700+2	K	4.312+0	6.160-1
1687	TW 637	TWE-B04225	B04 Rod(2,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1688	TW 638	TWE-B04226	B04 Rod(2,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1689	TW 639	TWE-B04227	B04 Rod(2,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1690	TW 640	TWE-B04229	B04 Rod(2,2) Pos.9	2.700+2	9.700+2	K	4.312+0	6.160-1
1691	TW 641	TWE-B10621	B10 Rod(6,2) Pos.1	2.700+2	9.700+2	K	4.312+0	6.160-1
1692	TW 642	TWE-B10623	B10 Rod(6,2) Pos.3	2.700+2	9.700+2	K	4.312+0	6.160-1
1693	TW 643	TWE-B10625	B10 Rod(6,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1694	TW 644	TWE-B10626	B10 Rod(6,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1695	TW 645	TWE-B10627	B10 Rod(6,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1696	TW 646	TWE-B10629	B10 Rod(6,2) Pos.9	2.700+2	9.700+2	K	4.312+0	6.160-1
1697	TW 647	TWE-B11221	B11 Rod(2,2) Pos.1	2.700+2	9.700+2	K	4.312+0	6.160-1
1698	TW 648	TWE-B11223	B11 Rod(2,2) Pos.3	2.700+2	9.700+2	K	4.312+0	6.160-1
1699	TW 649	TWE-B11225	B11 Rod(2,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1700	TW 650	TWE-B11226	B11 Rod(2,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1701	TW 651	TWE-B11227	B11 Rod(2,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1702	TW 652	TWE-B11229	B11 Rod(2,2) Pos.9	2.700+2	9.700+2	K	4.312+0	6.160-1
1703	TW 653	TWE-B16221	B16 Rod(2,2) Pos.1	2.700+2	9.700+2	K	4.312+0	6.160-1
1704	TW 654	TWE-B16223	B16 Rod(2,2) Pos.3	2.700+2	9.700+2	K	4.312+0	6.160-1
1705	TW 655	TWE-B16225	B16 Rod(2,2) Pos.5	2.700+2	9.700+2	K	4.312+0	6.160-1
1706	TW 656	TWE-B16226	B16 Rod(2,2) Pos.6	2.700+2	9.700+2	K	4.312+0	6.160-1
1707	TW 657	TWE-B16227	B16 Rod(2,2) Pos.7	2.700+2	9.700+2	K	4.312+0	6.160-1
1708	TW 658	TWE-B16229	B16 Rod(2,2) Pos.9	2.700+2	9.700+2	K	4.312+0	6.160-1
1731	FE 1	FE010-HLA	HLA Leakage(Positive)	0.0	4.000-1	kg/s	6.680-3	1.670+0
1732	FE 2	FE020A-LSA	Primary Loop A (High)	0.0	9.000+1	kg/s	1.071+0	1.190+0
1733	FE 3	FE020B-LSA	Primary Loop A (Low)	0.0	1.581+1	kg/s	1.736-1	1.098+0
1734	FE 4	FE150-HLB	HLB Leakage(Positive)	0.0	4.000-1	kg/s	6.680-3	1.670+0
1735	FE 5	FE160A-LSB	Primary Loop B (High)	0.0	9.000+1	kg/s	1.071+0	1.190+0
1736	FE 6	FE160B-LSB	Primary Loop B (Low)	0.0	1.581+1	kg/s	1.736-1	1.098+0
1737	FE 7	FE270-PR	PR Spray Line	0.0	1.000+0	kg/s	1.190-2	1.190+0
1740	FE 10	FE290-PR	PR Relief Valve	0.0	3.000+0	kg/s	5.010-2	1.670+0
1741	FE 11	FE300-PR	PR Safety Valve	0.0	6.000+0	kg/s	1.002-1	1.670+0
1742	FE 12	FE310-PV	PV-PR Vent Line	0.0	2.000+0	kg/s	4.646-2	2.323+0
1743	FE 13	FE430-SGA	SGA Feedwater	0.0	4.000+0	kg/s	6.452-2	1.613+0
1744	FE 14	FE431-SGA	SGA Downcomer	0.0	7.000+0	kg/s	1.129-1	1.613+0
1745	FE 15	FE432-SGA	SGA Downcomer	0.0	7.000+0	kg/s	1.129-1	1.613+0
1746	FE 16	FE433-SGA	SGA Downcomer	0.0	7.000+0	kg/s	1.129-1	1.613+0
1747	FE 17	FE434-SGA	SGA Downcomer	0.0	7.000+0	kg/s	1.129-1	1.613+0
1748	FE 18	FE440-SGA	SGA Steam Line	0.0	5.000+0	kg/s	1.141-1	2.283+0
1749	FE 19	FE450-SGA	SGA Relief Valve Line	0.0	4.000+0	kg/s	9.132-2	2.283+0
1750	FE 20	FE460-SGA	SGA Safety Valve Line	0.0	1.500+2	kg/s	3.424+0	2.283+0
1751	FE 21	FE470-SGB	SGB Feedwater	0.0	4.000+0	kg/s	6.680-2	1.670+0

Table 6.2 (Cont'd) (26/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1752	FE	22	FE471-SGB	SGB Downcomer	0.0	7.000+0	kg/s	1.169-1	1.670+0
1753	FE	23	FE472-SGB	SGB Downcomer	0.0	7.000+0	kg/s	1.169-1	1.670+0
1754	FE	24	FE473-SGB	SGB Downcomer	0.0	7.000+0	kg/s	1.169-1	1.670+0
1755	FE	25	FE474-SGB	SGB Downcomer	0.0	7.000+0	kg/s	1.169-1	1.670+0
1756	FE	26	FE480-SGB	SGB Steam Line	0.0	5.000+0	kg/s	1.161-1	2.323+0
1757	FE	27	FE490-SGB	SGB Relief Valve Line	0.0	4.000+0	kg/s	9.292-2	2.323+0
1758	FE	28	FE500-SGB	SGB Safety Valie Line	0.0	1.500+2	kg/s	3.484+0	2.323+0
1759	FE	29	FE510-SH	Steam Header	0.0	1.000+1	kg/s	2.283-1	2.283+0
1761	FE	31	FE560A-BU	BU No.1 Venturi (High)	0.0	7.000+1	kg/s	7.686-1	1.098+0
1762	FE	32	FE560B-BU	BU No.1 Venturi (Low)	0.0	1.000+1	kg/s	1.098-1	1.098+0
1763	FE	33	FE570A-BU	BU No.2 Venturi (High)	0.0	1.000+1	kg/s	1.190-1	1.190+0
1764	FE	34	FE570B-BU	BU No.2 Venturi (Low)	0.0	2.240+0	kg/s	2.666-2	1.190+0
1765	FE	35	FE580-ST	ST Vent Line	0.0	3.000-1	kg/s	3.060-3	1.020+0
1766	FE	36	FE590-ST	ST Bleed Line	0.0	2.000+1	kg/s	2.040-1	1.020+0
1767	FE	37	FE650-ACC	Cold Acc Flow to CL A	0.0	1.500+1	kg/s	3.485-1	2.323+0
1768	FE	38	FE660-ACC	Cold Acc Flow to CL B	0.0	9.000+1	kg/s	2.091+0	2.323+0
1769	FE	39	FE670-ACH	Hot Acc Flow to CL A	0.0	9.000+1	kg/s	2.091+0	2.323+0
1770	FE	40	FE680-ACH	Hot Acc Flow to CL B	0.0	1.000+1	kg/s	2.323-1	2.323+0
1771	FE	41	FE730-PJ	PJ Delivery	0.0	2.200+0	kg/s	3.674-2	1.670+0
1772	FE	42	FE740-PJ	Charging Flow to Loop A	0.0	1.400+0	kg/s	2.338-2	1.670+0
1773	FE	43	FE750-PJ	Charging Flow to Loop B	0.0	4.000-1	kg/s	6.680-3	1.670+0
1774	FE	44	FE760-PH	PH Delivery(High)	0.0	1.500+0	kg/s	2.409-2	1.606+0
1775	FE	45	FE770-PH	HPI Flow to Loop A	0.0	3.000+0	kg/s	5.010-2	1.670+0
1776	FE	46	FE780-PH	HPI Flow to Loop B(High)	0.0	5.000-1	kg/s	8.350-3	1.670+0
1777	FE	47	FE790-PJ	Charging Flow to CLA	0.0	5.000-1	kg/s	8.350-3	1.670+0
1778	FE	48	FE820-PL	RHR Outlet(High)	0.0	1.500+1	kg/s	3.485-1	2.323+0
1779	FE	49	FE830-PL	LPI Flow to CL A(High)	0.0	1.500+1	kg/s	3.485-1	2.323+0
1780	FE	50	FE840-PL	LPI Flow to CL B(High)	0.0	1.500+1	kg/s	3.485-1	2.323+0
1781	FE	51	FE900-EX	N2 Gas	0.0	1.500-1	kg/s	2.505-3	1.670+0
1782	FE	52	FE011-HLA	Hot Leg A Reflux Flow	0.0	2.500+0	kg/s	5.025-2	2.010+0
1783	FE	53	FE151-HLB	Hot Leg B Reflux Flow	0.0	2.500+0	kg/s	5.025-2	2.010+0
1784	FE	54	FE320-PV	PV Auto Bleed	0.0	1.000+0	kg/s	1.670-2	1.670+0
1785	FE	55	FE781-PH	HPI Flow to HL B	0.0	3.000+0	kg/s	5.031-2	1.677+0
1786	FE	56	FE782-PH	HPI Flow to LSB	0.0	3.000+0	kg/s	5.031-2	1.677+0
1787	FE	57	FE783-PH	HPI Flow to CL B	0.0	3.000+0	kg/s	5.031-2	1.677+0
1788	FE	58	FE784-PH	HPI Flow to PV Bottom	0.0	3.000+0	kg/s	5.031-2	1.677+0
1789	FE	59	FE785-PH	HPI Flow to PV Top	0.0	3.000+0	kg/s	5.031-2	1.677+0
1790	FE	60	FE831-PL	LPI Flow to HL A	0.0	1.200+1	kg/s	2.004-1	1.670+0
1791	FE	61	FE841-PL	LPI Flow to HL B	0.0	1.200+1	kg/s	2.004-1	1.670+0
1792	FE	62	FE010B-HLA	HLA Leakage(Negative)	0.0	4.000-1	kg/s	6.452-3	1.613+0
1793	FE	63	FE150B-HLB	HLB Leakage(Negative)	0.0	4.000-1	kg/s	6.452-3	1.613+0
1794	FE	64	FE280C-PR	PR Surge Line(Low)	0.0	1.000+1	kg/s	1.613-1	1.613+0
1795	FE	65	FE440B-SGA	SGA Main Steam Line(Low)	0.0	1.000+0	kg/s	2.278-2	2.278+0
1796	FE	66	FE451-SGA	SGA Turbine Bypass Flow	0.0	2.000+1	kg/s	4.566-1	2.283+0
1797	FE	67	FE480B-SGB	SGB Main Steam Line(Low)	0.0	1.000+0	kg/s	2.278-2	2.278+0
1798	FE	68	FE491-SGB	SGB Turbine Bypass Flow	0.0	2.000+1	kg/s	4.566-1	2.283+0
1799	FE	69	FE515-JC	JC Bleed	0.0	1.500+0	kg/s	2.420-2	1.613+0
1800	FE	70	FE520-PAA	Auxiliary Feedwater A(High)	0.0	1.500+0	kg/s	2.409-2	1.606+0
1801	FE	71	FE520B-PAA	Auxiliary Feedwater A(Low)	0.0	1.000+0	kg/s	1.613-2	1.613+0
1802	FE	72	FE530B-PAB	Auxiliary Feedwater B(Low)	0.0	1.000+0	kg/s	1.606-2	1.606+0
1803	FE	73	FE730B-PJ	PJ Delivery(Low)	0.0	1.277+0	kg/s	2.051-2	1.606+0
1804	FE	74	FE740B-PJ	Charging Flow to A(Low)	0.0	1.277+0	kg/s	2.051-2	1.606+0
1805	FE	75	FE750B-PJ	Charging Flow to B(Low)	0.0	2.047-1	kg/s	3.287-3	1.606+0
1806	FE	76	FE760B-PH	PH Delivery(Low)	0.0	1.000+0	kg/s	1.670-2	1.670+0
1807	FE	77	FE780B-PH	HPI Flow to Loop B(Low)	0.0	3.000-1	kg/s	4.818-3	1.606+0
1808	FE	78	FE820B-PL	RHR Outlet(Low)	0.0	5.000+0	kg/s	1.139-1	2.278+0
1809	FE	79	FE830B-PL	LPI Flow to CL A(Low)	0.0	5.000+0	kg/s	1.139-1	2.278+0
1810	FE	80	FE840B-PL	LPI Flow to CL B(Low)	0.0	3.000+0	kg/s	6.834-2	2.278+0
1811	FE	81	FE595-BU	Small BU (High)	0.0	2.500+0	kg/s	4.033-2	1.613+0
1812	FE	82	FE596-BU	Small BU (Low)	0.0	1.000+0	kg/s	1.613-2	1.613+0

Table 6.2 (Cont'd) (27/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1813	FE	83	FE960-CS	Oil Flow	0.0	2.000+0	kg/s	3.212-2	1.606+0
1881	PE	1	PE561-BU	BU No.1 Venturi	0.0	2.000+1	MPa	1.078-1	5.390-1
1882	PE	2	PE581-BU	BU No.2 Venturi	0.0	2.000+1	MPa	1.078-1	5.390-1
1883	PE	3	PE010-SGA	SGA Inlet Plenum	0.0	2.000+1	MPa	1.078-1	5.390-1
1884	PE	4	PE020-LSA	PCA Suction	0.0	2.000+1	MPa	1.078-1	5.390-1
1885	PE	5	PE030-CLA	PCA Delivery	0.0	2.000+1	MPa	1.078-1	5.390-1
1886	PE	6	PE150-SGB	SGB Inlet Plenum	0.0	2.000+1	MPa	1.078-1	5.390-1
1887	PE	7	PE160-LSB	PCB Suction	0.0	2.000+1	MPa	1.078-1	5.390-1
1888	PE	8	PE170-CLB	PCB Delivery	0.0	2.000+1	MPa	1.078-1	5.390-1
1889	PE	9	PE290-PV	PV Upper Head	0.0	2.000+1	MPa	1.078-1	5.390-1
1890	PE	10	PE280A-PV	PV Upper Plenum (High)	0.0	2.000+1	MPa	1.078-1	5.390-1
1891	PE	11	PE280B-PV	PV Upper Plenum (Low)	0.0	5.000+0	MPa	2.695-2	5.390-1
1892	PE	12	PE270-PV	PV Lower Plenum	0.0	2.000+1	MPa	1.078-1	5.390-1
1893	PE	13	PE300A-PR	PR (High Range)	0.0	2.000+1	MPa	1.078-1	5.390-1
1894	PE	14	PE300B-PR	PR (Low Range)	0.0	5.000+0	MPa	2.695-2	5.390-1
1895	PE	15	PE310-PR	PR RV Venturi Upstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1896	PE	16	PE320-PR	PR RV Venturi Downstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1897	PE	17	PE330-PR	PR SV Venturi Upstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1898	PE	18	PE340-PR	PR SV Venturi Downstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1899	PE	19	PE430-SGA	SGA Steam Dome	0.0	1.000+1	MPa	5.390-2	5.390-1
1900	PE	20	PE440-SGA	SGA Steam Line	0.0	1.000+1	MPa	5.390-2	5.390-1
1901	PE	21	PE450-SGB	SGB Steam Dome	0.0	1.000+1	MPa	5.390-2	5.390-1
1902	PE	22	PE460-SGB	SGB Steam Line	0.0	1.000+1	MPa	5.390-2	5.390-1
1903	PE	23	PE470-SH	Steam Header	0.0	1.000+1	MPa	5.390-2	5.390-1
1904	PE	24	PE480-JC	Jet Condenser	0.0	1.000+1	MPa	5.390-2	5.390-1
1905	PE	25	PE610-ST	Suppression Tank	0.0	1.000+0	MPa	3.200-3	3.200-1
1906	PE	26	PE560-BU	BU No.1 Orifice Upstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1907	PE	27	PE570-BU	BU No.1 Orifice Downstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1908	PE	28	PE580-BU	BU No.2 Orifice Upstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1909	PE	29	PE590-BU	BU No.2 Orifice Downstream	0.0	2.000+1	MPa	1.078-1	5.390-1
1910	PE	30	PE600-ST	Blowdown Piping	0.0	2.000+0	MPa	6.400-3	3.200-1
1911	PE	31	PE650-ACC	Cold Acc Tank	0.0	1.000+1	MPa	5.390-2	5.390-1
1912	PE	32	PE660-ACH	Hot Acc Tank	0.0	1.000+1	MPa	5.390-2	5.390-1
1914	PE	34	PE900-EX	N2 Gas	0.0	2.000+1	MPa	1.078-1	5.390-1
1915	PE	35	PE011-HLA	HLA Spool Piece	0.0	2.000+1	MPa	1.078-1	5.390-1
1916	PE	36	PE071-CLA	CLA Spool Piece	0.0	2.000+1	MPa	1.078-1	5.390-1
1917	PE	37	PE151-HLB	HLB Spool Piece	0.0	2.000+1	MPa	1.078-1	5.390-1
1918	PE	38	PE211-CLB	CLB Spool Piece	0.0	2.000+1	MPa	1.078-1	5.390-1
1919	PE	39	PE291-PR	PR Relief Valve S.P	0.0	2.000+1	MPa	1.118-1	5.590-1
1920	PE	40	PE301-PR	PR Safety Valve Line	0.0	2.000+1	MPa	1.118-1	5.590-1
1921	PE	41	PE311-PR	PV-PR Vent Line	0.0	2.000+1	MPa	1.118-1	5.590-1
1923	PE	43	PE571-BU	BU No.1 SP	0.0	2.000+1	MPa	1.118-1	5.590-1
1924	PE	44	PE591-BU	BU No.2 SP	0.0	2.000+1	MPa	1.118-1	5.590-1
1925	PE	45	PE451-SGA	SGA Safety Valve Line S.P	0.0	1.000+1	MPa	5.590-2	5.590-1
1926	PE	46	PE820-RHR	PL Delivery	0.0	2.000+1	MPa	1.078-1	5.390-1
1927	PE	47	PE595-BU		0.0	2.000+1	MPa	5.660-2	2.830-1
1928	PE	48	PE596-BU		0.0	2.000+1	MPa	5.660-2	2.830-1
1929	PE	49	PE597-BU		0.0	2.000+1	MPa	5.660-2	2.830-1
1930	PE	50	PE598-BU	Spool Piece Pos.3	0.0	2.000+1	MPa	5.800-2	2.900-1
1981	MI	1	RE010-PCA	PCA (Rotation Speed)	0.0	7.000+1	Hz	3.836-1	5.480-1
1982	MI	2	RE150-PCB	PCB (Rotation Speed)	0.0	7.000+1	Hz	3.836-1	5.480-1
1983	MI	3	OPE270-PR	PR Spray (HCV270)	0.0	1.000+2	%	5.390-1	5.390-1
1984	MI	4	OPE300A-PR	PR Pressure (PCV300A)	0.0	1.000+2	%	5.390-1	5.390-1
1985	MI	5	OPE430-SGA	SGA Feedwater (FCV430)	0.0	1.000+2	%	5.390-1	5.390-1
1986	MI	6	OPE470-SGB	SGB Feedwater (FCV470)	0.0	1.000+2	%	5.390-1	5.390-1
1987	MI	7	OPE440-SGA	Turbine Bypass (FCV440)	0.0	1.000+2	%	5.390-1	5.390-1
1988	MI	8	OPE510-SH	Steam Flow (FCV510)	0.0	1.000+2	%	5.390-1	5.390-1
1989	MI	9	OPE820-PL	RHR Flow (FCV820)	0.0	1.000+2	%	5.390-1	5.390-1
1990	MI	10	OPE840-PL	RHR Temperature (TCV840)	0.0	1.000+2	%	5.390-1	5.390-1
1991	MI	11	VBE010-PCA	PCA (Vibration)	0.0	2.000+2	um	1.001+1	5.005+0

Table 6.2 (Cont'd) (28/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
1992	MI	12	VBE150-PCB	PCB (Vibration)	0.0	2.000+2	um	1.001+1	5.005+0
1993	MI	13	TQE010-PCA	PCA (Torque)	0.0	1.000+2	Nm	1.601+0	1.601+0
1994	MI	14	TQE150-PCB	PCB (Torque)	0.0	1.000+2	Nm	1.601+0	1.601+0
1995	MI	15	AE010-PCA	PCA (Electric Current)	0.0	1.500+2	A	1.554+0	1.036+0
1996	MI	16	AE150-PCB	PCB (Electric Current)	0.0	1.500+2	A	1.554+0	1.036+0
1997	MI	17	WE270A-T	Total Core Power	0.0	1.600+1	MW	7.024-2	4.390-1
1998	MI	18	WE270B-M	Middle Heat Flux Region	0.0	2.000+0	MW	8.780-3	4.390-1
1999	MI	19	WE270C-H1	High Heat Flux Region	0.0	4.000+0	MW	1.756-2	4.390-1
2000	MI	20	WE270D-H2	High Heat Flux Region	0.0	4.000+0	MW	1.756-2	4.390-1
2001	MI	21	WE270E-L1	Low Heat Flux Region	0.0	2.000+0	MW	8.780-3	4.390-1
2002	MI	22	WE270F-L2	Low Heat Flux Region	0.0	2.000+0	MW	8.780-3	4.390-1
2003	MI	23	WE270G-L3	Low Heat Flux Region	0.0	2.000+0	MW	8.780-3	4.390-1
2004	MI	24	WE280A-PR	PR Proportional Heater	0.0	1.000+1	kW	1.503-1	1.503+0
2005	MI	25	WE280B-PR	PR Base Heater	0.0	1.500+2	kW	2.254+0	1.503+0
2006	MI	26	WE010-PCA	PCA	0.0	3.000+1	kW	4.509-1	1.503+0
2007	MI	27	WE150-PCB	PCB	0.0	3.000+1	kW	4.509-1	1.503+0
2009	MI	29	WE020-HLA	HLA	0.0	5.000+0	kW	7.555-2	1.511+0
2010	MI	30	WE030-LSA	LSA	0.0	7.500+0	kW	1.133-1	1.511+0
2011	MI	31	WE040-CLA	CLA	0.0	2.000+0	kW	3.022-2	1.511+0
2012	MI	32	WE160-HLB	HLB	0.0	5.000+0	kW	7.555-2	1.511+0
2013	MI	33	WE170-LSB	LSB	0.0	7.500+0	kW	1.133-1	1.511+0
2014	MI	34	WE180-CLB	CLB	0.0	2.000+0	kW	3.022-2	1.511+0
2015	MI	35	WE271A-PV	PV	0.0	1.500+1	kW	2.266-1	1.511+0
2016	MI	36	WE271B-PV	PV	0.0	1.500+1	kW	2.266-1	1.511+0
2017	MI	37	WE271C-PV	PV	0.0	1.500+1	kW	2.266-1	1.511+0
2018	MI	38	WE271D-PV	PV	0.0	1.500+1	kW	2.266-1	1.511+0
2019	MI	39	WE430A-SGA	SGA	0.0	4.000+0	kW	6.044-2	1.511+0
2020	MI	40	WE430B-SGA	SGA	0.0	4.000+0	kW	6.044-2	1.511+0
2021	MI	41	WE430C-SGA	SGA	0.0	4.000+0	kW	6.044-2	1.511+0
2022	MI	42	WE430D-SGA	SGA	0.0	4.000+0	kW	6.044-2	1.511+0
2023	MI	43	WE440A-SGA	SGA Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2024	MI	44	WE440B-SGA	SGA Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2025	MI	45	WE440C-SGA	SGA Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2026	MI	46	WE440D-SGA	SGA Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2027	MI	47	WE290-PR	PR Surge Line	0.0	4.000+0	kW	6.044-2	1.511+0
2028	MI	48	WE300-PR	PR Spray Line	0.0	7.500+0	kW	1.133-1	1.511+0
2029	MI	49	WE450A-SGB	SGB	0.0	4.000+0	kW	6.044-2	1.511+0
2030	MI	50	WE450B-SGB	SGB	0.0	4.000+0	kW	6.044-2	1.511+0
2031	MI	51	WE450C-SGB	SGB	0.0	4.000+0	kW	6.044-2	1.511+0
2032	MI	52	WE450D-SGB	SGB	0.0	4.000+0	kW	6.044-2	1.511+0
2033	MI	53	WE460A-SGB	SGB Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2034	MI	54	WE460B-SGB	SGB Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2035	MI	55	WE460C-SGB	SGB Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2036	MI	56	WE460D-SGB	SGB Downcomer	0.0	2.000+0	kW	3.022-2	1.511+0
2037	MI	57	WE650A-ACC	Cold ACC Line	0.0	1.000+1	kW	1.511-1	1.511+0
2038	MI	58	WE650B-ACC	Cold ACC Line	0.0	1.000+1	kW	1.511-1	1.511+0
2039	MI	59	WE660A-ACH	Hot Acc Line	0.0	2.000+1	kW	3.022-1	1.511+0
2040	MI	60	WE660B-ACH	Hot Acc Line	0.0	1.500+1	kW	2.266-1	1.511+0
2066	MI	86	VE010-HLA	HLA Pitot Tube	0.0	3.000+1	V	4.500-1	1.500+0
2072	MI	92	VE-N-006-DC	PV Downcomer North			V		
2073	MI	93	VE-S-006-DC	PV Downcomer South			V		
2074	MI	94	VE-E-006-DC	PV Downcomer East			V		
2075	MI	95	VE-W-006-DC	PV Downcomer West			V		
2078	MI	98	VE030A-CLA	CLA Pitot Tube			V		
2079	MI	99	VE030B-CLA	CLA Pitot Tube			V		
2080	MI	100	VE030-CLA	CLA Pitot Tube			V		
2081	MI	101	VE010A-HLA	HLA Pitot Tube			V		
2082	MI	102	VE010B-HLA	HLA Pitot Tube			V		
2083	MI	103	VE020A-LSA	LSA Pitot Tube			V		
2084	MI	104	VE020B-LSA	LSA Pitot Tube			V		

Table 6.2 (Cont'd) (29/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
2085	MI	105	VE020-LSA	LSA Pitot Tube			V		
2181	LE	1	LE270-PV	PV	0.0	1.100+1	m	3.520-2	3.200-1
2182	LE	2	LE280-PR	PR	0.0	5.000+0	m	2.695-2	5.390-1
2183	LE	3	LE430-SGA	SGA Wide Range	0.0	1.700+1	m	5.440-2	3.200-1
2184	LE	4	LE440-SGA	SGA Narrow Range	0.0	6.000+0	m	1.920-2	3.200-1
2185	LE	5	LE441-SGA	SGA Boiling Section	0.0	1.100+1	m	3.520-2	3.200-1
2186	LE	6	LE450-SGB	SGB Wide Range	0.0	1.700+1	m	5.440-2	3.200-1
2187	LE	7	LE460-SGB	SGB Narrow Range	0.0	6.000+0	m	1.920-2	3.200-1
2188	LE	8	LE461-SGB	SGB Boiling Section	0.0	1.100+1	m	3.520-2	3.200-1
2189	LE	9	LE470-JC	JC	0.0	5.500+0	m	1.760-2	3.200-1
2190	LE	10	LE560-ST	ST Wide Range	0.0	1.200+1	m	3.840-2	3.200-1
2191	LE	11	LE570-ST	ST Low Level	0.0	4.000+0	m	1.280-2	3.200-1
2192	LE	12	LE580-ST	ST Middle Level	0.0	4.000+0	m	1.280-2	3.200-1
2193	LE	13	LE590-ST	ST High Level	0.0	4.000+0	m	1.280-2	3.200-1
2194	LE	14	LE650-ACC	Cold Acc Tank	0.0	5.000+0	m	2.695-2	5.390-1
2195	LE	15	LE660-ACH	Hot Acc Tank	0.0	5.000+0	m	2.695-2	5.390-1
2196	LE	16	LE820-PL	RHR	0.0	5.000+0	m	1.600-2	3.200-1
2197	LE	17	LE830-RWST	RWST	0.0	1.000+1	m	3.200-2	3.200-1
2198	LE	18	LE442-SGA	SGA Downcomer	0.0	1.200+1	m	3.840-2	3.200-1
2199	LE	19	LE462-SGB	SGB Downcomer	0.0	1.200+1	m	3.840-2	3.200-1
2200	LE	20	DLE270-PV	PV	0.0	6.300+1	kPa	2.230-1	3.540-1
2201	LE	21	DLE280-PR	PR	0.0	3.916+1	kPa	2.189-1	5.590-1
2202	LE	22	DLE430-SGA	SGA Wide Range	0.0	1.159+2	kPa	4.104-1	3.540-1
2203	LE	23	DLE440-SGA	SGA Narrow Range	0.0	4.091+1	kPa	1.448-1	3.540-1
2204	LE	24	DLE441-SGA	SGA Boiling Section	0.0	7.500+1	kPa	2.655-1	3.540-1
2205	LE	25	DLE442-SGA	SGA Downcomer	0.0	8.192+1	kPa	2.900-1	3.540-1
2206	LE	26	DLE450-SGB	SGB Wide Range	0.0	1.159+2	kPa	4.104-1	3.540-1
2207	LE	27	DLE460-SGB	SGB Narrow Range	0.0	4.091+1	kPa	1.448-1	3.540-1
2208	LE	28	DLE461-SGB	SGB Boiling Section	0.0	7.500+1	kPa	2.655-1	3.540-1
2209	LE	29	DLE462-SGB	SGB Downcomer	0.0	8.192+1	kPa	2.900-1	3.540-1
2210	LE	30	DLE470-JC	JC	0.0	3.787+1	kPa	1.341-1	3.540-1
2211	LE	31	DLE560-ST	ST Wide Range	0.0	1.128+2	kPa	3.992-1	3.540-1
2212	LE	32	DLE570-ST	ST Low Level	0.0	3.757+1	kPa	1.330-1	3.540-1
2213	LE	33	DLE580-ST	ST Middle Level	0.0	3.757+1	kPa	1.330-1	3.540-1
2214	LE	34	DLE590-ST	ST High Level	0.0	3.757+1	kPa	1.330-1	3.540-1
2215	LE	35	DLE650-ACC	Cold Acc Tank	0.0	6.013+1	kPa	3.361-1	5.590-1
2216	LE	36	DLE660-ACH	Hot Acc Tank	0.0	5.512+1	kPa	3.081-1	5.590-1
2217	LE	37	DLE820-PL	RHR	0.0	4.857+1	kPa	1.719-1	3.540-1
2218	LE	38	DLE830-RWST	RWST	0.0	9.807+1	kPa	3.472-1	3.540-1
2251	DP	1	DPE010-HLA	Upper Plenum - HLA Nozzle	-4.000+1	4.000+1	kPa	4.472-1	5.590-1
2252	DP	2	DPE020-HLA	HLA Nozzle - HLA Break	-4.000+1	4.000+1	kPa	4.472-1	5.590-1
2253	DP	3	DPE030A-HLA	PR Surge Line (High)	-1.000+2	1.900+3	kPa	7.080+0	3.540-1
2254	DP	4	DPE040-HLA	HLA Break - SGA Inlet	-4.000+1	4.000+1	kPa	4.472-1	5.590-1
2255	DP	5	DPE050A-SGA	SGA Inlet - Tube 3 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2256	DP	6	DPE050B-SGA	SGA Inlet - Tube 2 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2257	DP	7	DPE050C-SGA	SGA Inlet - Tube 1 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2258	DP	8	DPE050D-SGA	SGA Inlet - Tube 4 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2259	DP	9	DPE050E-SGA	SGA Inlet - Tube 5 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2260	DP	10	DPE050F-SGA	SGA Inlet - Tube 6 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2261	DP	11	DPE060A-SGA	SGA Outlet - Tube 3 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2262	DP	12	DPE060B-SGA	SGA Outlet - Tube 2 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2263	DP	13	DPE060C-SGA	SGA Outlet - Tube 1 Top	-1.500+2	5.000+1	kPa	7.080-1	3.540-1
2264	DP	14	DPE060D-SGA	SGA Outlet - Tube 4 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2265	DP	15	DPE060E-SGA	SGA Outlet - Tube 5 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2266	DP	16	DPE060F-SGA	SGA Outlet - Tube 6 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2267	DP	17	DPE070-LSA	SGA Outlet - LSA Bottom	-8.000+1	8.000+1	kPa	8.944-1	5.590-1
2268	DP	18	DPE080-LSA	LSA Bottom - PCA Suction	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2269	DP	19	DPE090-PCA	PCA Suction - Delivery	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2270	DP	20	DPE100-CLA	PR Spray Line	-2.000+2	2.000+2	kPa	2.236+0	5.590-1
2271	DP	21	DPE110-CLA	PCA Delivery - CLA Break	-5.000+1	5.000+1	kPa	5.590-1	5.590-1

Table 6.2 (Cont'd) (30/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2272	DP	22	DPE120-CLA	CLA Break - CLA Nozzle	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2273	DP	23	DPE130-CLA	CLA Nozzle - Downcomer	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2274	DP	24	DPE140-HLA	Upper Plenum - Downcomer	-3.000+1	3.000+1	kPa	3.354-1	5.590-1
2275	DP	25	DPE150-HLB	Upper Plenum -HLB Nozzle	-3.000+1	3.000+1	kPa	3.354-1	5.590-1
2276	DP	26	DPE160-HLB	HLB Nozzle - HLB Break	-3.000+1	3.000+1	kPa	3.354-1	5.590-1
2277	DP	27	DPE170-HLB	HLB Break - SGB Break	-3.000+1	3.000+1	kPa	3.354-1	5.590-1
2278	DP	28	DPE180-HLB	SGB Break - SGB Inlet	-3.000+1	3.000+1	kPa	3.354-1	5.590-1
2279	DP	29	DPE190A-SGB	SGB Inlet - Tube 3 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2280	DP	30	DPE190B-SGB	SGB Inlet - Tube 2 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2281	DP	31	DPE190C-SGB	SGB Inlet - Tube 1 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2282	DP	32	DPE190D-SGB	SGB Inlet - Tube 4 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2283	DP	33	DPE190E-SGB	SGB Inlet - Tube 5 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2284	DP	34	DPE190F-SGB	SGB Inlet - Tube 6 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2285	DP	35	DPE200A-SGB	SGB Outlet - Tube 3 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2286	DP	36	DPE200B-SGB	SGB Outlet - Tube 2 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2287	DP	37	DPE200C-SGB	SGB Outlet - Tube 1 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2288	DP	38	DPE200D-SGB	SGB Outlet - Tube 4 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2289	DP	39	DPE200E-SGB	SGB Outlet - Tube 5 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2290	DP	40	DPE200F-SGB	SGB Outlet - Tube 6 Top	-1.500+2	5.000+1	kPa	1.118+0	5.590-1
2291	DP	41	DPE210-LSB	SGB Outlet - LSB Bottom	-8.000+1	8.000+1	kPa	8.944-1	5.590-1
2292	DP	42	DPE220-LSB	LSB Bottom - PCB Suction	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2293	DP	43	DPE230-PCB	PCB Suction - Delivery	-5.000+1	5.000+1	kPa	5.590-1	5.590-1
2294	DP	44	DPE240-CLB	PCB Delivery - CLB Break	-2.000+1	2.000+1	kPa	2.236-1	5.590-1
2295	DP	45	DPE250-CLB	CLB Break - CLB Nozzle	-2.000+1	2.000+1	kPa	2.236-1	5.590-1
2296	DP	46	DPE260-CLB	CLB Nozzle - Downcomer	-2.000+1	2.000+1	kPa	2.236-1	5.590-1
2297	DP	47	DPE270-PV	PV Bottom - Top	-1.000+2	4.000+2	kPa	2.795+0	5.590-1
2298	DP	48	DPE280-PV	PV Lower Plenum	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2299	DP	49	DPE290-PV	Lower Core Support Plate	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2300	DP	50	DPE300-PV	Core(Elevation -35 - 3945)	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2301	DP	51	DPE320-PV	Upper Plenum	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2302	DP	52	DPE330-PV	Upper Head	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2303	DP	53	DPE310-PV	Upper Core Support Plate	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2304	DP	54	DPE350A-PV	Guide Tube Top Orifice	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2305	DP	55	DPE350B-PV	Guide Tube Top Orifice	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2306	DP	56	DPE360-PV	PV Downcomer	-1.000+2	3.000+2	kPa	2.236+0	5.590-1
2307	DP	57	DPE370-PV	Lower Downcomer	-5.000+1	1.500+2	kPa	1.118+0	5.590-1
2308	DP	58	DPE380-PV	Upper Downcomer	-5.000+1	1.500+2	kPa	1.118+0	5.590-1
2309	DP	59	DPE390-PV	Simulated Check Valve A	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2310	DP	60	DPE400-PV	Simulated Check Valve B	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2311	DP	61	DPE410-PV	Check Valve Control	-5.000+1	1.000+2	kPa	8.385-1	5.590-1
2312	DP	62	DPE332-PV	Upper Head - Downcomer	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2313	DP	63	DPE331-PV	Upper Head	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2314	DP	64	DPE560A-BU	FE560A (BU 1 High)	0.0	2.450+2	kPa	1.370+0	5.590-1
2315	DP	65	DPE560B-BU	FE560B (BU 1 Low)	0.0	5.000+0	kPa	1.600-2	3.200-1
2316	DP	66	DPE570-BU	BU No.1 Venturi	0.0	5.000+2	kPa	2.795+0	5.590-1
2317	DP	67	DPE580A-BU	FE570A (BU 2 High)	0.0	1.000+2	kPa	5.590-1	5.590-1
2318	DP	68	DPE580B-BU	FE570B (BU 2 Low)	0.0	5.000+0	kPa	1.600-2	3.200-1
2319	DP	69	DPE590-BU	BU No.2 Venturi	0.0	5.000+2	kPa	2.795+0	5.590-1
2320	DP	70	DPE030B-HLA	PR Surge Line (Low)	-3.000+2	3.000+2	kPa	3.354+0	5.590-1
2321	DP	71	DPE072-LSA	LSA (SG Side)	0.0	4.500+1	kPa	2.515-1	5.590-1
2322	DP	72	DPE073-LSA	LSA (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2323	DP	73	DPE074-LSA	LSA (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2324	DP	74	DPE075-LSA	LSA (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2325	DP	75	DPE076-LSA	LSA (SG Side)	0.0	3.000+1	kPa	1.677-1	5.590-1
2326	DP	76	DPE212-LSB	LSB (SG Side)	0.0	4.500+1	kPa	2.515-1	5.590-1
2327	DP	77	DPE213-LSB	LSB (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2328	DP	78	DPE214-LSB	LSB (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2329	DP	79	DPE215-LSB	LSB (SG Side)	-1.000+1	1.000+1	kPa	1.118-1	5.590-1
2330	DP	80	DPE216-LSB	LSB (SG Side)	0.0	3.000+1	kPa	1.677-1	5.590-1
2331	DP	81	DPE430-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1

Table 6.2 (Cont'd) (31/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2332	DP	82	DPE431-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2333	DP	83	DPE432-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2334	DP	84	DPE433-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2335	DP	85	DPE434-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2336	DP	86	DPE435-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2337	DP	87	DPE436-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2338	DP	88	DPE437-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2339	DP	89	DPE438-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2340	DP	90	DPE439-SGA	SGA Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2341	DP	91	DPE440-SGA	SGA Boiling Section	-4.000+1	0.0	kPa	2.236-1	5.590-1
2342	DP	92	DPE450-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2343	DP	93	DPE451-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2344	DP	94	DPE452-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2345	DP	95	DPE453-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2346	DP	96	DPE454-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2347	DP	97	DPE455-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2348	DP	98	DPE456-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2349	DP	99	DPE457-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2350	DP	100	DPE458-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2351	DP	101	DPE459-SGB	SGB Boiling Section	-3.000+1	0.0	kPa	1.677-1	5.590-1
2352	DP	102	DPE460-SGB	SGB Boiling Section	-4.000+1	0.0	kPa	2.236-1	5.590-1
2353	DP	103	DPE011-HLA	HLA Spool Piece	-1.000+1	1.000+1	kPa	6.410-2	3.205-1
2354	DP	104	DPE071-CLA	CLA Spool Piece	-1.000+1	1.000+1	kPa	6.410-2	3.205-1
2355	DP	105	DPE151-HLB	HLB Spool Piece	-1.000+1	1.000+1	kPa	6.410-2	3.205-1
2356	DP	106	DPE211-CLB	CLB Spool Piece	-1.000+1	1.000+1	kPa	6.410-2	3.205-1
2357	DP	107	DPE571-BU	BU No.1 Spool Piece	0.0	2.000+2	kPa	1.118+0	5.590-1
2358	DP	108	DPE591-BU	BU No.2 Spool Piece	-1.000+2	1.000+2	kPa	1.118+0	5.590-1
2359	DP	109	DPE041-PR	PR Diff. Press.	0.0	6.118+0	kPa	1.958-2	3.200-1
2360	DP	110	DPE042-PR	PR Diff. Press.	0.0	7.340+0	kPa	2.349-2	3.200-1
2361	DP	111	DPE043-PR	PR Diff. Press.	0.0	3.670+0	kPa	1.174-2	3.200-1
2362	DP	112	DPE044-PR	PR Diff. Press.	0.0	3.670+0	kPa	1.174-2	3.200-1
2363	DP	113	DPE045-PR	PR Diff. Press.	0.0	1.101+1	kPa	3.524-2	3.200-1
2364	DP	114	DPE046-PR	PR Diff. Press.	0.0	7.342+0	kPa	2.349-2	3.200-1
2365	DP	115	DPE101-PR	PR-CLA Diff. Press.	-2.000+2	2.000+2	kPa	1.280+0	3.200-1
2366	DP	116	DPE055A-SGA	SGA I.P-O.P (High)	-3.000+1	3.000+1	kPa	1.920-1	3.200-1
2367	DP	117	DPE055B-SGA	SGA I.P-O.P (Low)	-3.000+0	3.000+0	kPa	1.920-2	3.200-1
2368	DP	118	DPE195A-SGB	SGB I.P-O.P (High)	-3.000+1	3.000+1	kPa	1.920-1	3.200-1
2369	DP	119	DPE195B-SGB	SGB I.P-O.P (Low)	-3.000+0	3.000+0	kPa	1.920-2	3.200-1
2370	DP	120	DPE056-SGA	SGA Plenum Diff.Press.	-4.000+1	4.000+1	kPa	2.560-1	3.200-1
2371	DP	121	DPE057-SGA	Primary-Secondary	-1.000+0	1.000+0	MPa	6.400-3	3.200-1
2372	DP	122	DPE196-SGB	SGB Plenum Diff.Press.	-4.000+1	4.000+1	kPa	2.560-1	3.200-1
2373	DP	123	DPE197-SGB	Primary-Secondary	-1.000+0	1.000+0	MPa	6.400-3	3.200-1
2374	DP	124	DPE301-PV	Core(Elevation-35-+409)	-5.000+0	1.000+1	kPa	4.245-2	2.830-1
2375	DP	125	DPE302-PV	Core(Elevation+409-+815)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2376	DP	126	DPE303-PV	Core(Elevation+815-+1221)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2377	DP	127	DPE304-PV	Core(Elevation+1221-+1627)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2378	DP	128	DPE305-PV	Core(Elevation+1627-+2033)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2379	DP	129	DPE306-PV	Core(Elevation+2033-+2439)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2380	DP	130	DPE307-PV	Core(Elevation+2439-+2845)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2381	DP	131	DPE308-PV	Core(Elevation+2845-+3251)	-5.000+0	5.000+0	kPa	2.830-2	2.830-1
2382	DP	132	DPE309-PV	Core(Elevation+3251-+3945)	-3.000+1	0.0	kPa	8.490-2	2.830-1
2383	DP	133	DPE333-PV	UpperH(Elevation6634-8860)	-3.500+1	0.0	kPa	9.905-2	2.830-1
2384	DP	134	DPE595-BU	Spool Piece	0.0	1.000+1	kPa	3.200-2	3.200-1
2451	MF	1	MFE011A-HLA	HLA Spool Piece Top			V		
2452	MF	2	MFE011B-HLA	HLA Spool Piece Side			V		
2453	MF	3	MFE011C-HLA	HLA Spool Piece Bottom			V		
2454	MF	4	MFE051A-LSA	LSA Spool Piece East			V		
2455	MF	5	MFE051B-LSA	LSA Spool Piece South			V		
2456	MF	6	MFE051C-LSA	LSA Spool Piece West			V		
2457	MF	7	MFE071A-CLA	CLA Spool Piece Top			V		

Table 6.2 (Cont'd) (32/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2458	MF	8	MFE071B-CLA	CLA Spool Piece Side			V		
2459	MF	9	MFE071C-CLA	CLA Spool Piece Bottom			V		
2460	MF	10	MFE151A-HLB	HLB Spool Piece Top			V		
2461	MF	11	MFE151B-HLB	HLB Spool Piece Side			V		
2462	MF	12	MFE151C-HLB	HLB Spool Piece Bottom			V		
2463	MF	13	MFE191A-LSB	LSB Spool Piece West			V		
2464	MF	14	MFE191B-LSB	LSB Spool Piece North			V		
2465	MF	15	MFE191C-LSB	LSB Spool Piece East			V		
2466	MF	16	MFE211A-CLB	CLB Spool Piece Top			V		
2467	MF	17	MFE211B-CLB	CLB Spool Piece Side			V		
2468	MF	18	MFE211C-CLB	CLB Spool Piece Bottom			V		
2469	MF	19	MFE291A-PR	PR Relief Valve Line(High)			V		
2470	MF	20	MFE291B-PR	PR Relief Valve Line(Low)			V		
2471	MF	21	MFE021-HLA	SGA Inlet			V		
2472	MF	22	MFE051D-LSA	LSA Spool Piece North(Low)			V		
2473	MF	23	MFE161-HLB	SGB Inlet			V		
2474	MF	24	MFE191D-LSB	LSB Spool Piece South(Low)			V		
2475	MF	25	MFE-N-006-DC	PV Downcomer DTT North			V		
2476	MF	26	MFE-S-006-DC	PV Downcomer DTT South			V		
2477	MF	27	MFE-E-006-DC	PV Downcomer DTT East			V		
2478	MF	28	MFE-W-006-DC	PV Downcomer DTT West			V		
2479	MF	29	MFE301B-PR	PR Safety Valve Line(Low)			V		
2480	MF	30	MFT161-HLB	SGB Inlet			V		
2483	MF	33	MFE591A-BU	BU No.2 SP (High)			V		
2484	MF	34	MFE591B-BU	BU No.2 SP (Low)			V		
2485	MF	35	MFE061A-LSA	LSA Spool Piece			V		
2486	MF	36	MFE061B-LSA	LSA Spool Piece			V		
2487	MF	37	MFE201A-LSB	LSB Spool Piece			V		
2488	MF	38	MFE201B-LSB	LSB Spool Piece			V		
2489	MF	39	MFE301A-PR	PR Safety Valve Line(High)			V		
2490	MF	40	MFT211A-CLB	CLB S.P Top			V		
2491	MF	41	MFT211B-CLB	CLB S.P Side			V		
2492	MF	42	MFT211C-CLB	CLB S.P Bottom			V		
2493	MF	43	MFE311A-PR	PV-PR Vent Line S.P Top			V		
2494	MF	44	MFE311B-PR	PV-PR Vent Line Bottom			V		
2495	MF	45	MFT011A-HLA	HLA S.P Top			V		
2496	MF	46	MFT011B-HLA	HLA S.P Side			V		
2497	MF	47	MFT011C-HLA	HLA S.P Bottom			V		
2498	MF	48	MFT021-HLA	SGA Inlet			V		
2499	MF	49	MFT051A-LSA	LSA Line North			V		
2500	MF	50	MFT051B-LSA	LSA Line South			V		
2501	MF	51	MFT051C-LSA	LSA Line East			V		
2502	MF	52	MFT051D-LSA	SGA Outlet			V		
2503	MF	53	MFT071A-CLA	CLA S.P TOP			V		
2504	MF	54	MFT071B-CLA	CLA S.P Side			V		
2505	MF	55	MFT071C-CLA	CLA S.P Bottom			V		
2506	MF	56	MFT151A-HLB	HLB S.P Top			V		
2507	MF	57	MFT151B-HLB	HLB S.P Side			V		
2508	MF	58	MFT151C-HLB	HLB S.P Bottom			V		
2509	MF	59	MFT191A-LSB	LSB Line North			V		
2510	MF	60	MFT191B-LSB	LSB Line South			V		
2511	MF	61	MFT191C-LSB	LSB Line East			V		
2512	MF	62	MFT191D-LSB	SGB Outlet			V		
2531	DE	1	DE011A-HLA	HLA S.P Beam A			V		
2532	DE	2	DE011B-HLA	HLA S.P Beam B			V		
2533	DE	3	DE011C-HLA	HLA S.P Beam C			V		
2534	DE	4	DE051A-LSA	LSA SP Beam A			V		
2535	DE	5	DE051B-LSA	LSA SP Beam B			V		
2536	DE	6	DE051C-LSA	LSA SP Beam C			V		
2537	DE	7	DE071A-CLA	CLA S.P Beam A			V		

Table 6.2 (Cont'd) (33/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2538	DE	8	DE071B-CLA	CLA S.P Beam B			V		
2539	DE	9	DE071C-CLA	CLA S.P Beam C			V		
2540	DE	10	DE151A-HLB	HLB S.P Beam A			V		
2541	DE	11	DE151B-HLB	HLB S.P Beam B			V		
2542	DE	12	DE151C-HLB	HLB S.P Beam C			V		
2543	DE	13	DE191A-LSB	LSB SP Beam A			V		
2544	DE	14	DE191B-LSB	LSB SP Beam B			V		
2545	DE	15	DE191C-LSB	LSB SP Beam C			V		
2546	DE	16	DE211A-CLB	CLB S.P Beam A			V		
2547	DE	17	DE211B-CLB	CLB S.P Beam B			V		
2548	DE	18	DE211C-CLB	CLB S.P Beam C			V		
2549	DE	19	DE052-LSA	PCA Suction			V		
2550	DE	20	DE192-LSB	PCB Suction			V		
2551	DE	21	DE281-PR	PR Surge Line			V		
2552	DE	22	DE291-PR	PR Relief Valve Line			V		
2553	DE	23	DE301-PR	PR Safety Valve Line			V		
2554	DE	24	DE311-PR	PV-PR Vent Line			V		
2555	DE	25	DE431-SGA	SGA Downcomer			V		
2556	DE	26	DE471-SGB	SGB Downcomer			V		
2557	DE	27	DE451A-SGA	SGA Safety S.P Upper Beam			V		
2558	DE	28	DE451B-SGA	SGA Safety S.P Center Beam			V		
2559	DE	29	DE451C-SGA	SGA Safety S.P Bottom Beam			V		
2560	DE	30	DE571A-BU	BU No.1 S.P Beam A			V		
2561	DE	31	DE571B-BU	BU No.1 S.P Beam B			V		
2562	DE	32	DE571C-BU	BU No.1 S.P Beam C			V		
2563	DE	33	DE591A-BU	BU No.2 SP Beam A			V		
2564	DE	34	DE591B-BU	BU No.2 SP Beam B			V		
2565	DE	35	DE591C-BU	BU No.2 SP Beam C			V		
2611	CP	1	CPE-E-012C-DC	Downcomer E.L.-1.2m,East	0.0	1.000+2	%	3.000-1	3.000-1
2612	CP	2	CPE-E-006C-DC	Downcomer E.L.-0.6m,East	0.0	1.000+2	%	3.000-1	3.000-1
2613	CP	3	CPE-E000C-DC	Downcomer E.L.0.0m,East	0.0	1.000+2	%	3.000-1	3.000-1
2614	CP	4	CPE-E006C-DC	Downcomer E.L.0.6m,East	0.0	1.000+2	%	3.000-1	3.000-1
2615	CP	5	CPE-E012C-DC	Downcomer E.L.1.2m,East	0.0	1.000+2	%	3.000-1	3.000-1
2616	CP	6	CPE-E018C-DC	Downcomer E.L.1.8m,East	0.0	1.000+2	%	3.000-1	3.000-1
2617	CP	7	CPE-E024C-DC	Downcomer E.L.2.4m,East	0.0	1.000+2	%	3.000-1	3.000-1
2618	CP	8	CPE-E031C-DC	Downcomer E.L.3.1m,East	0.0	1.000+2	%	3.000-1	3.000-1
2619	CP	9	CPE-E037C-DC	Downcomer E.L.3.7m,East	0.0	1.000+2	%	3.000-1	3.000-1
2620	CP	10	CPE-E043C-DC	Downcomer E.L.4.3m,East	0.0	1.000+2	%	3.000-1	3.000-1
2621	CP	11	CPE-E049C-DC	Downcomer E.L.4.9m,East	0.0	1.000+2	%	3.000-1	3.000-1
2622	CP	12	CPE-E055C-DC	Downcomer E.L.5.5m,East	0.0	1.000+2	%	3.000-1	3.000-1
2623	CP	13	CPE-E061C-DC	Downcomer E.L.6.1m,East	0.0	1.000+2	%	3.000-1	3.000-1
2624	CP	14	CPE-E067C-DC	Downcomer E.L.6.7m,East	0.0	1.000+2	%	3.000-1	3.000-1
2625	CP	15	CPE-E066F-UH	Upper Head E.L.6.6m,East	0.0	1.000+2	%	3.000-1	3.000-1
2626	CP	16	CPE-W066F-UH	Upper Head E.L.6.6m,West	0.0	1.000+2	%	3.000-1	3.000-1
2627	CP	17	CPE-E069F-UH	Upper Head E.L.6.9m,East	0.0	1.000+2	%	3.000-1	3.000-1
2628	CP	18	CPE-W069F-UH	Upper Head E.L.6.9m,West	0.0	1.000+2	%	3.000-1	3.000-1
2629	CP	19	CPE-E072F-UH	Upper Head E.L.7.2m,East	0.0	1.000+2	%	3.000-1	3.000-1
2630	CP	20	CPE-W072F-UH	Upper Head E.L.7.2m,West	0.0	1.000+2	%	3.000-1	3.000-1
2631	CP	21	CPE-E075F-UH	Upper Head E.L.7.5m,East	0.0	1.000+2	%	3.000-1	3.000-1
2632	CP	22	CPE-W075F-UH	Upper Head E.L.7.5m,West	0.0	1.000+2	%	3.000-1	3.000-1
2633	CP	23	CPE-E078F-UH	Upper Head E.L.7.8m,East	0.0	1.000+2	%	3.000-1	3.000-1
2634	CP	24	CPE-W078F-UH	Upper Head E.L.7.8m,West	0.0	1.000+2	%	3.000-1	3.000-1
2635	CP	25	CPE-E081F-UH	Upper Head E.L.8.1m,East	0.0	1.000+2	%	3.000-1	3.000-1
2636	CP	26	CPE-W081F-UH	Upper Head E.L.8.1m,West	0.0	1.000+2	%	3.000-1	3.000-1
2637	CP	27	CPE-E066H-GT	Guide Tube E.L.6.6m,East	0.0	1.000+2	%	3.000-1	3.000-1
2638	CP	28	CPE-W066H-GT	Guide Tube E.L.6.6m,West	0.0	1.000+2	%	3.000-1	3.000-1
2639	CP	29	CPE-E072H-GT	Guide Tube E.L.7.2m,East	0.0	1.000+2	%	3.000-1	3.000-1
2640	CP	30	CPE-W072H-GT	Guide Tube E.L.7.2m,West	0.0	1.000+2	%	3.000-1	3.000-1
2641	CP	31	CPE-E078H-GT	Guide Tube E.L.7.8m,East	0.0	1.000+2	%	3.000-1	3.000-1
2642	CP	32	CPE-W078H-GT	Guide Tube E.L.7.8m,West	0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (34/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
2643	CP 33	CPE-E043H-GT	Guide Tube E.L.4.3m,East	0.0	1.000+2	%	3.000-1	3.000-1
2644	CP 34	CPE-W043H-GT	Guide Tube E.L.4.3m,West	0.0	1.000+2	%	3.000-1	3.000-1
2645	CP 35	CPE-E044H-GT	Guide Tube E.L.4.4m,East	0.0	1.000+2	%	3.000-1	3.000-1
2646	CP 36	CPE-W044H-GT	Guide Tube E.L.4.4m,West	0.0	1.000+2	%	3.000-1	3.000-1
2647	CP 37	CPE-E048H-GT	Guide Tube E.L.4.8m,East	0.0	1.000+2	%	3.000-1	3.000-1
2648	CP 38	CPE-W048H-GT	Guide Tube E.L.4.8m,West	0.0	1.000+2	%	3.000-1	3.000-1
2649	CP 39	CPE-E054H-GT	Guide Tube E.L.5.4m,East	0.0	1.000+2	%	3.000-1	3.000-1
2650	CP 40	CPE-W054H-GT	Guide Tube E.L.5.4m,West	0.0	1.000+2	%	3.000-1	3.000-1
2651	CP 41	CPE-E060H-GT	Guide Tube E.L.6.0m,East	0.0	1.000+2	%	3.000-1	3.000-1
2652	CP 42	CPE-W060H-GT	Guide Tube E.L.6.0m,West	0.0	1.000+2	%	3.000-1	3.000-1
2653	CP 43	CPE-E042-UP	Upper Plenum E.L.4.2m,East	0.0	1.000+2	%	3.000-1	3.000-1
2654	CP 44	CPE-W042-UP	Upper Plenum E.L.4.2m,West	0.0	1.000+2	%	3.000-1	3.000-1
2655	CP 45	CPE-E043-UP	Upper Plenum E.L.4.3m,East	0.0	1.000+2	%	3.000-1	3.000-1
2656	CP 46	CPE-W043-UP	Upper Plenum E.L.4.3m,West	0.0	1.000+2	%	3.000-1	3.000-1
2657	CP 47	CPE-E044-UP	Upper Plenum E.L.4.4m,East	0.0	1.000+2	%	3.000-1	3.000-1
2658	CP 48	CPE-W044-UP	Upper Plenum E.L 4.4m,West	0.0	1.000+2	%	3.000-1	3.000-1
2659	CP 49	CPE-E048-UP	Upper Plenum E.L.4.8m,East	0.0	1.000+2	%	3.000-1	3.000-1
2660	CP 50	CPE-W048-UP	Upper Plenum E.L.4.8m,West	0.0	1.000+2	%	3.000-1	3.000-1
2661	CP 51	CPE-E051-UP	Upper Plenum E.L.5.1m,East	0.0	1.000+2	%	3.000-1	3.000-1
2662	CP 52	CPE-W051-UP	Upper Plenum E.L.5.1m,West	0.0	1.000+2	%	3.000-1	3.000-1
2663	CP 53	CPE-E054-UP	Upper Plenum E.L.5.4m,East	0.0	1.000+2	%	3.000-1	3.000-1
2664	CP 54	CPE-W054-UP	Upper Plenum E.L.5.4m,West	0.0	1.000+2	%	3.000-1	3.000-1
2665	CP 55	CPE-E057-UP	Upper Plenum E.L.5.7m,East	0.0	1.000+2	%	3.000-1	3.000-1
2666	CP 56	CPE-W057-UP	Upper Plenum E.L.5.7m,West	0.0	1.000+2	%	3.000-1	3.000-1
2667	CP 57	CPE-E060-UP	Upper Plenum E.L.6.0m,East	0.0	1.000+2	%	3.000-1	3.000-1
2668	CP 58	CPE-W060-UP	Upper Plenum E.L.6.0m,West	0.0	1.000+2	%	3.000-1	3.000-1
2669	CP 59	CPE-C-021-LP	Lower Plenum E.L.-2.1m	0.0	1.000+2	%	3.000-1	3.000-1
2670	CP 60	CPE-C-018-LP	Lower Plenum E.L.-1.8m	0.0	1.000+2	%	3.000-1	3.000-1
2671	CP 61	CPE-C-015-LP	Lower Plenum E.L.-1.5m	0.0	1.000+2	%	3.000-1	3.000-1
2672	CP 62	CPE-C-012-LP	Lower Plenum E.L.-1.2m	0.0	1.000+2	%	3.000-1	3.000-1
2673	CP 63	CPE-C-009-LP	Lower Plenum E.L.-0.9m	0.0	1.000+2	%	3.000-1	3.000-1
2674	CP 64	CPE-C-006-LP	Lower Plenum E.L.-0.6m	0.0	1.000+2	%	3.000-1	3.000-1
2675	CP 65	CPE-C-005-LP	Lower Plenum E.L.-0.5m	0.0	1.000+2	%	3.000-1	3.000-1
2676	CP 66	CPE-C-003-LP	Lower Plenum E.L.-0.3m	0.0	1.000+2	%	3.000-1	3.000-1
2677	CP 67	CPE-C-002-LP	Lower Plenum E.L.-0.2m	0.0	1.000+2	%	3.000-1	3.000-1
2687	CP 77	CPE-B15661	B15 Rod(6,6) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2688	CP 78	CPE-B15662	B15 Rod(6,6) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2689	CP 79	CPE-B15663	B15 Rod(6,6) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2690	CP 80	CPE-B15664	B15 Rod(6,6) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2691	CP 81	CPE-B15665	B15 Rod(6,6) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2692	CP 82	CPE-B15666	B15 Rod(6,6) Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2693	CP 83	CPE-B15667	B15 Rod(6,6) Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2694	CP 84	CPE-B15668	B15 Rod(6,6) Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2695	CP 85	CPE-B15669	B15 Rod(6,6) Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2705	CP 95	CPE-B20621	B20 Rod(6,2) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2706	CP 96	CPE-B20622	B20 Rod(6,2) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2707	CP 97	CPE-B20623	B20 Rod(6,2) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2708	CP 98	CPE-B20624	B20 Rod(6,2) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2709	CP 99	CPE-B20625	B20 Rod(6,2) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2710	CP 100	CPE-B20626	B20 Rod(6,2) Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2711	CP 101	CPE-B20627	B20 Rod(6,2) Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2712	CP 102	CPE-B20628	B20 Rod(6,2) Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2713	CP 103	CPE-B20629	B20 Rod(6,2) Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2714	CP 104	CPE-B22621	B22 Rod(6,2) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2715	CP 105	CPE-B22622	B22 Rod(6,2) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2716	CP 106	CPE-B22623	B22 Rod(6,2) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2717	CP 107	CPE-B22624	B22 Rod(6,2) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2718	CP 108	CPE-B22625	B22 Rod(6,2) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2719	CP 109	CPE-B22626	B22 Rod(6,2) Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2720	CP 110	CPE-B22627	B22 Rod(6,2) Pos.7	0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (35/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2721	CP 111	CPE-B22628	B22 Rod(6,2) Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2722	CP 112	CPE-B22629	B22 Rod(6,2) Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2723	CP 113	CPE-211-PR	Pressurizer Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2724	CP 114	CPE-207-PR	Pressurizer Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2725	CP 115	CPE-204-PR	Pressurizer Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2726	CP 116	CPE-200-PR	Pressurizer Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2727	CP 117	CPE-196-PR	Pressurizer Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2728	CP 118	CPE-192-PR	Pressurizer Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2729	CP 119	CPE-189-PR	Pressurizer Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2730	CP 120	CPE-185-PR	Pressurizer Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2731	CP 121	CPE-181-PR	Pressurizer Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2732	CP 122	CPE-177-PR	Pressurizer Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2733	CP 123	CPE-086C-SGA	SGA Boiling Section Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2734	CP 124	CPE-099C-SGA	SGA Boiling Section Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2735	CP 125	CPE-112C-SGA	SGA Boiling Section Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2736	CP 126	CPE-125C-SGA	SGA Boiling Section Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2737	CP 127	CPE-137C-SGA	SGA Boiling Section Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2738	CP 128	CPE-150C-SGA	SGA Boiling Section Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2739	CP 129	CPE-163C-SGA	SGA Boiling Section Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2740	CP 130	CPE-178C-SGA	SGA Boiling Section Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2741	CP 131	CPE-192F-SGA	SGA Boiling Section Pos.12	0.0	1.000+2	%	3.000-1	3.000-1
2742	CP 132	CPE-208F-SGA	Separator Pos.13	0.0	1.000+2	%	3.000-1	3.000-1
2743	CP 133	CPE-192C-SGA	Downcomer Pos.12	0.0	1.000+2	%	3.000-1	3.000-1
2744	CP 134	CPE-208C-SGA	Downcomer Pos.13	0.0	1.000+2	%	3.000-1	3.000-1
2745	CP 135	CPE-223C-SGA	Dryer Pos.14	0.0	1.000+2	%	3.000-1	3.000-1
2746	CP 136	CPE-245C-SGA	Steam Dome Pos.15	0.0	1.000+2	%	3.000-1	3.000-1
2747	CP 137	CPE-IN0861-SGA	SGA U-Tube(1,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2748	CP 138	CPE-EX0861-SGA	SGA U-Tube(1,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2749	CP 139	CPE-IN0862-SGA	SGA U-Tube(2,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2750	CP 140	CPE-EX0862-SGA	SGA U-Tube(2,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2751	CP 141	CPE-IN0863-SGA	SGA U-Tube(3,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2752	CP 142	CPE-EX0863-SGA	SGA U-Tube(3,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2753	CP 143	CPE-IN0864-SGA	SGA U-Tube(4,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2754	CP 144	CPE-EX0864-SGA	SGA U-Tube(4,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2755	CP 145	CPE-IN0865-SGA	SGA U-Tube(5,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2756	CP 146	CPE-EX0865-SGA	SGA U-Tube(5,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2757	CP 147	CPE-IN0866-SGA	SGA U-Tube(6,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2758	CP 148	CPE-EX0866-SGA	SGA U-Tube(6,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2759	CP 149	CPE-IN0931-SGA	SGA U-Tube(1,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2760	CP 150	CPE-IN0932-SGA	SGA U-Tube(2,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2761	CP 151	CPE-IN0933-SGA	SGA U-Tube(3,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2762	CP 152	CPE-IN0934-SGA	SGA U-Tube(4,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2763	CP 153	CPE-IN0935-SGA	SGA U-Tube(5,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2764	CP 154	CPE-IN0936-SGA	SGA U-Tube(6,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2765	CP 155	CPE-IN0991-SGA	SGA U-Tube(1,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2766	CP 156	CPE-EX0991-SGA	SGA U-Tube(1,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2767	CP 157	CPE-IN0992-SGA	SGA U-Tube(2,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2768	CP 158	CPE-EX0992-SGA	SGA U-Tube(2,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2769	CP 159	CPE-IN0993-SGA	SGA U-Tube(3,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2770	CP 160	CPE-EX0993-SGA	SGA U-Tube(3,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2771	CP 161	CPE-IN0994-SGA	SGA U-Tube(4,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2772	CP 162	CPE-EX0994-SGA	SGA U-Tube(4,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2773	CP 163	CPE-IN0995-SGA	SGA U-Tube(5,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2774	CP 164	CPE-EX0995-SGA	SGA U-Tube(5,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2775	CP 165	CPE-IN0996-SGA	SGA U-Tube(6,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2776	CP 166	CPE-EX0996-SGA	SGA U-Tube(6,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2777	CP 167	CPE-IN1051-SGA	SGA U-Tube(1,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2778	CP 168	CPE-IN1052-SGA	SGA U-Tube(2,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2779	CP 169	CPE-IN1053-SGA	SGA U-Tube(3,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2780	CP 170	CPE-IN1054-SGA	SGA U-Tube(4,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (36/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION		SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2781	CP 171	CPE-IN1055-SGA	SGA U-Tube(5,IN)	Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2782	CP 172	CPE-IN1056-SGA	SGA U-Tube(6,IN)	Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2783	CP 173	CPE-IN1121-SGA	SGA U-Tube(1,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2784	CP 174	CPE-EX1121-SGA	SGA U-Tube(1,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2785	CP 175	CPE-IN1122-SGA	SGA U-Tube(2,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2786	CP 176	CPE-EX1122-SGA	SGA U-Tube(2,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2787	CP 177	CPE-IN1123-SGA	SGA U-Tube(3,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2788	CP 178	CPE-EX1123-SGA	SGA U-Tube(3,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2789	CP 179	CPE-IN1124-SGA	SGA U-Tube(4,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2790	CP 180	CPE-EX1124-SGA	SGA U-Tube(4,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2791	CP 181	CPE-IN1125-SGA	SGA U-Tube(5,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2792	CP 182	CPE-EX1125-SGA	SGA U-Tube(5,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2793	CP 183	CPE-IN1126-SGA	SGA U-Tube(6,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2794	CP 184	CPE-EX1126-SGA	SGA U-Tube(6,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2795	CP 185	CPE-IN1251-SGA	SGA U-Tube(1,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2796	CP 186	CPE-EX1251-SGA	SGA U-Tube(1,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2797	CP 187	CPE-IN1252-SGA	SGA U-Tube(2,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2798	CP 188	CPE-EX1252-SGA	SGA U-Tube(2,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2799	CP 189	CPE-IN1253-SGA	SGA U-Tube(3,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2800	CP 190	CPE-EX1253-SGA	SGA U-Tube(3,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2801	CP 191	CPE-IN1254-SGA	SGA U-Tube(4,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2802	CP 192	CPE-EX1254-SGA	SGA U-Tube(4,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2803	CP 193	CPE-IN1255-SGA	SGA U-Tube(5,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2804	CP 194	CPE-EX1255-SGA	SGA U-Tube(5,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2805	CP 195	CPE-IN1256-SGA	SGA U-Tube(6,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2806	CP 196	CPE-EX1256-SGA	SGA U-Tube(6,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2807	CP 197	CPE-IN1371-SGA	SGA U-Tube(1,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2808	CP 198	CPE-EX1371-SGA	SGA U-Tube(1,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2809	CP 199	CPE-IN1372-SGA	SGA U-Tube(2,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2810	CP 200	CPE-EX1372-SGA	SGA U-Tube(2,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2811	CP 201	CPE-IN1373-SGA	SGA U-Tube(3,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2812	CP 202	CPE-EX1373-SGA	SGA U-Tube(3,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2813	CP 203	CPE-IN1374-SGA	SGA U-Tube(4,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2814	CP 204	CPE-EX1374-SGA	SGA U-Tube(4,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2815	CP 205	CPE-IN1375-SGA	SGA U-Tube(5,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2816	CP 206	CPE-EX1375-SGA	SGA U-Tube(5,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2817	CP 207	CPE-IN1376-SGA	SGA U-Tube(6,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2818	CP 208	CPE-EX1376-SGA	SGA U-Tube(6,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2819	CP 209	CPE-IN1501-SGA	SGA U-Tube(1,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2820	CP 210	CPE-EX1501-SGA	SGA U-Tube(1,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2821	CP 211	CPE-IN1502-SGA	SGA U-Tube(2,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2822	CP 212	CPE-EX1502-SGA	SGA U-Tube(2,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2823	CP 213	CPE-IN1503-SGA	SGA U-Tube(3,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2824	CP 214	CPE-EX1503-SGA	SGA U-Tube(3,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2825	CP 215	CPE-IN1504-SGA	SGA U-Tube(4,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2826	CP 216	CPE-EX1504-SGA	SGA U-Tube(4,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2827	CP 217	CPE-IN1505-SGA	SGA U-Tube(5,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2828	CP 218	CPE-EX1505-SGA	SGA U-Tube(5,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2829	CP 219	CPE-IN1506-SGA	SGA U-Tube(6,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2830	CP 220	CPE-EX1506-SGA	SGA U-Tube(6,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2831	CP 221	CPE-IN1632-SGA	SGA U-Tube(2,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2832	CP 222	CPE-EX1632-SGA	SGA U-Tube(2,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2833	CP 223	CPE-IN1633-SGA	SGA U-Tube(3,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2834	CP 224	CPE-EX1633-SGA	SGA U-Tube(3,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2835	CP 225	CPE-IN1634-SGA	SGA U-Tube(4,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2836	CP 226	CPE-EX1634-SGA	SGA U-Tube(4,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2837	CP 227	CPE-IN1635-SGA	SGA U-Tube(5,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2838	CP 228	CPE-EX1635-SGA	SGA U-Tube(5,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2839	CP 229	CPE-IN1701-SGA	SGA U-Tube(1,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2840	CP 230	CPE-IN1706-SGA	SGA U-Tube(6,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (37/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
2841	CP 231	CPE-IN1782-SGA	SGA U-Tube(2,IN) Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2842	CP 232	CPE-IN1785-SGA	SGA U-Tube(5,IN) Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2843	CP 233	CPE-IN1863-SGA	SGA U-Tube(3,IN) Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2844	CP 234	CPE-IN1864-SGA	SGA U-Tube(4,IN) Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2845	CP 235	CPE-086C-SGB	SGB Boiling Section Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2846	CP 236	CPE-099C-SGB	SGB Boiling Section Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2847	CP 237	CPE-112C-SGB	SGB Boiling Section Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2848	CP 238	CPE-125C-SGB	SGB Boiling Section Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2849	CP 239	CPE-137C-SGB	SGB Boiling Section Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2850	CP 240	CPE-150C-SGB	SGB Boiling Section Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2851	CP 241	CPE-163C-SGB	SGB Boiling Section Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2852	CP 242	CPE-178C-SGB	SGB Boiling Section Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2853	CP 243	CPE-192F-SGB	SGB Boiling Section Pos.12	0.0	1.000+2	%	3.000-1	3.000-1
2854	CP 244	CPE-208F-SGB	SGB Separator Pos.13	0.0	1.000+2	%	3.000-1	3.000-1
2855	CP 245	CPE-192C-SGB	SGB Downcomer Pos.12	0.0	1.000+2	%	3.000-1	3.000-1
2856	CP 246	CPE-208C-SGB	SGB Downcomer Pos.13	0.0	1.000+2	%	3.000-1	3.000-1
2857	CP 247	CPE-223C-SGB	SGB Dryer Pos.14	0.0	1.000+2	%	3.000-1	3.000-1
2858	CP 248	CPE-245C-SGB	SGB Steam Dome Pos.15	0.0	1.000+2	%	3.000-1	3.000-1
2859	CP 249	CPE-IN0861-SGB	SGB U-Tube(1,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2860	CP 250	CPE-EX0861-SGB	SGB U-Tube(1,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2861	CP 251	CPE-IN0862-SGB	SGB U-Tube(2,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2862	CP 252	CPE-EX0862-SGB	SGB U-Tube(2,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2863	CP 253	CPE-IN0863-SGB	SGB U-Tube(3,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2864	CP 254	CPE-EX0863-SGB	SGB U-Tube(3,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2865	CP 255	CPE-IN0864-SGB	SGB U-Tube(4,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2866	CP 256	CPE-EX0864-SGB	SGB U-Tube(4,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2867	CP 257	CPE-IN0865-SGB	SGB U-Tube(5,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2868	CP 258	CPE-EX0865-SGB	SGB U-Tube(5,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2869	CP 259	CPE-IN0866-SGB	SGB U-Tube(6,IN) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2870	CP 260	CPE-EX0866-SGB	SGB U-Tube(6,EX) Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
2871	CP 261	CPE-IN0931-SGB	SGB U-Tube(1,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2872	CP 262	CPE-IN0932-SGB	SGB U-Tube(2,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2873	CP 263	CPE-IN0933-SGB	SGB U-Tube(3,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2874	CP 264	CPE-IN0934-SGB	SGB U-Tube(4,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2875	CP 265	CPE-IN0935-SGB	SGB U-Tube(5,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2876	CP 266	CPE-IN0936-SGB	SGB U-Tube(6,IN) Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
2877	CP 267	CPE-IN0991-SGB	SGB U-Tube(1,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2878	CP 268	CPE-EX0991-SGB	SGB U-Tube(1,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2879	CP 269	CPE-IN0992-SGB	SGB U-Tube(2,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2880	CP 270	CPE-EX0992-SGB	SGB U-Tube(2,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2881	CP 271	CPE-IN0993-SGB	SGB U-Tube(3,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2882	CP 272	CPE-EX0993-SGB	SGB U-Tube(3,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2883	CP 273	CPE-IN0994-SGB	SGB U-Tube(4,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2884	CP 274	CPE-EX0994-SGB	SGB U-Tube(4,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2885	CP 275	CPE-IN0995-SGB	SGB U-Tube(5,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2886	CP 276	CPE-EX0995-SGB	SGB U-Tube(5,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2887	CP 277	CPE-IN0996-SGB	SGB U-Tube(6,IN) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2888	CP 278	CPE-EX0996-SGB	SGB U-Tube(6,EX) Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
2889	CP 279	CPE-IN1051-SGB	SGB U-Tube(1,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2890	CP 280	CPE-IN1052-SGB	SGB U-Tube(2,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2891	CP 281	CPE-IN1053-SGB	SGB U-Tube(3,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2892	CP 282	CPE-IN1054-SGB	SGB U-Tube(4,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2893	CP 283	CPE-IN1055-SGB	SGB U-Tube(5,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2894	CP 284	CPE-IN1056-SGB	SGB U-Tube(6,IN) Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
2895	CP 285	CPE-IN1121-SGB	SGB U-Tube(1,IN) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2896	CP 286	CPE-EX1121-SGB	SGB U-Tube(1,EX) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2897	CP 287	CPE-IN1122-SGB	SGB U-Tube(2,IN) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2898	CP 288	CPE-EX1122-SGB	SGB U-Tube(2,EX) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2899	CP 289	CPE-IN1123-SGB	SGB U-Tube(3,IN) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2900	CP 290	CPE-EX1123-SGB	SGB U-Tube(3,EX) Pos.5	0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (38/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION		SPAN LIMITS LO	SPAN LIMITS HI	UNIT	UNCERTAINTY ABS.	UNCERTAINTY REL.(%)
2901	CP 291	CPE-IN1124-SGB	SGB U-Tube(4,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2902	CP 292	CPE-EX1124-SGB	SGB U-Tube(4,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2903	CP 293	CPE-IN1125-SGB	SGB U-Tube(5,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2904	CP 294	CPE-EX1125-SGB	SGB U-Tube(5,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2905	CP 295	CPE-IN1126-SGB	SGB U-Tube(6,IN)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2906	CP 296	CPE-EX1126-SGB	SGB U-Tube(6,EX)	Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
2907	CP 297	CPE-IN1251-SGB	SGB U-Tube(1,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2908	CP 298	CPE-EX1251-SGB	SGB U-Tube(1,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2909	CP 299	CPE-IN1252-SGB	SGB U-Tube(2,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2910	CP 300	CPE-EX1252-SGB	SGB U-Tube(2,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2911	CP 301	CPE-IN1253-SGB	SGB U-Tube(3,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2912	CP 302	CPE-EX1253-SGB	SGB U-Tube(3,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2913	CP 303	CPE-IN1254-SGB	SGB U-Tube(4,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2914	CP 304	CPE-EX1254-SGB	SGB U-Tube(4,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2915	CP 305	CPE-IN1255-SGB	SGB U=Tube(5,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2916	CP 306	CPE-EX1255-SGB	SGB U-Tube(5,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2917	CP 307	CPE-IN1256-SGB	SGB U-Tube(6,IN)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2918	CP 308	CPE-EX1256-SGB	SGB U-Tube(6,EX)	Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
2919	CP 309	CPE-IN1371-SGB	SGB U-Tube(1,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2920	CP 310	CPE-EX1371-SGB	SGB U-Tube(1,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2921	CP 311	CPE-IN1372-SGB	SGB U-Tube(2,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2922	CP 312	CPE-EX1372-SGB	SGB U-Tube(2,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2923	CP 313	CPE-IN1373-SGB	SGB U-Tube(3,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2924	CP 314	CPE-EX1373-SGB	SGB U-Tube(3,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2925	CP 315	CPE-IN1374-SGB	SGB U-Tube(4,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2926	CP 316	CPE-EX1374-SGB	SGB U-Tube(4,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2927	CP 317	CPE-IN1375-SGB	SGB U-Tube(5,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2928	CP 318	CPE-EX1375-SGB	SGB U-Tube(5,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2929	CP 319	CPE-IN1376-SGB	SGB U-Tube(6,IN)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2930	CP 320	CPE-EX1376-SGB	SGB U-Tube(6,EX)	Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
2931	CP 321	CPE-IN1501-SGB	SGB U-Tube(1,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2932	CP 322	CPE-EX1501-SGB	SGB U-Tube(1,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2933	CP 323	CPE-IN1502-SGB	SGB U-Tube(2,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2934	CP 324	CPE-EX1502-SGB	SGB U-Tube(2,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2935	CP 325	CPE-IN1503-SGB	SGB U-Tube(3,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2936	CP 326	CPE-EX1503-SGB	SGB U-Tube(3,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2937	CP 327	CPE-IN1504-SGB	SGB U-Tube(4,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2938	CP 328	CPE-EX1504-SGB	SGB U-Tube(4,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2939	CP 329	CPE-IN1505-SGB	SGB U-Tube(5,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2940	CP 330	CPE-EX1505-SGB	SGB U-Tube(5,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2941	CP 331	CPE-IN1506-SGB	SGB U-Tube(6,IN)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2942	CP 332	CPE-EX1506-SGB	SGB U-Tube(6,EX)	Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
2943	CP 333	CPE-IN1632-SGB	SGB U-Tube(2,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2944	CP 334	CPE-EX1632-SGB	SGB U-Tube(2,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2945	CP 335	CPE-IN1633-SGB	SGB U-Tube(3,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2946	CP 336	CPE-EX1633-SGB	SGB U-Tube(3,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2947	CP 337	CPE-IN1634-SGB	SGB U-Tube(4,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2948	CP 338	CPE-EX1634-SGB	SGB U-Tube(4,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2949	CP 339	CPE-IN1635-SGB	SGB U-Tube(5,IN)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2950	CP 340	CPE-EX1635-SGB	SGB U-Tube(5,EX)	Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
2951	CP 341	CPE-IN1701-SGB	SGB U-Tube(1,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2952	CP 342	CPE-IN1706-SGB	SGB U-Tube(6,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2953	CP 343	CPE-IN1782-SGB	SGB U-Tube(2,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2954	CP 344	CPE-IN1785-SGB	SGB U-Tube(5,IN)	Pos.10	0.0	1.000+2	%	3.000-1	3.000-1
2955	CP 345	CPE-IN1863-SGB	SGB U-Tube(3,IN)	Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2956	CP 346	CPE-IN1864-SGB	SGB U-Tube(4,IN)	Pos.11	0.0	1.000+2	%	3.000-1	3.000-1
2957	CP 347	CPE-010A-HLA	HLA Vessel Side CPT		0.0	1.000+2	%	3.000-1	3.000-1
2958	CP 348	CPE-010B-HLA	HLA Vessel Side CPT		0.0	1.000+2	%	3.000-1	3.000-1
2959	CP 349	CPE-010C-HLA	HLA Vessel Side CPT		0.0	1.000+2	%	3.000-1	3.000-1
2960	CP 350	CPE-010D-HLA	HLA Vessel Side CPT		0.0	1.000+2	%	3.000-1	3.000-1

Table 6.2 (Cont'd) (39/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
2961	CP 351	CPE-010E-HLA	HLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2963	CP 353	CPE-040B-HLA	HLA SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2964	CP 354	CPE-040C-HLA	HLA SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2965	CP 355	CPE-040D-HLA	HLA SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2966	CP 356	CPE-040E-HLA	HLA SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2967	CP 357	CPE-090A-CLA	CLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2968	CP 358	CPE-090B-CLA	CLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2969	CP 359	CPE-090C-CLA	CLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2970	CP 360	CPE-090D-CLA	CLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2971	CP 361	CPE-090E-CLA	CLA Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2972	CP 362	CPE-150A-HLB	HLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2973	CP 363	CPE-150B-HLB	HLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2974	CP 364	CPE-150C-HLB	HLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2975	CP 365	CPE-150D-HLB	HLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2976	CP 366	CPE-150E-HLB	HLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2977	CP 367	CPE-180A-HLB	HLB SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2978	CP 368	CPE-180B-HLB	HLB SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2979	CP 369	CPE-180C-HLB	HLB SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2980	CP 370	CPE-180D-HLB	HLB SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2981	CP 371	CPE-180E-HLB	HLB SG Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2982	CP 372	CPE-230A-CLB	CLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2983	CP 373	CPE-230B-CLB	CLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2984	CP 374	CPE-230C-CLB	CLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2985	CP 375	CPE-230D-CLB	CLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2986	CP 376	CPE-230E-CLB	CLB Vessel Side CPT	0.0	1.000+2	%	3.000-1	3.000-1
2987	CP 377	CPE-560-ST	Suppression Tank inlet	0.0	1.000+2	%	3.000-1	3.000-1
2988	CP 378	CPE051A-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2989	CP 379	CPE051B-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2990	CP 380	CPE051C-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2991	CP 381	CPE051D-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2992	CP 382	CPE051E-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2993	CP 383	CPE051F-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2994	CP 384	CPE051G-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2995	CP 385	CPE051H-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2996	CP 386	CPE051I-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2997	CP 387	CPE051J-LSA	LSA (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2998	CP 388	CPE191A-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
2999	CP 389	CPE191B-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3000	CP 390	CPE191C-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3001	CP 391	CPE191D-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3002	CP 392	CPE191E-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3003	CP 393	CPE191F-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3004	CP 394	CPE191G-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3005	CP 395	CPE191H-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3006	CP 396	CPE191I-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3007	CP 397	CPE191J-LSB	LSB (SG Side)	0.0	1.000+2	%	3.350-1	3.350-1
3018	CP 408	CE270-PV	PV Bottom	0.0	1.000+2	%	5.000-1	5.000-1
3019	CP 409	CP-VALVE-Y	Break Signal for YEWCOM	0.0	1.000+2	%	3.000-1	3.000-1
3020	CP 410	CP-VALVE-S	Break Signal for FACOM	0.0	1.000+2	%	0.0	0.0
3021	CP 411	CPE-W057C-DC	PV Downcomer	0.0	1.000+2	%	3.350-1	3.350-1
3022	CP 412	CPE-W067C-DC	PV Downcomer	0.0	1.000+2	%	3.350-1	3.350-1
3023	CP 413	CPE-W071C-DC	PV Downcomer	0.0	1.000+2	%	3.350-1	3.350-1
3024	CP 414	CPE-E071C-DC	PV Downcomer	0.0	1.000+2	%	3.350-1	3.350-1
3025	CP 415	CPE-B23661	B23 Rod(6,6) Pos.1	0.0	1.000+2	%	3.350-1	3.350-1
3026	CP 416	CPE-B23662	B23 Rod(6,6) Pos.2	0.0	1.000+2	%	3.350-1	3.350-1
3027	CP 417	CPE-B23663	B23 Rod(6,6) Pos.3	0.0	1.000+2	%	3.350-1	3.350-1
3028	CP 418	CPE-B23664	B23 Rod(6,6) Pos.4	0.0	1.000+2	%	3.350-1	3.350-1
3029	CP 419	CPE-B23665	B23 Rod(6,6) Pos.5	0.0	1.000+2	%	3.350-1	3.350-1
3030	CP 420	CPE-B23666	B23 Rod(6,6) Pos.6	0.0	1.000+2	%	3.350-1	3.350-1
3031	CP 421	CPE-B23667	B23 Rod(6,6) Pos.7	0.0	1.000+2	%	3.350-1	3.350-1

Table 6.2 (Cont'd) (40/42)

SEQ NO	FUNC ID.	TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
3032	CP 422	CPE-B23668	B23 Rod(6,6) Pos.8	0.0	1.000+2	%	3.350-1	3.350-1
3033	CP 423	CPE-B23669	B23 Rod(6,6) Pos.9	0.0	1.000+2	%	3.350-1	3.350-1
3034	CP 424	CPE-B01001	Core Barrel Inside W Pos.1	0.0	1.000+2	%	3.350-1	3.350-1
3035	CP 425	CPE-B01002	Core Barrel Inside W Pos.2	0.0	1.000+2	%	3.350-1	3.350-1
3036	CP 426	CPE-B01003	Core Barrel Inside W Pos.3	0.0	1.000+2	%	3.350-1	3.350-1
3037	CP 427	CPE-B01004	Core Barrel Inside W Pos.4	0.0	1.000+2	%	3.350-1	3.350-1
3038	CP 428	CPE-B01005	Core Barrel Inside W Pos.5	0.0	1.000+2	%	3.350-1	3.350-1
3039	CP 429	CPE-B01006	Core Barrel Inside W Pos.6	0.0	1.000+2	%	3.350-1	3.350-1
3040	CP 430	CPE-B01007	Core Barrel Inside W Pos.7	0.0	1.000+2	%	3.350-1	3.350-1
3041	CP 431	CPE-B01008	Core Barrel Inside W Pos.8	0.0	1.000+2	%	3.350-1	3.350-1
3042	CP 432	CPE-B01009	Core Barrel Inside W Pos.9	0.0	1.000+2	%	3.350-1	3.350-1
3043	CP 433	CPE-B05001	Core Barrel Inside E Pos.1	0.0	1.000+2	%	3.350-1	3.350-1
3044	CP 434	CPE-B05002	Core Barrel Inside E Pos.2	0.0	1.000+2	%	3.350-1	3.350-1
3045	CP 435	CPE-B05003	Core Barrel Inside E Pos.3	0.0	1.000+2	%	3.350-1	3.350-1
3046	CP 436	CPE-B05004	Core Barrel Inside E Pos.4	0.0	1.000+2	%	3.350-1	3.350-1
3047	CP 437	CPE-B05005	Core Barrel Inside E Pos.5	0.0	1.000+2	%	3.350-1	3.350-1
3048	CP 438	CPE-B05006	Core Barrel Inside E Pos.6	0.0	1.000+2	%	3.350-1	3.350-1
3049	CP 439	CPE-B05007	Core Barrel Inside E Pos.7	0.0	1.000+2	%	3.350-1	3.350-1
3050	CP 440	CPE-B05008	Core Barrel Inside E Pos.8	0.0	1.000+2	%	3.350-1	3.350-1
3051	CP 441	CPE-B05009	Core Barrel Inside E Pos.9	0.0	1.000+2	%	3.350-1	3.350-1
3052	CP 442	CPE-B07001	Core Barrel Inside S Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
3053	CP 443	CPE-B07002	Core Barrel Inside S Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
3054	CP 444	CPE-B07003	Core Barrel Inside S Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
3055	CP 445	CPE-B07004	Core Barrel Inside S Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
3056	CP 446	CPE-B07005	Core Barrel Inside S Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
3057	CP 447	CPE-B07006	Core Barrel Inside S Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
3058	CP 448	CPE-B07007	Core Barrel Inside S Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
3059	CP 449	CPE-B07008	Core Barrel Inside S Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
3060	CP 450	CPE-B07009	Core Barrel Inside S Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
991	CP 451	CPE-B03001	Core Barrel Inside N Pos.1	0.0	1.000+2	%	3.000-1	3.000-1
992	CP 452	CPE-B03002	Core Barrel Inside N Pos.2	0.0	1.000+2	%	3.000-1	3.000-1
993	CP 453	CPE-B03003	Core Barrel Inside N Pos.3	0.0	1.000+2	%	3.000-1	3.000-1
994	CP 454	CPE-B03004	Core Barrel Inside N Pos.4	0.0	1.000+2	%	3.000-1	3.000-1
995	CP 455	CPE-B03005	Core Barrel Inside N Pos.5	0.0	1.000+2	%	3.000-1	3.000-1
996	CP 456	CPE-B03006	Core Barrel Inside N Pos.6	0.0	1.000+2	%	3.000-1	3.000-1
997	CP 457	CPE-B03007	Core Barrel Inside N Pos.7	0.0	1.000+2	%	3.000-1	3.000-1
998	CP 458	CPE-B03008	Core Barrel Inside N Pos.8	0.0	1.000+2	%	3.000-1	3.000-1
999	CP 459	CPE-B03009	Core Barrel Inside N Pos.9	0.0	1.000+2	%	3.000-1	3.000-1
1000	CP 460	CPE-IN0630-SGA	SGA Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1001	CP 461	CPE-IN0650-SGA	SGA Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1002	CP 462	CPE-IN0680-SGA	SGA Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1003	CP 463	CPE-IN0720-SGA	SGA Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1004	CP 464	CPE-IN0760-SGA	SGA Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1005	CP 465	CPE-EX0630-SGA	SGA Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1006	CP 466	CPE-EX0650-SGA	SGA Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1007	CP 467	CPE-EX0680-SGA	SGA Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1008	CP 468	CPE-EX0720-SGA	SGA Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1009	CP 469	CPE-EX0760-SGA	SGA Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1010	CP 470	CPE-IN0630-SGB	SGB Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1011	CP 471	CPE-IN0650-SGB	SGB Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1012	CP 472	CPE-IN0680-SGB	SGB Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1013	CP 473	CPE-IN0720-SGB	SGB Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1014	CP 474	CPE-IN0760-SGB	SGB Inlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1015	CP 475	CPE-EX0630-SGB	SGB Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1016	CP 476	CPE-EX0650-SGB	SGB Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1017	CP 477	CPE-EX0680-SGB	SGB Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1018	CP 478	CPE-EX0720-SGB	SGB Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
1019	CP 479	CPE-EX0760-SGB	SGB Outlet Plenum	0.0	1.000+2	%	3.350-1	3.350-1
3161	RC 1	MFE011A-HLA-EU	HLA Spool Piece Top	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3162	RC 2	MFE011B-HLA-EU	HLA Spool Piece Side	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0

Table 6.2 (Cont'd) (41/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
3163	RC	3	MFE011C-HLA-EU	HLA Spool Piece Bottom	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3164	RC	4	MFE051A-LSA-EU	LSA Spool Piece East	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3165	RC	5	MFE051B-LSA-EU	LSA Spool Piece South	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3166	RC	6	MFE051C-LSA-EU	LSA Spool Piece West	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3167	RC	7	MFE071A-CLA-EU	CLA Spool Piece Top	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3168	RC	8	MFE071B-CLA-EU	CLA Spool Piece Side	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3169	RC	9	MFE071C-CLA-EU	CLA Spool Piece Bottom	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3170	RC	10	MFE151A-HLB-EU	HLB Spool Piece Top	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3171	RC	11	MFE151B-HLB-EU	HLB Spool Piece Side	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3172	RC	12	MFE151C-HLB-EU	HLB Spool Piece Bottom	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3173	RC	13	MFE191A-LSB-EU	LSB Spool Piece West	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3174	RC	14	MFE191B-LSB-EU	LSB Spool Piece North	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3175	RC	15	MFE191C-LSB-EU	LSB Spool Piece East	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3176	RC	16	MFE211A-CLB-EU	CLB Spool Piece Top	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3177	RC	17	MFE211B-CLB-EU	CLB Spool Piece Side	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3178	RC	18	MFE211C-CLB-EU	CLB Spool Piece Bottom	-1.300+4	1.300+4	kg/ms2	2.600+2	1.000+0
3179	RC	19	MFE021-HLA-EU	SGA Inlet	-2.890+3	2.890+3	kg/ms2	5.780+1	1.000+0
3180	RC	20	MFE051D-LSA-EU	LSA Spool Piece North(Low)	-2.890+3	2.890+3	kg/ms2	5.780+1	1.000+0
3181	RC	21	MFE161-HLB-EU	SGB Inlet	-2.890+3	2.890+3	kg/ms2	5.780+1	1.000+0
3182	RC	22	MFE191D-LSB-EU	LSB Spool Piece South(Low)	-2.890+3	2.890+3	kg/ms2	5.780+1	1.000+0
3183	RC	23	MFE-E-006-DC-EU	PV Downcomer DTT East	-1.400+4	1.400+4	kg/ms2	5.780+2	2.000+0
3185	RC	25	MFE-W-006-DC-EU	PV Downcomer DTT West	-1.400+4	1.400+4	kg/ms2	5.780+2	2.000+0
3187	RC	27	VE-E-006-DC-EU	PV Downcomer East	-9.000+0	9.000+1	m/s	3.600-1	2.000+0
3189	RC	29	VE-W-006-DC-EU	PV Downcomer West	-9.000+0	9.000+1	m/s	3.600-1	2.000+0
3191	RC	31	DE011A-HLA-EU	HLA S.P Beam A	0.0	1.000+3	kg/m3	2.700+1	2.700+0
3192	RC	32	DE011B-HLA-EU	HLA S.P Beam B	0.0	1.000+3	kg/m3	2.000+1	2.000+0
3193	RC	33	DE011C-HLA-EU	HLA S.P Beam C	0.0	1.000+3	kg/m3	2.200+1	2.200+0
3194	RC	34	DE151A-HLB-EU	HLB S.P Beam A	0.0	1.000+3	kg/m3	2.700+1	2.700+0
3195	RC	35	DE151B-HLB-EU	HLB S.P Beam B	0.0	1.000+3	kg/m3	2.000+1	2.000+0
3196	RC	36	DE151C-HLB-EU	HLB S.P Beam C	0.0	1.000+3	kg/m3	2.200+1	2.200+0
3197	RC	37	DE071A-CLA-EU	CLA S.P Beam A	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3198	RC	38	DE071B-CLA-EU	CLA S.P Beam B	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3199	RC	39	DE071C-CLA-EU	CLA S.P Beam C	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3200	RC	40	DE211A-CLB-EU	CLB S.P Beam A	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3201	RC	41	DE211B-CLB-EU	CLB S.P Beam B	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3202	RC	42	DE211C-CLB-EU	CLB S.P Beam C	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3206	RC	46	FRE-011-HLA	from RC 1 2 3 31 32 33	-1.210+2	1.210+2	kg/s	5.490+0	2.270+0
3207	RC	47	DAE-011-HLA	from RC 31 32 33	0.0	1.000+3	kg/m3	4.170+1	4.170+0
3208	RC	48	FRE-151-HLB	from RC 10 11 12 34 35 36	-1.210+2	1.210+2	kg/s	5.490+0	2.270+0
3209	RC	49	DAE-151-HLB	from RC 34 35 36	0.0	1.000+3	kg/m3	4.170+1	4.170+0
3210	RC	50	FRE-071-CLA	from RC 7 8 9 37 38 39	-1.210+2	1.210+2	kg/s	2.171+1	8.970+0
3211	RC	51	FRE-211-CLB	from RC 16 17 18 40 41 42	-1.210+2	1.210+2	kg/s	2.171+1	8.970+0
3212	RC	52	DAE-071-CLA	from RC 37 38 39	0.0	1.000+3	kg/m3	8.930+1	8.930+0
3213	RC	53	DAE-211-CLB	from RC 40 41 42	0.0	1.000+3	kg/m3	8.930+1	8.930+0
3216	RC	56	DE051A-LSA-EU	LSA SP Beam A	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3217	RC	57	DE051B-LSA-EU	LSA SP Beam B	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3218	RC	58	DE051C-LSA-EU	LSA SP Beam C	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3219	RC	59	DE191A-LSB-EU	LSB SP Beam A	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3220	RC	60	DE191B-LSB-EU	LSB SP Beam B	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3221	RC	61	DE191C-LSB-EU	LSB SP Beam C	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3222	RC	62	DE052-LSA-EU	PCA Suction	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3223	RC	63	DE192-LSB-EU	PCB Suction	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3224	RC	64	DE281-PR-EU	PR Surge Line	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3225	RC	65	DE291-PR-EU	PR Relief Valve Line	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3226	RC	66	DE301-PR-EU	PR Safety Valve Line	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3227	RC	67	DE311-PR-EU	PV-PR Vent Line	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3228	RC	68	DE431-SGA-EU	SGA Downcomer	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3229	RC	69	DE471-SGB-EU	SGB Downcomer	0.0	1.000+3	kg/m3	5.500+1	5.500+0
3230	RC	70	DE451A-SGA-EU	SGA Safety S.P Upper Beam	0.0	1.000+1	kg/m3	1.000+0	1.000+1
3231	RC	71	DE451B-SGA-EU	SGA Safety S.P Center Beam	0.0	1.000+1	kg/m3	1.000+0	1.000+1

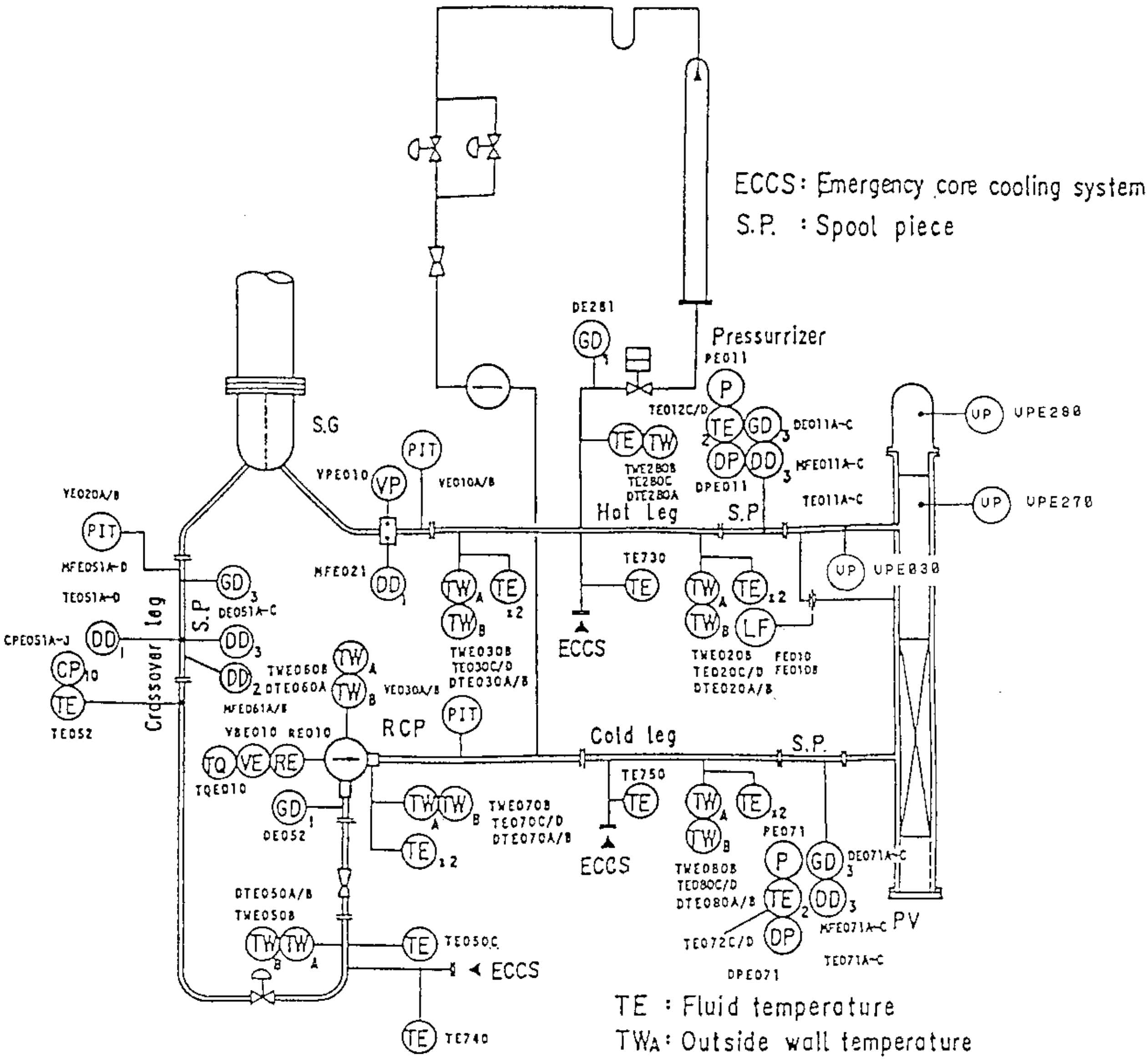
Table 6.2 (Cont'd) (42/42)

SEQ NO	FUNC ID.		TAG NAME	LOCATION	SPAN LIMITS LO	HI	UNIT	UNCERTAINTY ABS.	REL.(%)
3232	RC	72	DE451C-SGA-EU	SGA Safety S.P Bottom Beam	0.0	1.000+1	kg/m3	1.000+0	1.000+1
3233	RC	73	DE591A-BU-EU	BU No.2 SP Beam A	0.0	1.000+1	kg/m3	1.000+0	1.000+1
3234	RC	74	DE591B-BU-EU	BU No.2 SP Beam B	0.0	1.000+1	kg/m3	1.000+0	1.000+1
3235	RC	75	DE591C-BU-EU	BU No.2 SP Beam C	0.0	1.000+1	kg/m3	7.200+0	7.200-1
3236	RC	76	MFE061A-LSA-EU	LSA Spool Piece	0.0	1.239+4	kg/ms2	0.0	0.0
3237	RC	77	MFE061B-LSA-EU	LSA Spool Piece	0.0	1.239+4	kg/ms2	0.0	0.0
3238	RC	78	MFE201A-LSB-EU	LSB Spool Piece	0.0	1.239+4	kg/ms2	0.0	0.0
3239	RC	79	MFE201B-LSB-EU	LSB Spool Piece	0.0	1.239+4	kg/ms2	0.0	0.0
3240	RC	80	MFE311A-PR-EU	PV-PR Vent Line S.P Top	0.0	1.239+4	kg/ms2	0.0	0.0
3241	RC	81	MFE311B-PR-EU	PV-PR Vent Line Bottom	0.0	1.239+4	kg/ms2	0.0	0.0
3242	RC	82	MFE291A-PR-EU	PR Relief Valve Line(High)	0.0	1.239+4	kg/ms2	0.0	0.0
3243	RC	83	MFE291B-PR-EU	PR Relief Valve Line(Low)	0.0	1.239+4	kg/ms2	0.0	0.0
3244	RC	84	MFE301B-PR-EU	PR Safety Valve Line(Low)	0.0	1.239+4	kg/ms2	0.0	0.0
3245	RC	85	MFE301A-PR-EU	PR Safety Valve Line(High)	0.0	1.239+4	kg/ms2	0.0	0.0
3246	RC	86	MFE591A-BU-EU	BU No.2 SP (High)	0.0	1.239+4	kg/ms2	0.0	0.0
3247	RC	87	MFE591B-BU-EU	BU No.2 SP (Low)	0.0	1.239+4	kg/ms2	0.0	0.0
3248	RC	88	VE030A-CLA-EU	CLA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3249	RC	89	VE030B-CLA-EU	CLA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3250	RC	90	VE030-CLA-EU	CLA Pitot Tube	0.0	1.239+4	mm	0.0	0.0
3251	RC	91	VE010A-HLA-EU	HLA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3252	RC	92	VE010B-HLA-EU	HLA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3253	RC	93	VE010-HLA-EU	HLA Pitot Tube	0.0	1.239+4	mm	0.0	0.0
3254	RC	94	VE020A-LSA-EU	LSA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3255	RC	95	VE020B-LSA-EU	LSA Pitot Tube	0.0	1.239+4	kg/ms2	0.0	0.0
3256	RC	96	VE020-LSA-EU	LSA Pitot Tube	0.0	1.239+4	mm	0.0	0.0
3257	RC	97	FE291A-AVG	from RC 65 RC 82	0.0	3.000+0	kg/s	4.860-2	1.620+0
3258	RC	98	FE291B-AVG	from RC 65 RC 83	0.0	3.000+0	kg/s	4.860-2	1.620+0
3259	RC	99	FE301A-AVG	from RC 66 RC 85	0.0	6.000+0	kg/s	9.720-2	1.620+0
3260	RC	100	FE301B-AVG	from RC 66 RC 84	0.0	6.000+0	kg/s	9.720-2	1.620+0
3061	RC	101	FE311A-AVG	from RC 67,80	0.0	2.000+0	kg/s	4.580-2	2.290+0
3062	RC	102	FE311B-AVG	from RC 67,81	0.0	2.000+0	kg/s	4.580-2	2.290+0
3065	RC	105	DE451-AVG	from RC 70,71,72	0.0	1.000+1	kg/m3	0.0	0.0
3067	RC	107	FRE590-ST	from TE 85,86 PE 25 LE 10	0.0	1.000+1	kg/s	2.600+2	1.000+0
3068	RC	108	FRE675-ACH	from TE 93,94 PE 32 LE 15	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3069	RC	109	FRE655-ACC	from TE 89,90 PE 31 LE 14	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3070	RC	110	FRE-051-LSA	Cross Over Leg A Flow Rate	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3071	RC	111	FRE-191-LSB	Cross Over Leg B Flow Rate	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3072	RC	112	DAE-051-LSA	Cross Over Leg A Ave. Dens.	0.0	1.000+3	kg/m3	0.0	0.0
3073	RC	113	DAE-191-LSB	Cross Over Leg B Ave. Dens.	0.0	1.000+3	kg/m3	0.0	0.0
3074	RC	114	FRE-061-LSA	from RC 76,77,56,57,58	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3075	RC	115	FRE-201-LSB	from RC 78,79,59,60,61	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3078	RC	118	FRE-591A-BU	from RC 86	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3079	RC	119	FRE-591B-BU	from RC 87	-1.300+4	1.300+4	kg/s	2.600+2	1.000+0
3080	RC	120	DAE-051-LSA-TY	from RC 56,57,58	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3081	RC	121	DAE-191-LSB-TY	from RC 59,60,61	0.0	1.000+3	kg/m3	5.000+1	5.000+0
3084	RC	124	DAE-591A-BU	from RC 73,74,75	0.0	1.000+3	kg/m3	0.0	0.0
3085	RC	125	DAE-591B-BU	from RC 73,74,75	0.0	1.000+3	kg/m3	0.0	0.0
3086	RC	126	FRE-291A-PR	from RC 82,65	-1.210+2	1.210+2	kg/s	0.0	0.0
3087	RC	127	FRE-291B-PR	from RC 83,65	-1.210+2	1.210+2	kg/s	0.0	0.0
3088	RC	128	FRE-301A-PR	from RC 85,66	-1.210+2	1.210+2	kg/s	0.0	0.0
3089	RC	129	FRE-301B-PR	from RC 84,66	-1.210+2	1.210+2	kg/s	0.0	0.0
3090	RC	130	FRE-311A-PR	from RC 80,67	-1.210+2	1.210+2	kg/s	0.0	0.0
3091	RC	131	FRE-311B-PR	from RC 81,67	-1.210+2	1.210+2	kg/s	0.0	0.0
3092	RC	132	DE591-AVG	from RC 73,74,75	-1.210+2	1.210+2	kg/m3	0.0	0.0
3093	RC	133	TWE-PCT	Peak Cladding Temp.	0.0	0.0	K	0.0	0.0
3094	RC	134	TWE-PCTLOC	Location of PCT	0.0	0.0	Channe	0.0	0.0
3095	RC	135	FE591A-AVG	from RC 86,132	-1.210+2	1.210+2	kg/s	0.0	0.0
3096	RC	136	FE591B-AVG	from RC 87,132	-1.210+2	1.210+2	kg/s	0.0	0.0

Table 6.3 List of Engineering Unit Conversion Process

Eq. no.	Content
0	Range fitting
1	Flow rate conversion and calibration by T & P for liquid
2	for steam
3	Water level conversion and calibration by T & P (N2 exist in low density region)
4	Water level conversion and calibration by T & P (filled with steam)
5	(not used)
6	Torque data conversion
7	T data conversion with JIS* table
8	with linear equation
9	dT data conversion with JIS* table
10	(not used)
11	Water level conversion and calibration by T (saturated)
12	(not used)
13	(not used)
14	Water level conversion and calibration by P (saturated)
15	Flow rate conversion and calibration by T & P for liquid (ST tank bleed line)
16	for steam (ST tank vent line)
17	Range fitting (square root)
18	Flow rate conversion and calibration by T & P (square root) for liquid
19	for steam
20	Flow rate conversion and calibration by T & P for liquid (reverse flow)
21	Flow rate conversion and calibration by P for N2

*JIS : Japan Industrial Standard



GD₁ : 1 beam γ-densitometer
GD₃ : 3 beam γ-densitometer
DD : Drag disk flow meter
PIT : Pitot-tube velocimeter
CP_{10} : Conductance probe

DP : Differential pressure
P : Pressure
VP : Video probe
CPT_5 : Conductance probe with TC

TE : Fluid temperature
TW_A : Outside wall temperature
TW_B : Inside wall temperature
RE : Rotation speed
VE : Pump oscillation
TQ : Pump torque
LF : Leakage flow meter

Fig. 6.1(a) Primary Loop A Instruments (I)

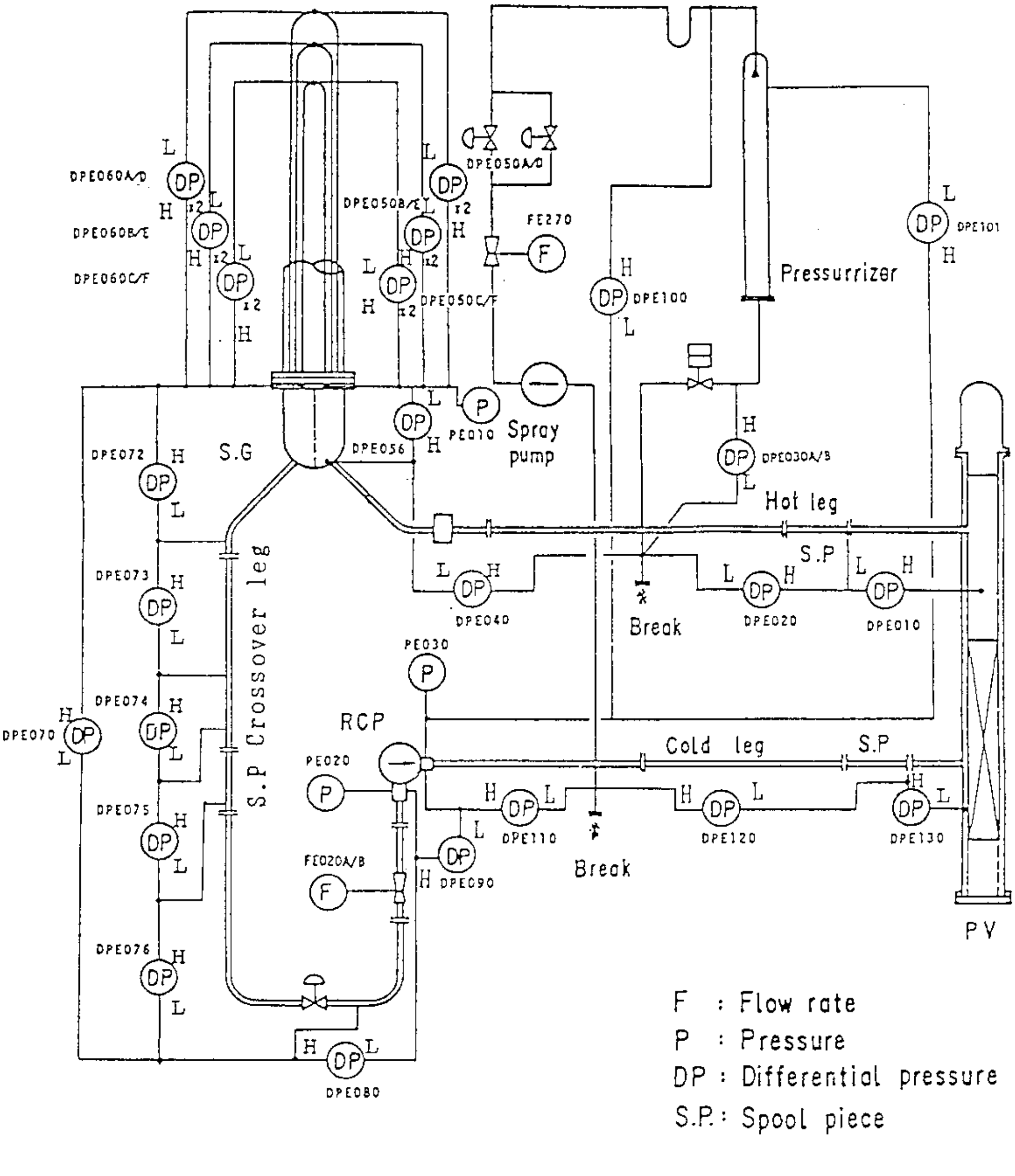
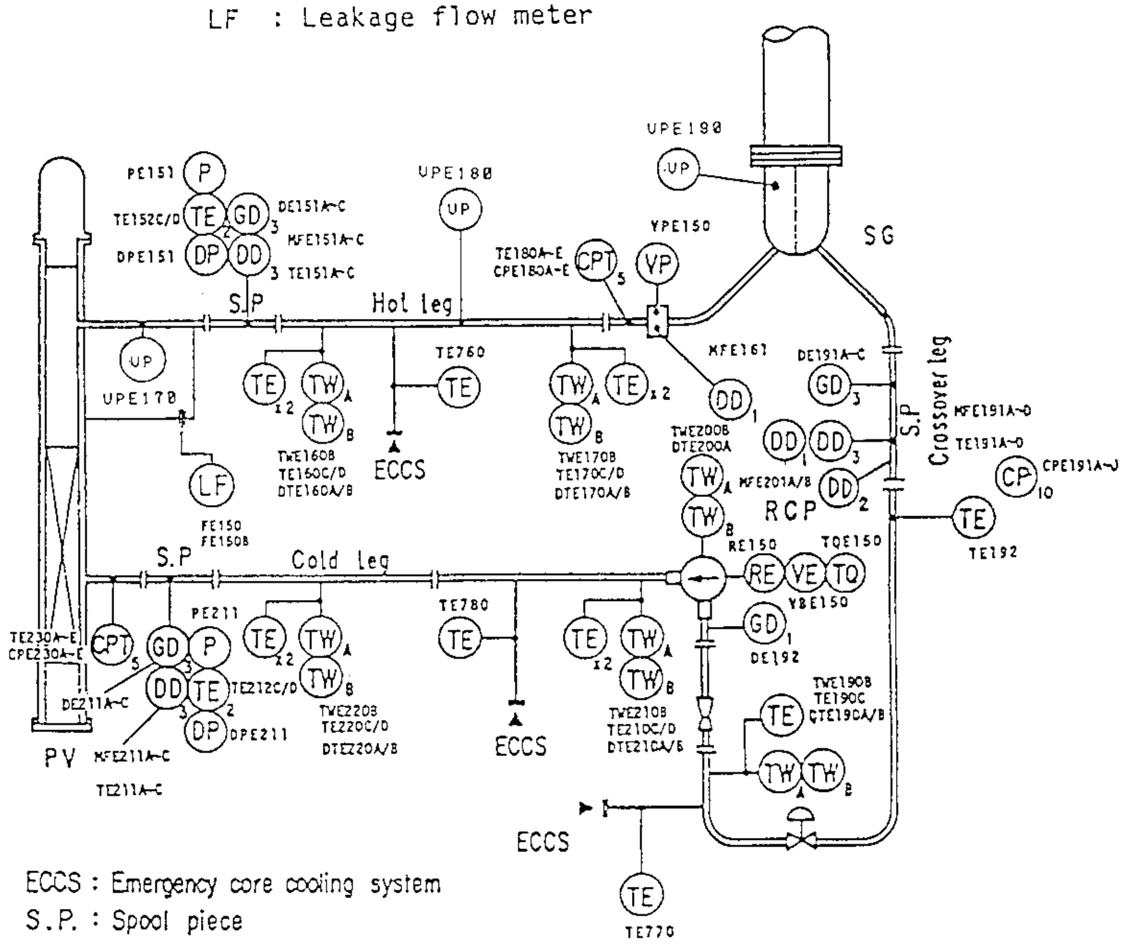


Fig. 6.1(b) Primary Loop A Instruments (II)

VP : Video probe
GD_3 : 3 beams γ－ densitometer
DD : Drag disk flow meter
CP_{10} : Conductance probe

DP : Differential pressure
P : Pressure
CPT_5 : Conductance probe with TC
TE : Fluid temperature
TW_A : Outside wall temperature
TW_B : Inside wall temperature
RE : Rotation speed
VE : Pump oscillation
TQ : Pump torque
LF : Leakage flow meter



ECCS : Emergency core cooling system
S.P. : Spool piece

Fig. 6.2(a) Primary Loop B Instruments (I)

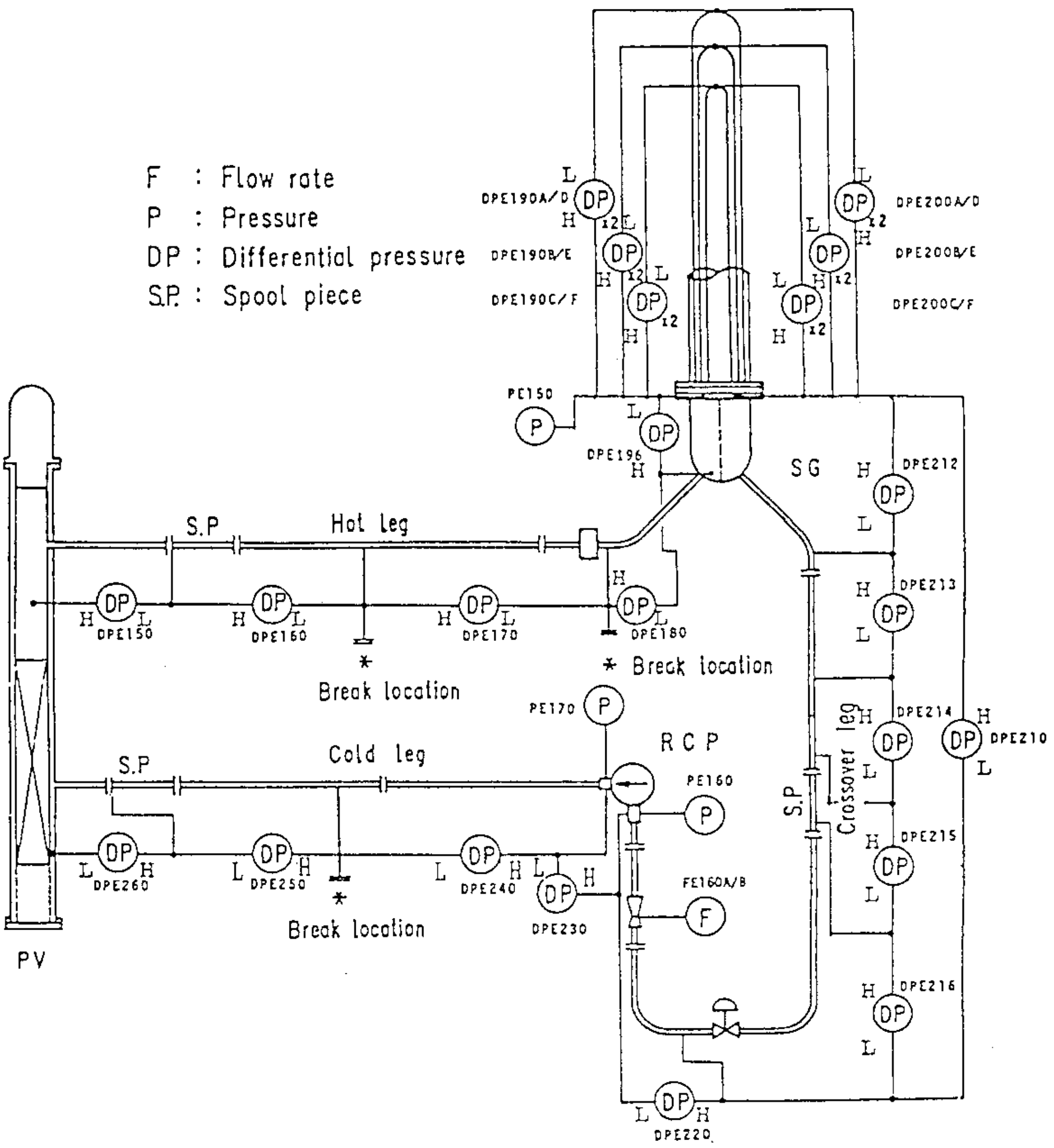


Fig. 6.2(b) Primary Loop B Instruments (II)

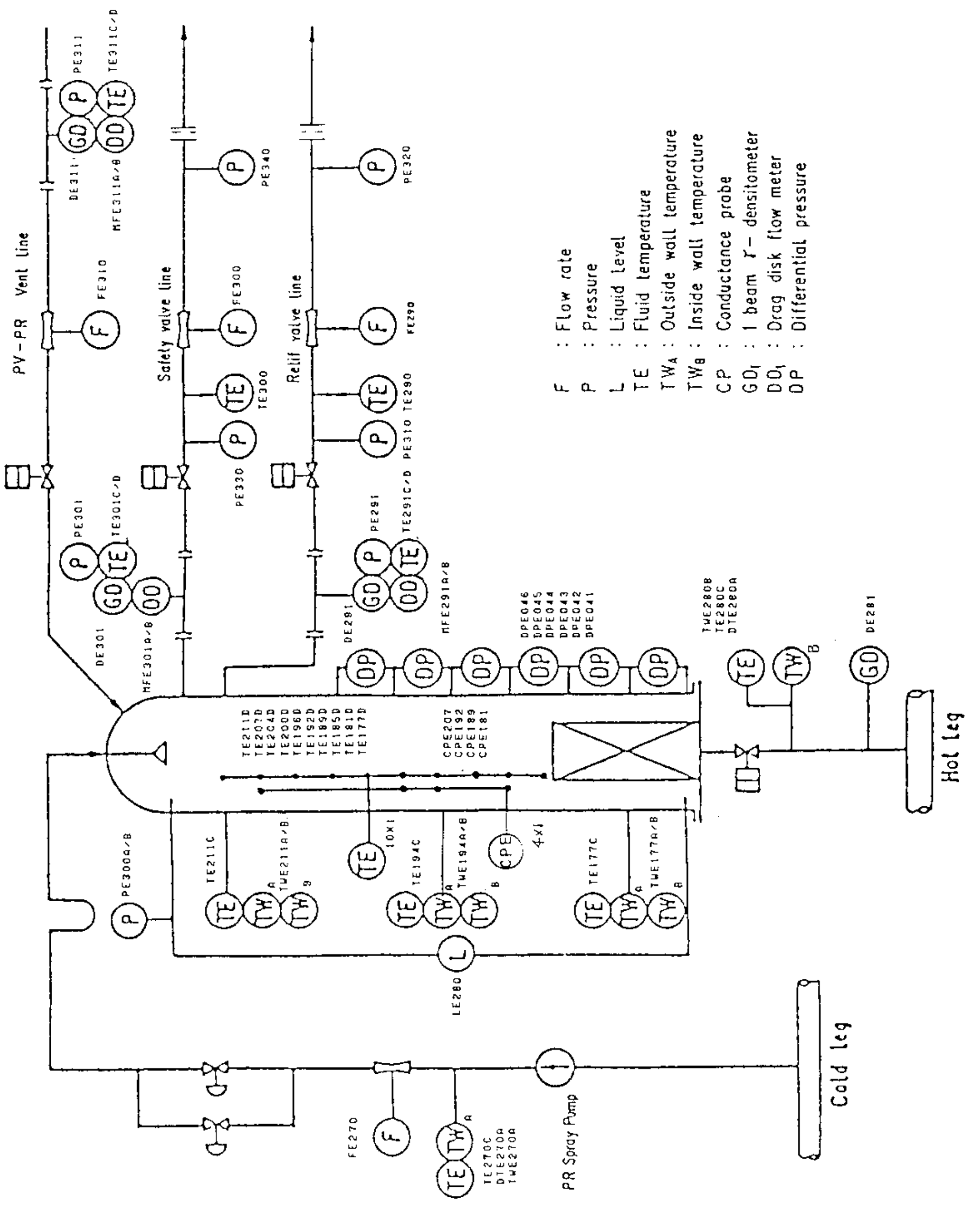


Fig. 6.3 Instruments of Pressurizer and Associated Lines

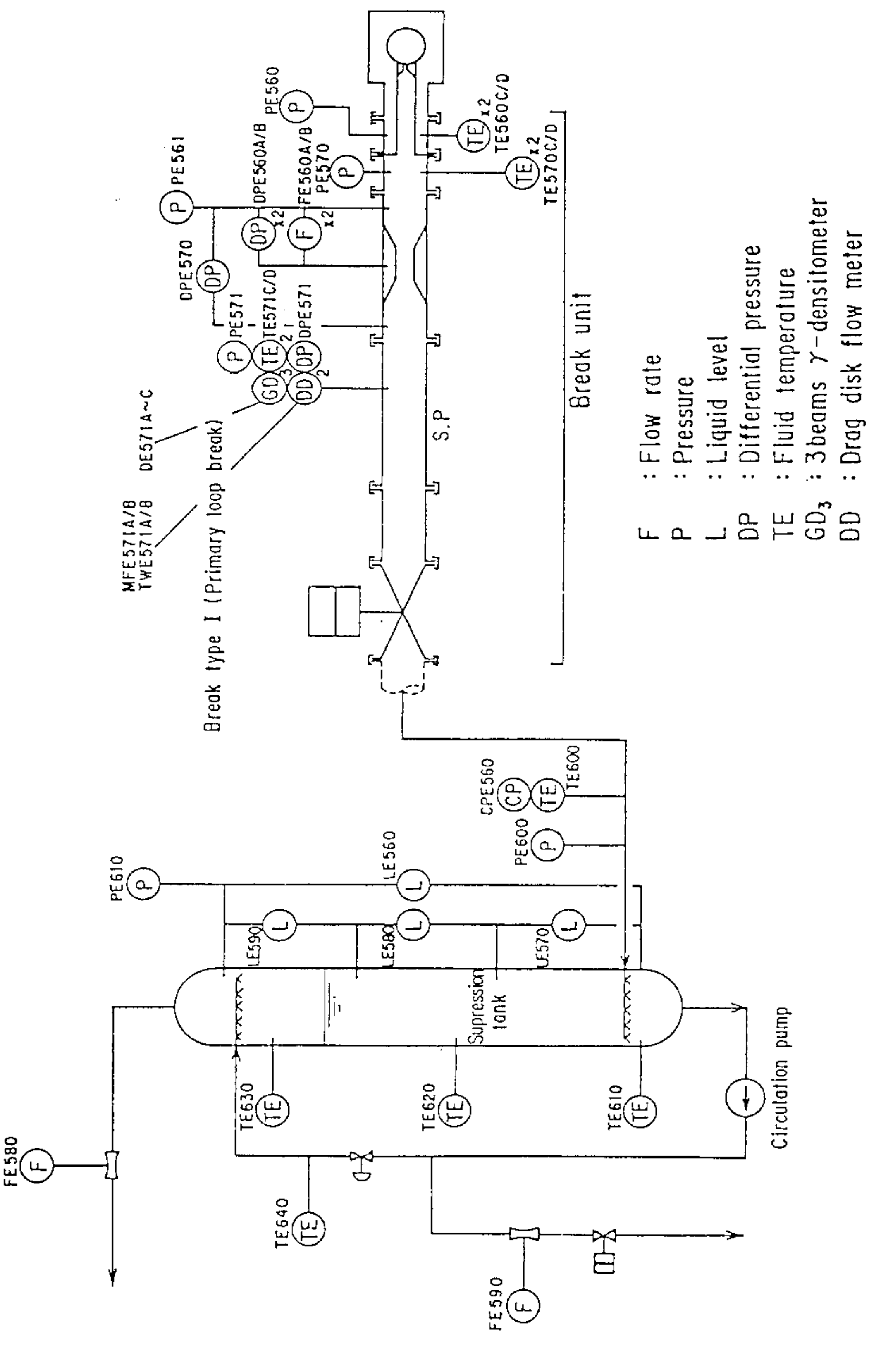
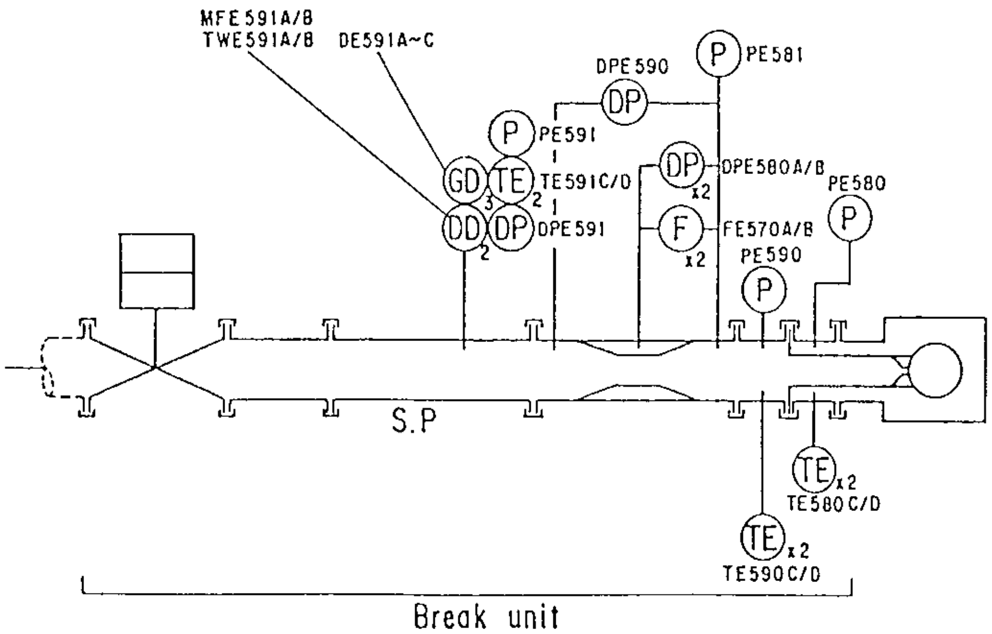


Fig. 6.4(a)　Break Unit and Break Line Instrumentations (Type I)



F : Flow rate
P : Pressure
L : Liquid level
DP : Differential pressure
TE : Fluid temperature
GD_3 : 3 beams γ-densitometer
DD : Drag disk flow meter

Fig. 6.4(b) Break Unit and Break Line Instrumentations (Type II) Instruments

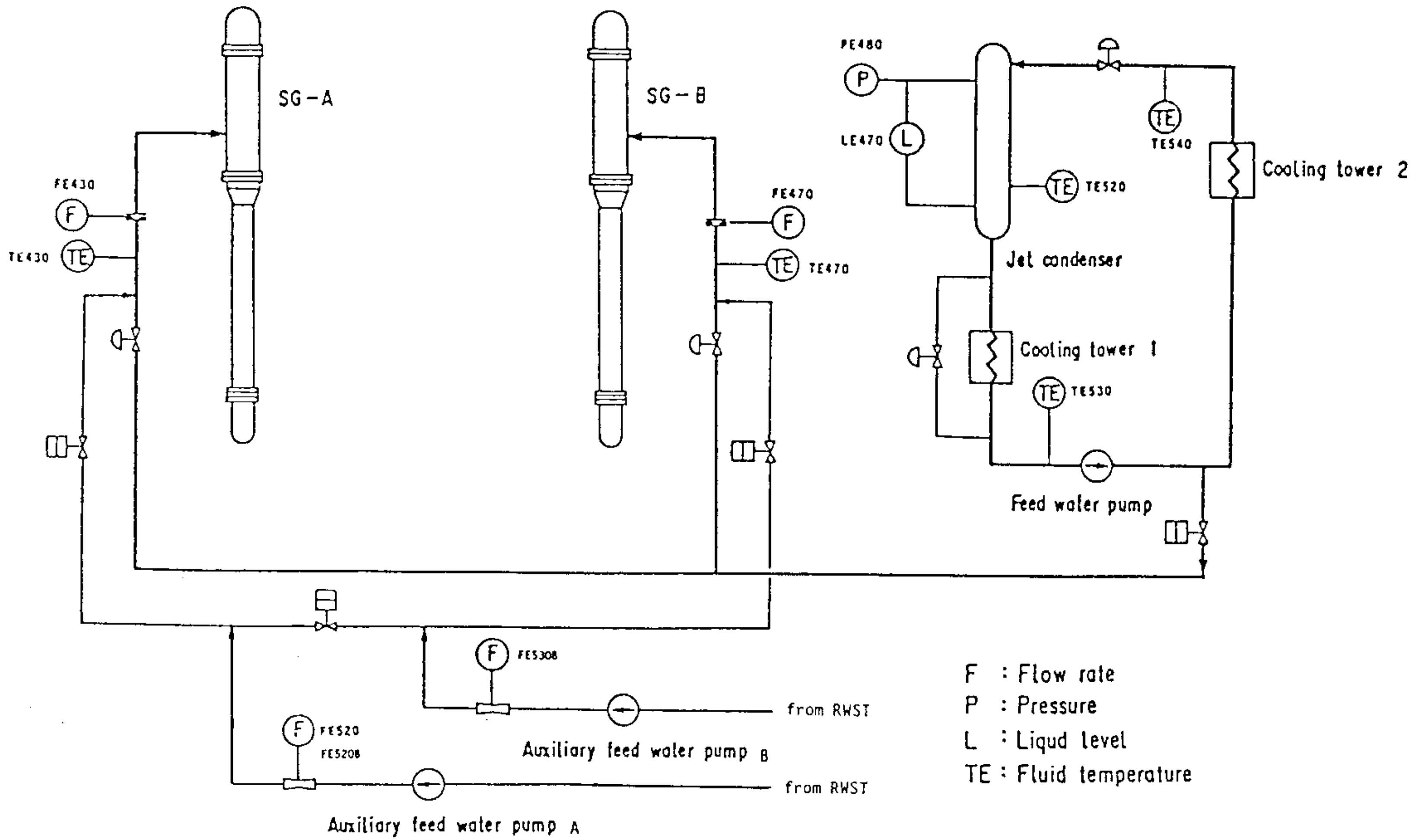


Fig. 6.5 Main Feed Water Line, Aux. Feedwater Line and Jet Condenser Instruments

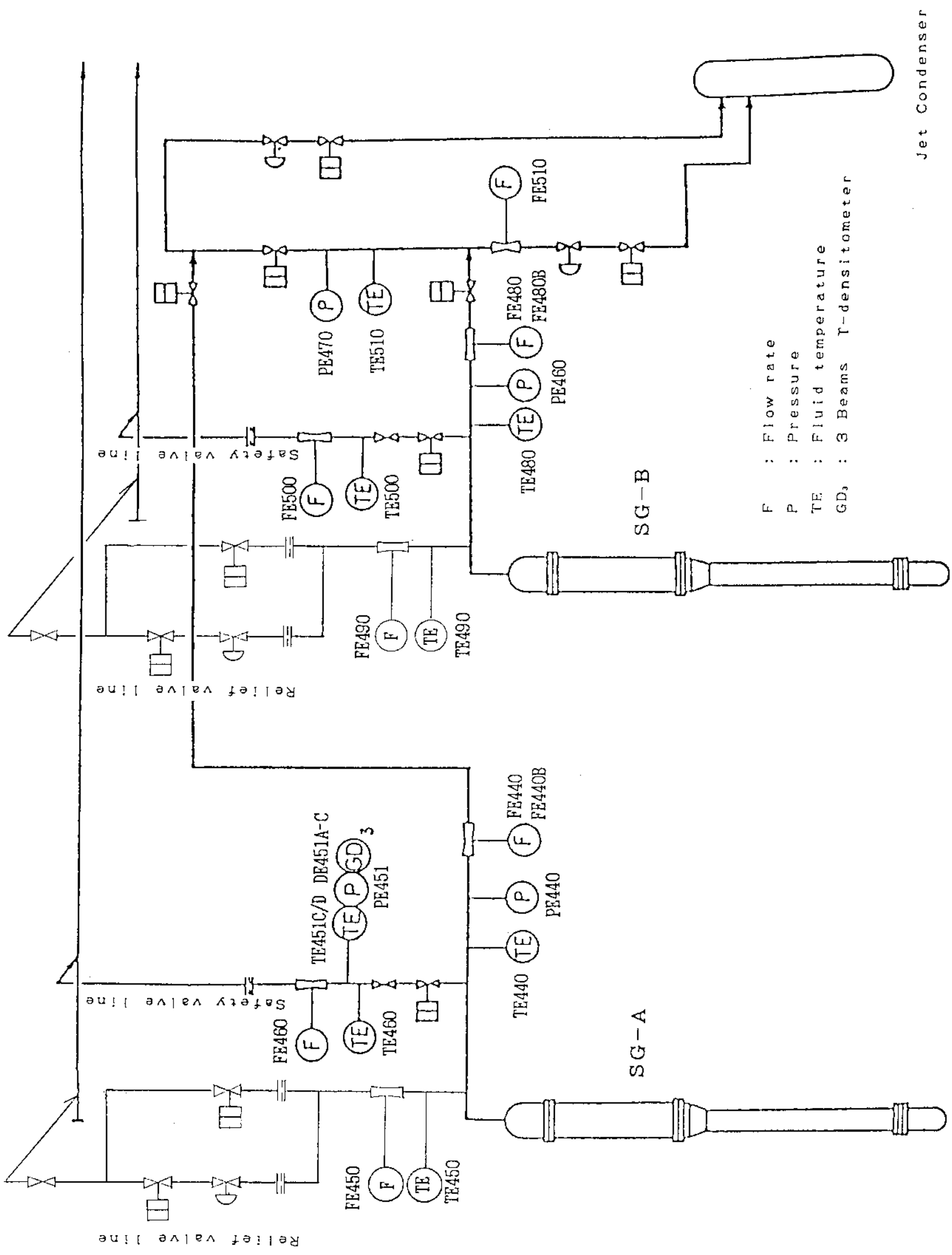
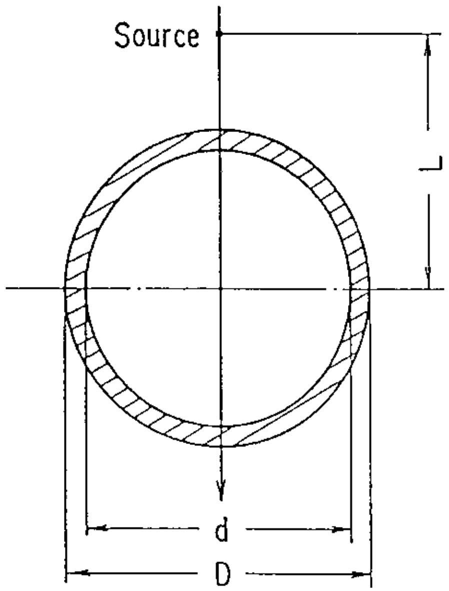
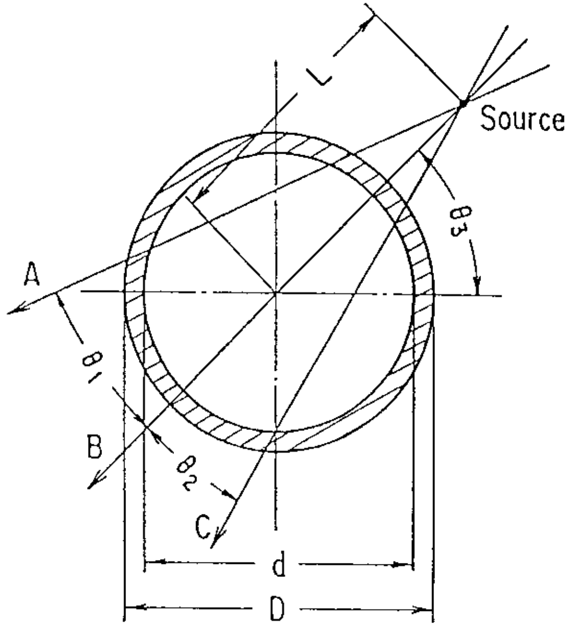


Fig. 6.6 Main Steam Line, Relief Valve Line and Safety Valve Line Instruments





Single-Beam Densitometer

ID	No.	D (mm)	d (mm)	L (mm)	Pipe Name/Direction
DE	19	240.2	168.2	305.0	Loopseal A/Vertical
〃	20	〃	〃	〃	Loopseal B/ 〃
〃	21	89.1	66.9	155.0	PR Surge L. 〃
〃	22	48.6	34.4	145.0	PORV L./Horiz.
〃	23	60.5	43.1	150.0	PR SV L./ 〃
〃	24	〃	〃	〃	PR Vent L./ 〃
〃	25	114.3	97.1	170.0	SG-A DC/Vertical
〃	26	〃	〃		SG-D DC/ 〃

Three - Beam Densitometer

ID	No.	D (mm)	d (mm)	L (mm)	θ_1 (Degree)	θ_2 (Degree)	Pipe Direction/θ_3
DE	1~3	295.0	207.0	212.9	22.10	14.35	HLA, Horiz./ 45.0
〃	7~9	〃	〃	〃	〃	〃	CLA, 〃 / .
〃	10~12	〃	〃	〃	〃	〃	HLB, 〃 / .
〃	16~18	〃	〃	〃	〃	〃	CLB, 〃 / 〃
DE	4~6	240.2	168.2	240.0	15.9	11.2	LSA, Vertical/—
〃	13~15	〃	〃	〃	〃	〃	LSB, 〃 /—
〃	27~29	216.3	190.9	240.0	18.1	12.3	SGA, Horiz./
〃	30~32	114.3	87.3	180.0	16.3	8.3	Break Unit, ——
〃	33~35	〃	〃	〃	〃	〃	〃 〃 , ——

Fig. 6.7 Single-and Three-Beam Gamma Densitometers

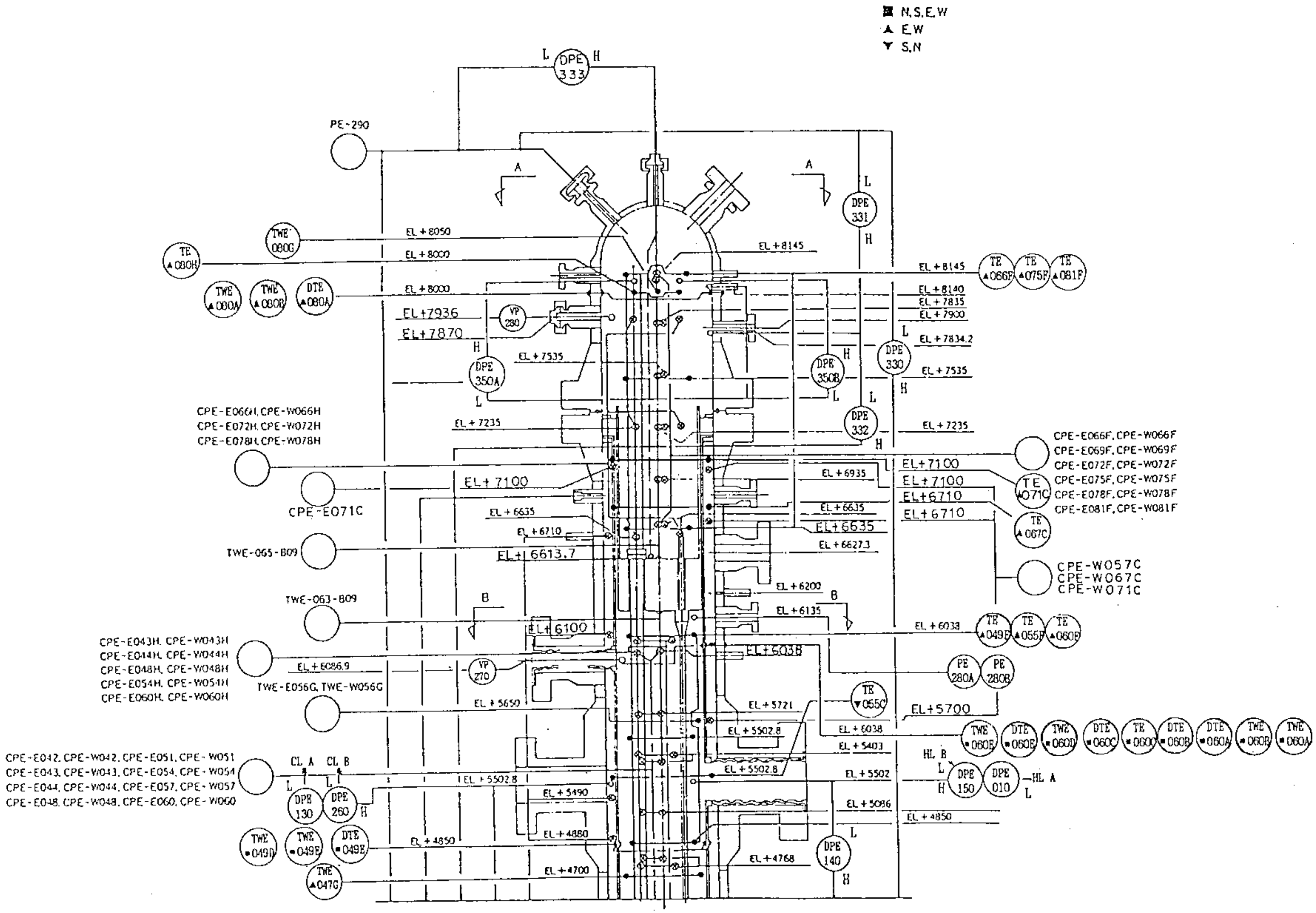


Fig. 6.8(a)　Vertical Locations of Pressure vessel Instruments (Except Simulated Core) (I)

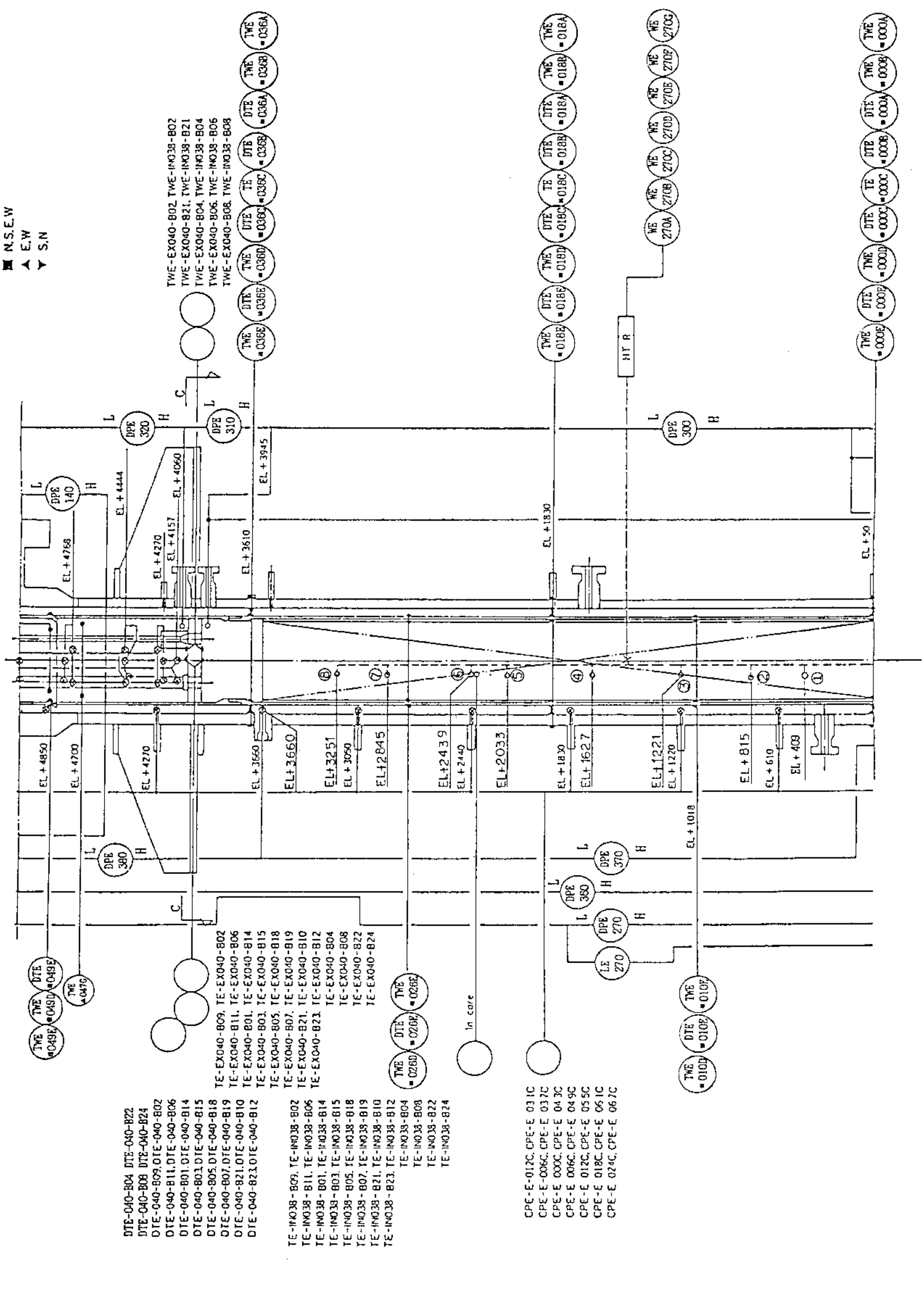


Fig. 6.8(b) Vertical Locations of Pressure Vessel Instruments (Except Simulated Core) (II)

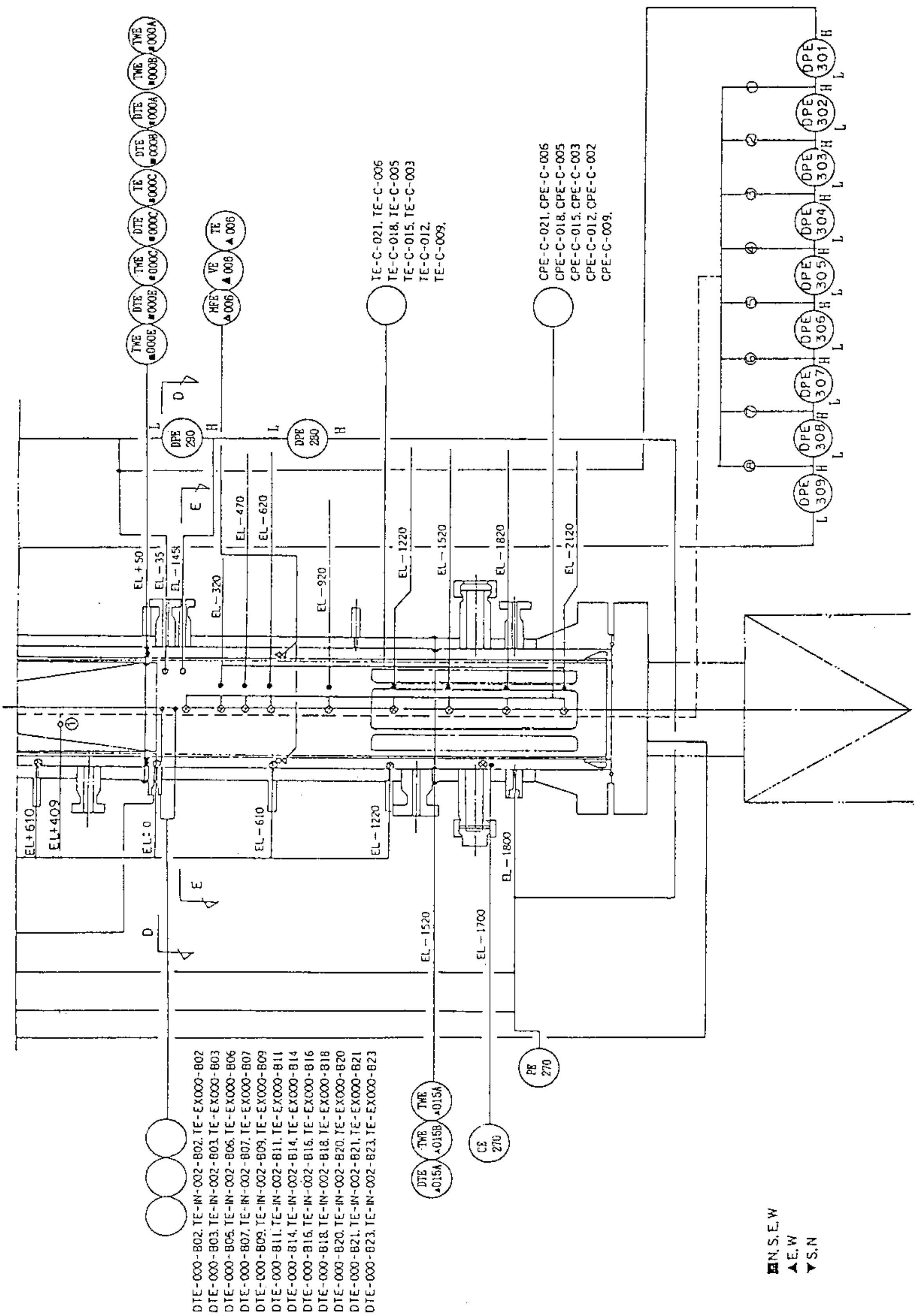


Fig. 6.8(c) Vertical Locations of Pressure Vessel Instruments (Except Simulated Core) (III)

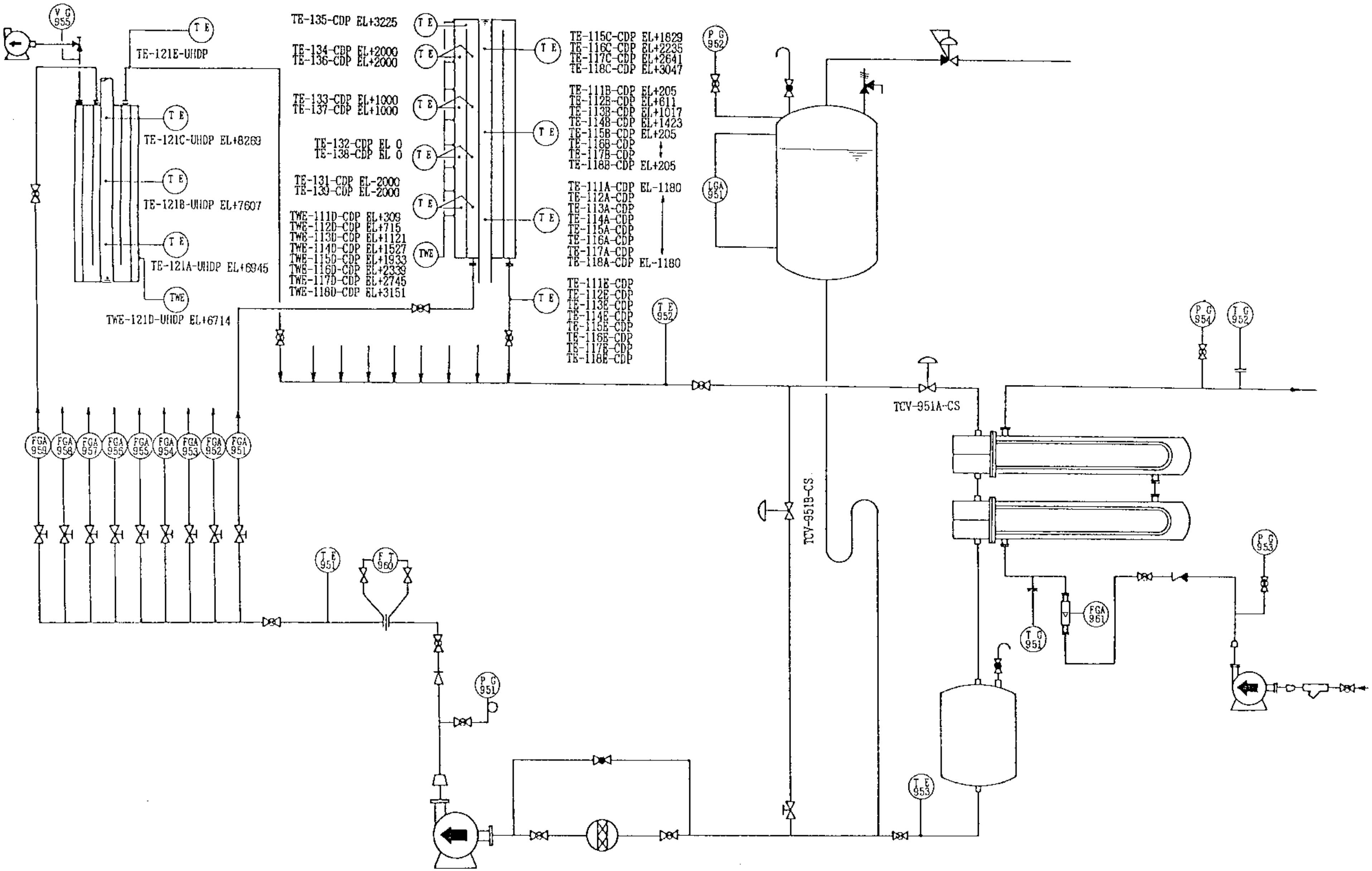


Fig. 6.8(d) Temperature Measurements around New Differential Pressure Measurements in Core and Upper Head

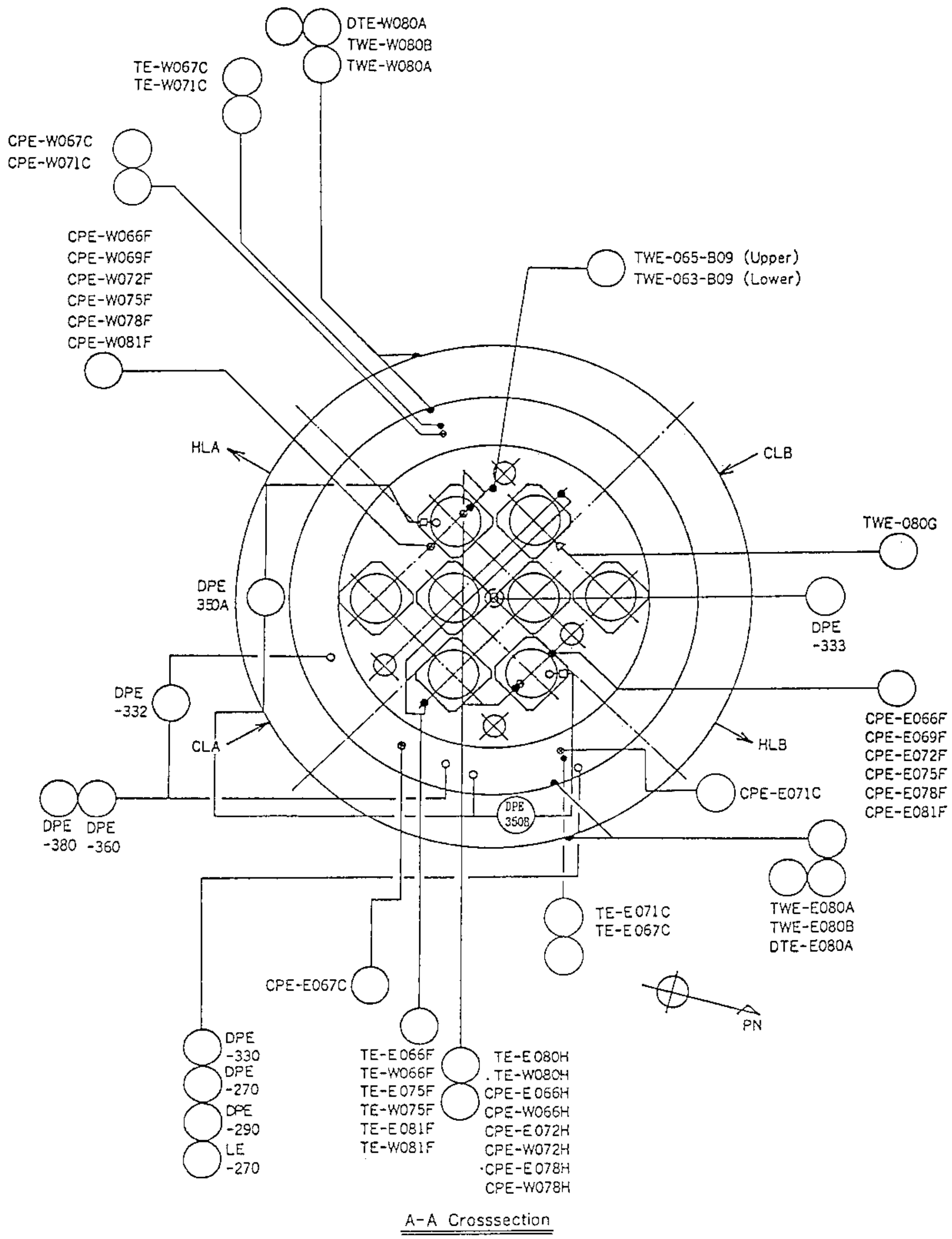


Fig. 6.9(a) Horizontal Locations of Pressure Vessel Instruments (Except Simulated Core) (I)

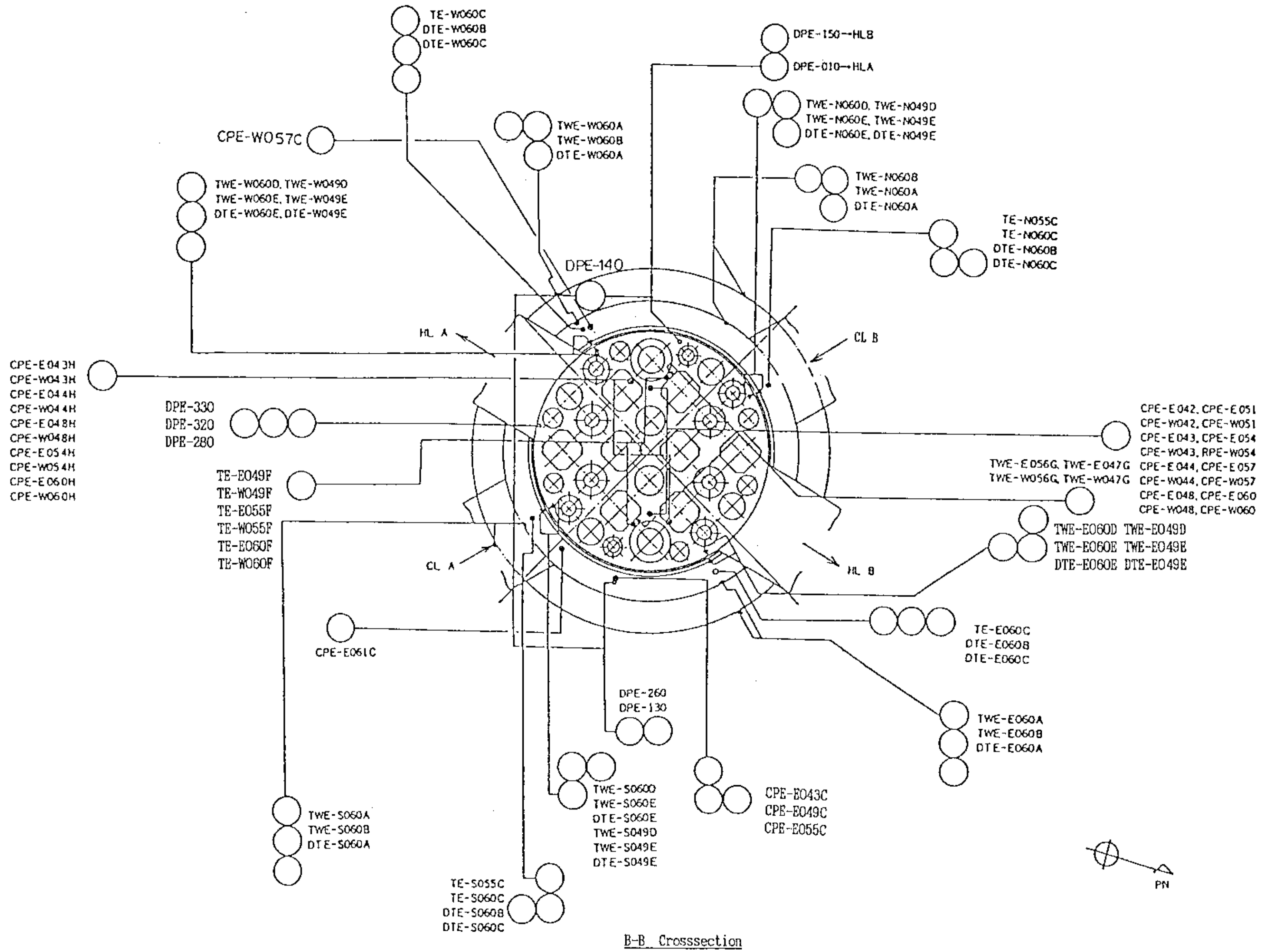


Fig. 6.9(b)　Horizontal Locations of Pressure Vessel Instruments (Except Simulated Core) (II)

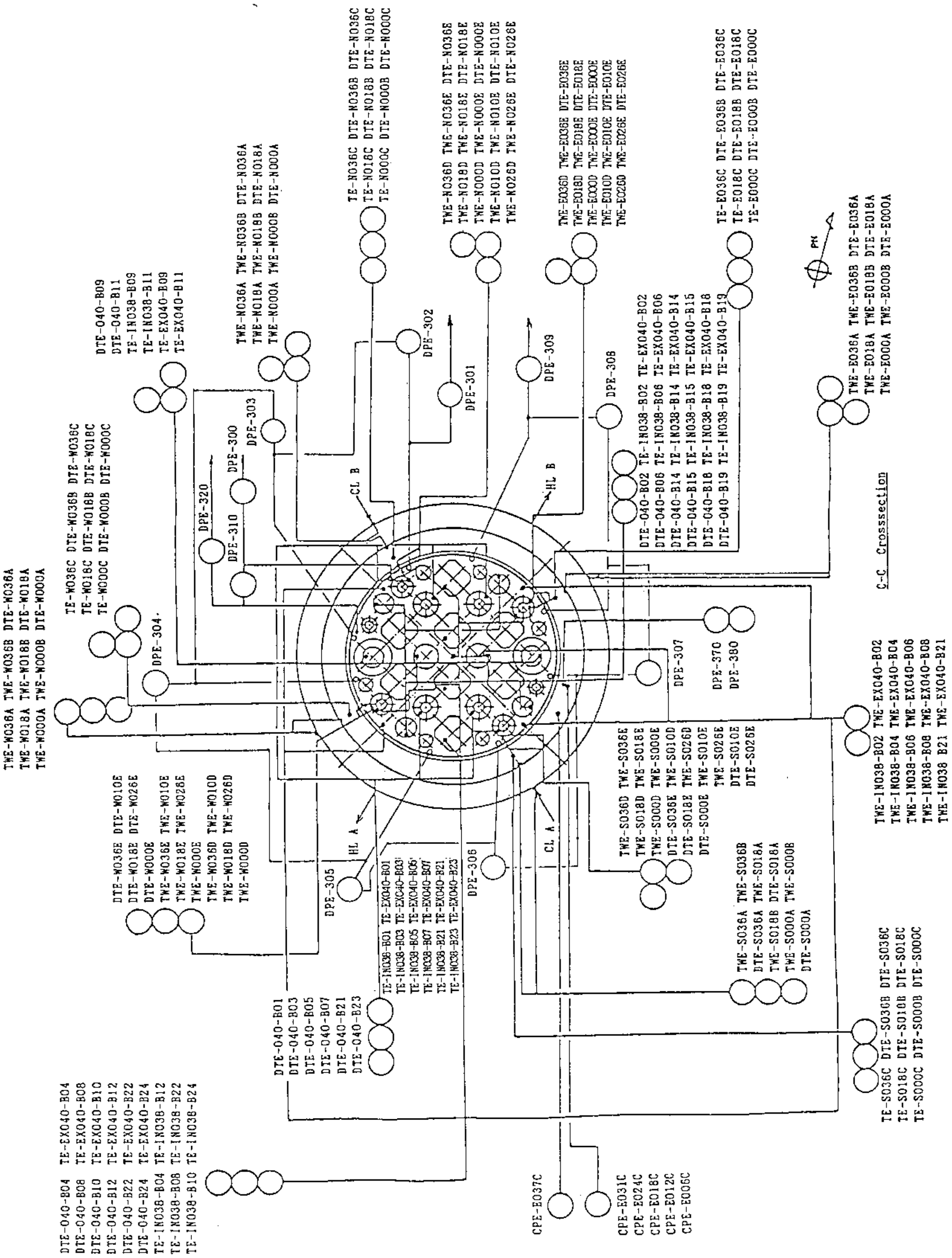


Fig. 6.9(c) Horizontal Locations of Pressure Vessel Instruments (Except Simulated Core) (III)

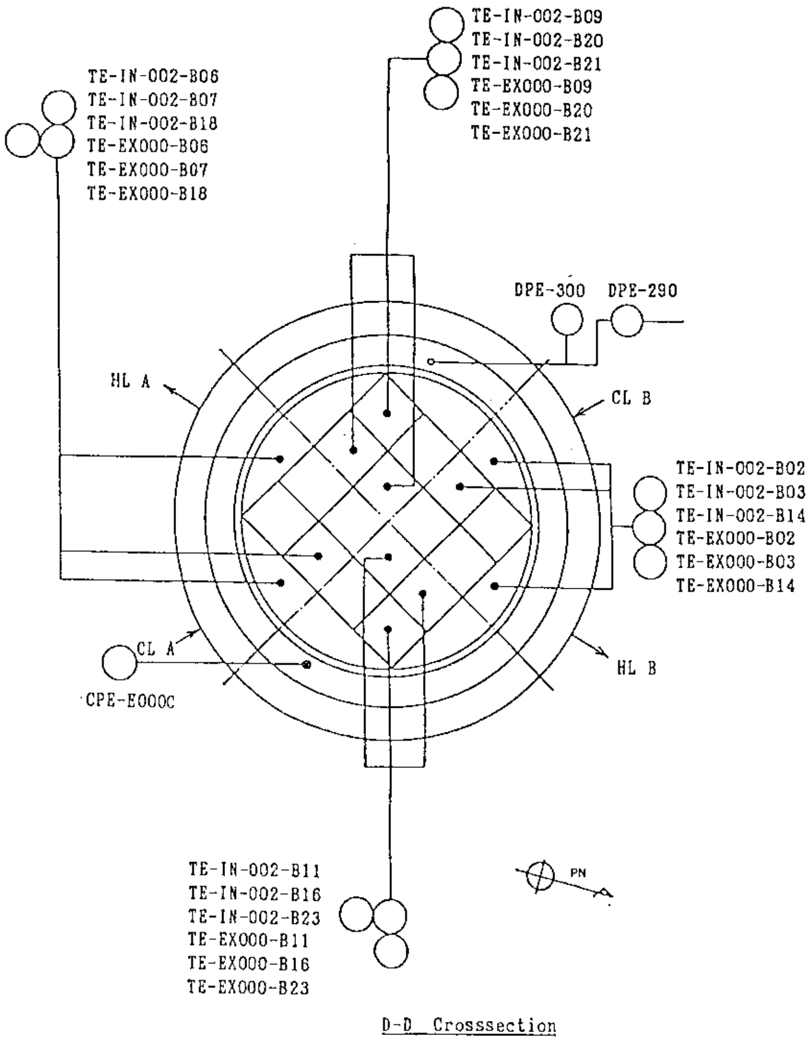


Fig. 6.9(d) Horizontal Locations of Pressure Vessel Instruments (Except Simulated Core) (IV)

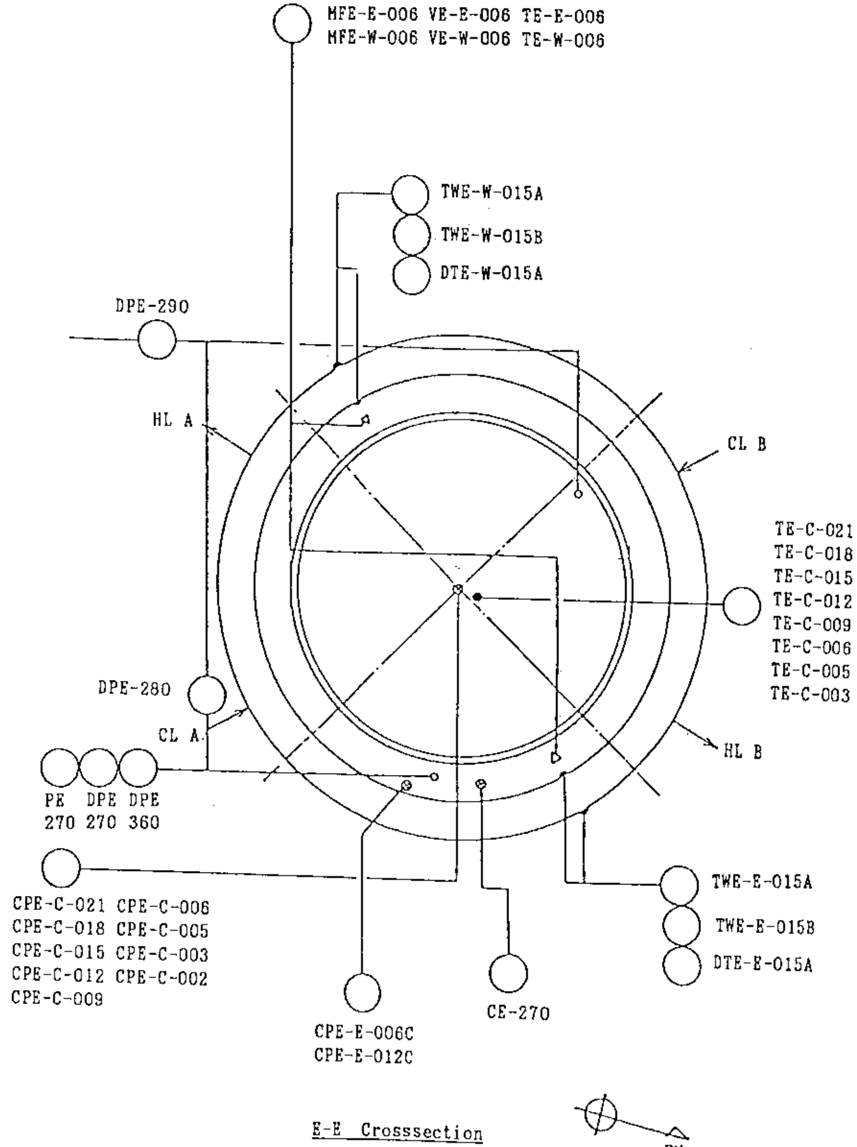


Fig. 6.9(e) Horizontal Locations of Pressure Vessel Instruments (Except Simulated Core) (V)

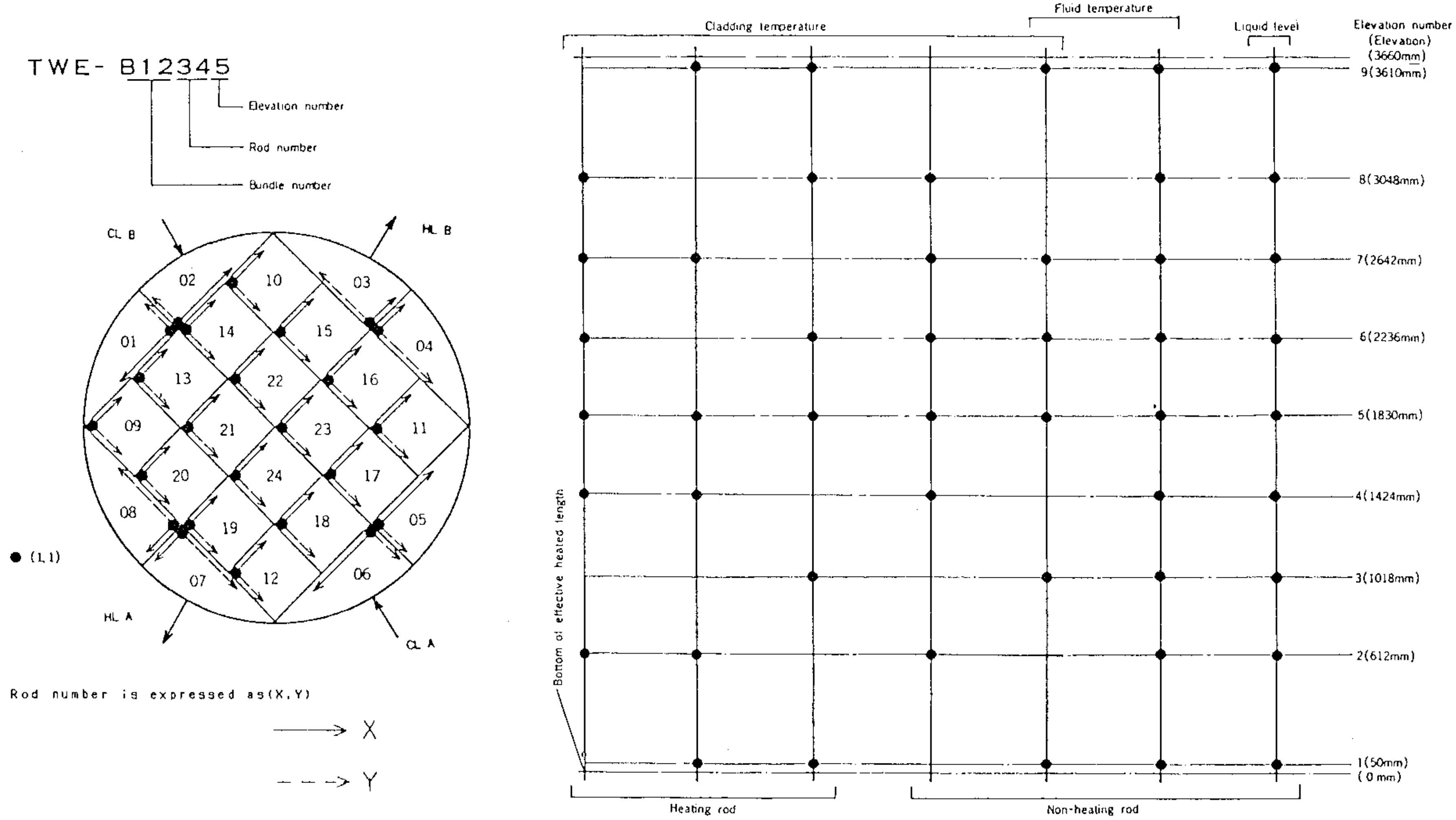


Fig. 6.10 Locations of Simulated Core Instruments

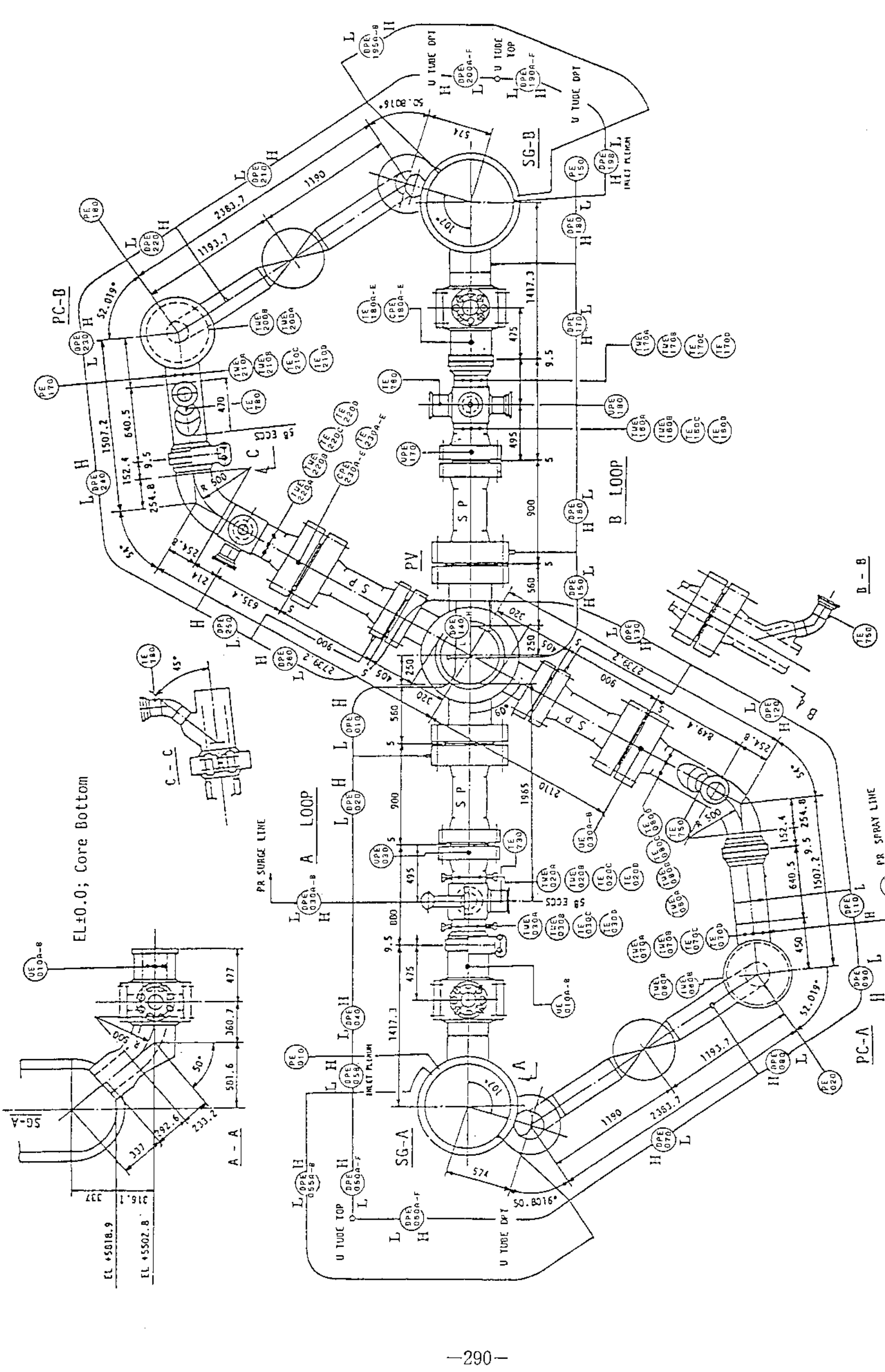


Fig. 6.11(a) Locations of Selected Instruments on Primary Loop A and B

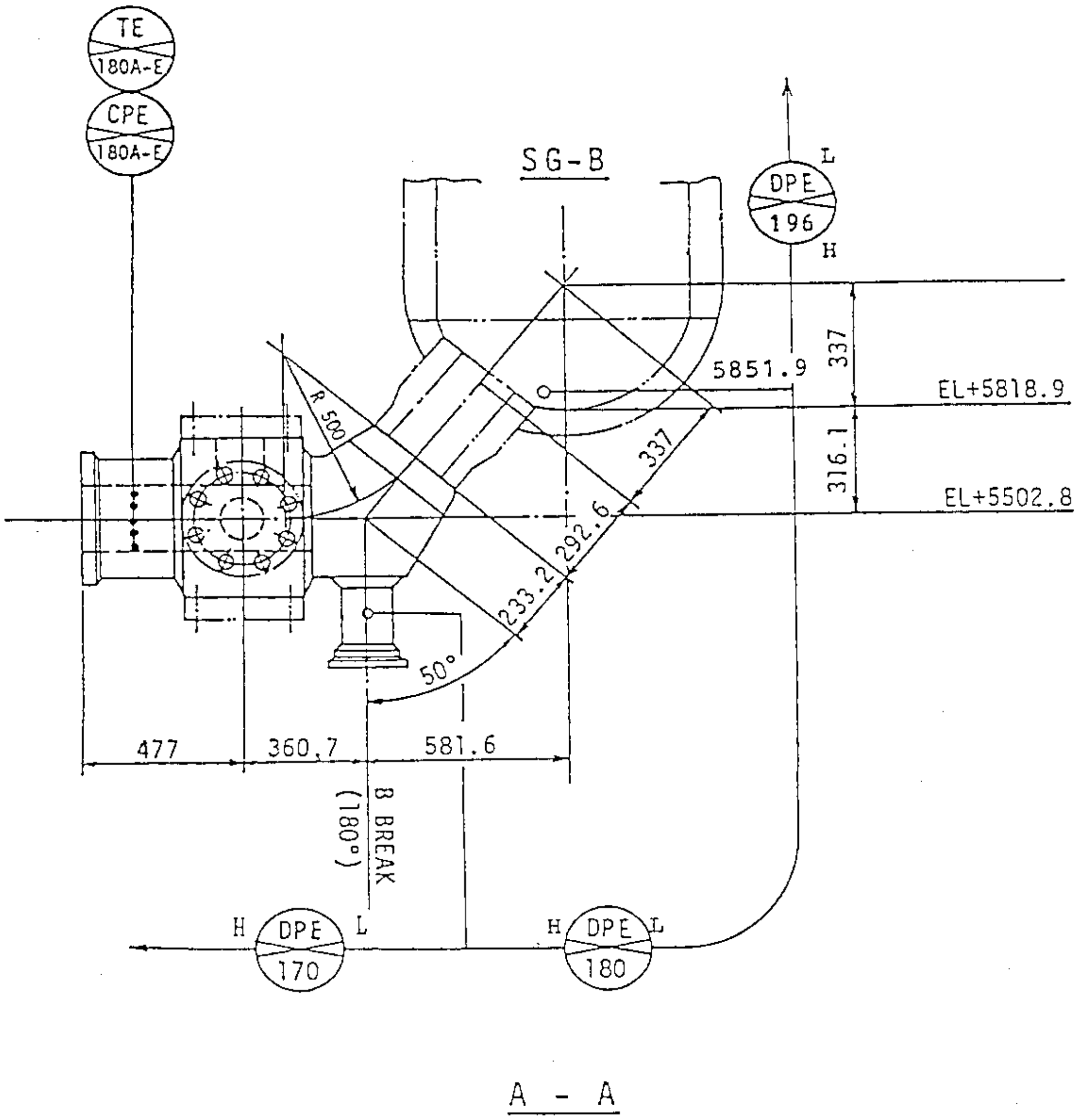


Fig. 6.11(b) Instrument Locations of Inlet Pipe of Steam Generator B

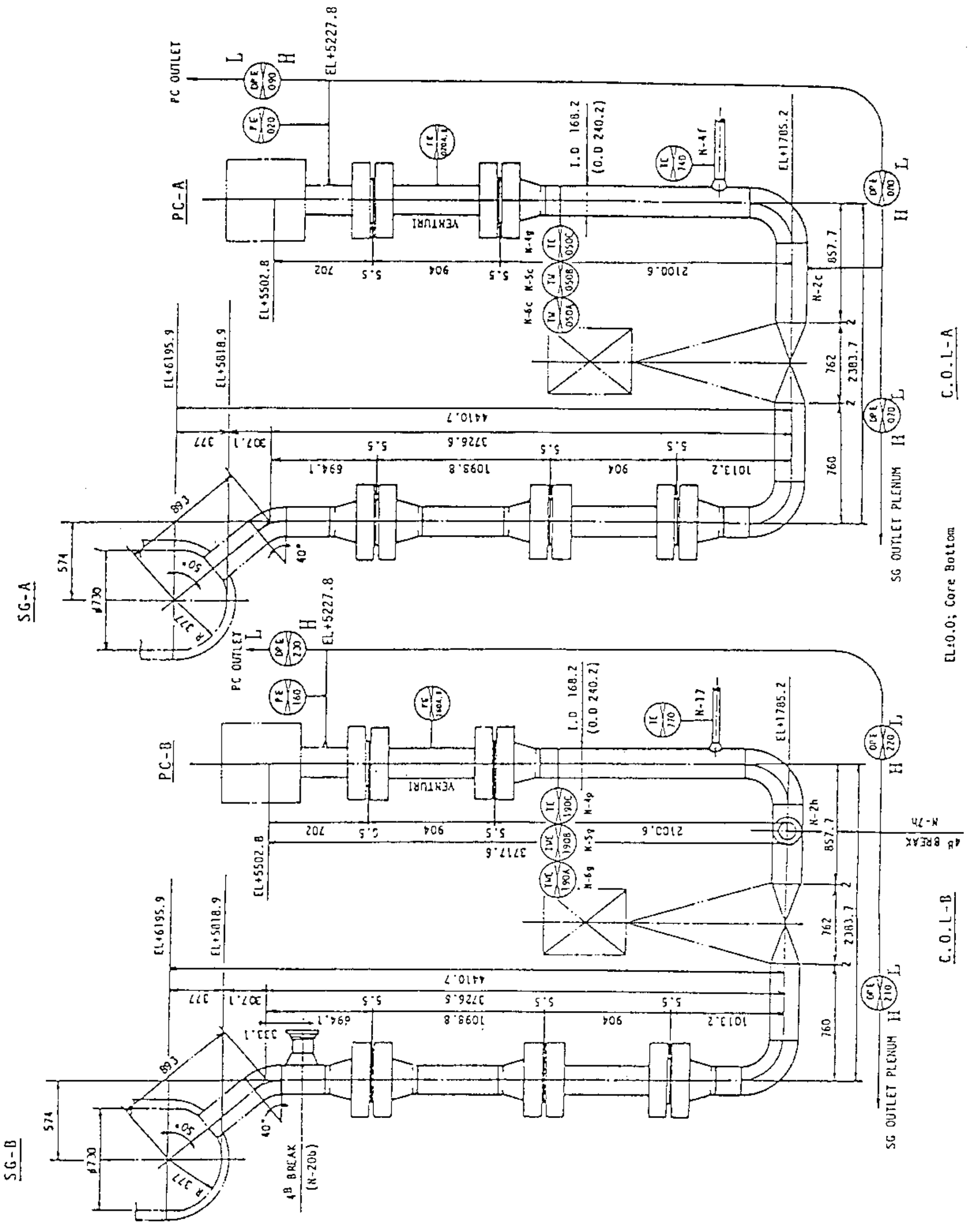


Fig. 6.11(c) Locations of Selected Instruments on Crossover Legs A and B (I)

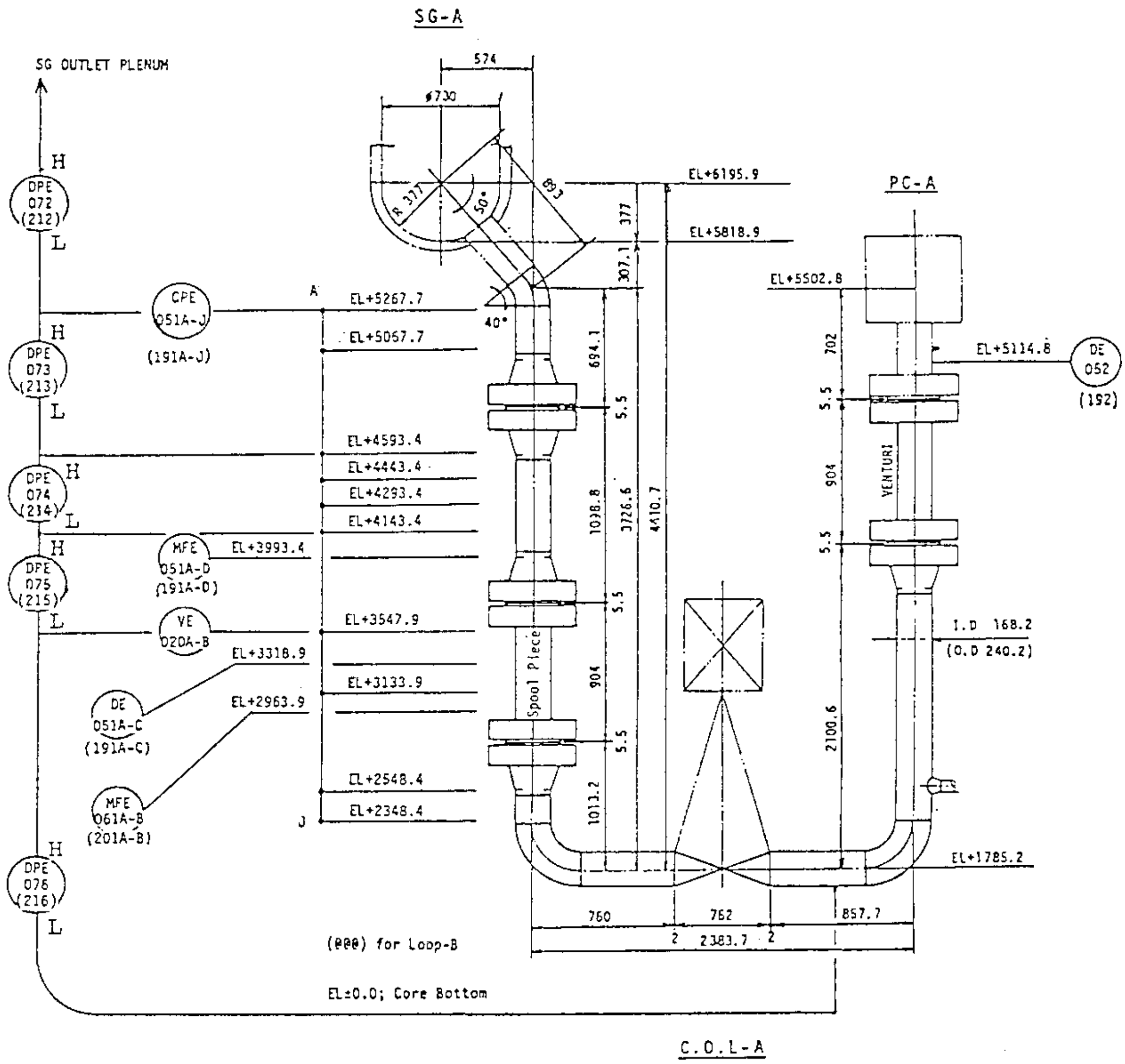


Fig. 6.11(d) Locations of Selected Instruments on Crossover Legs A and B (II)

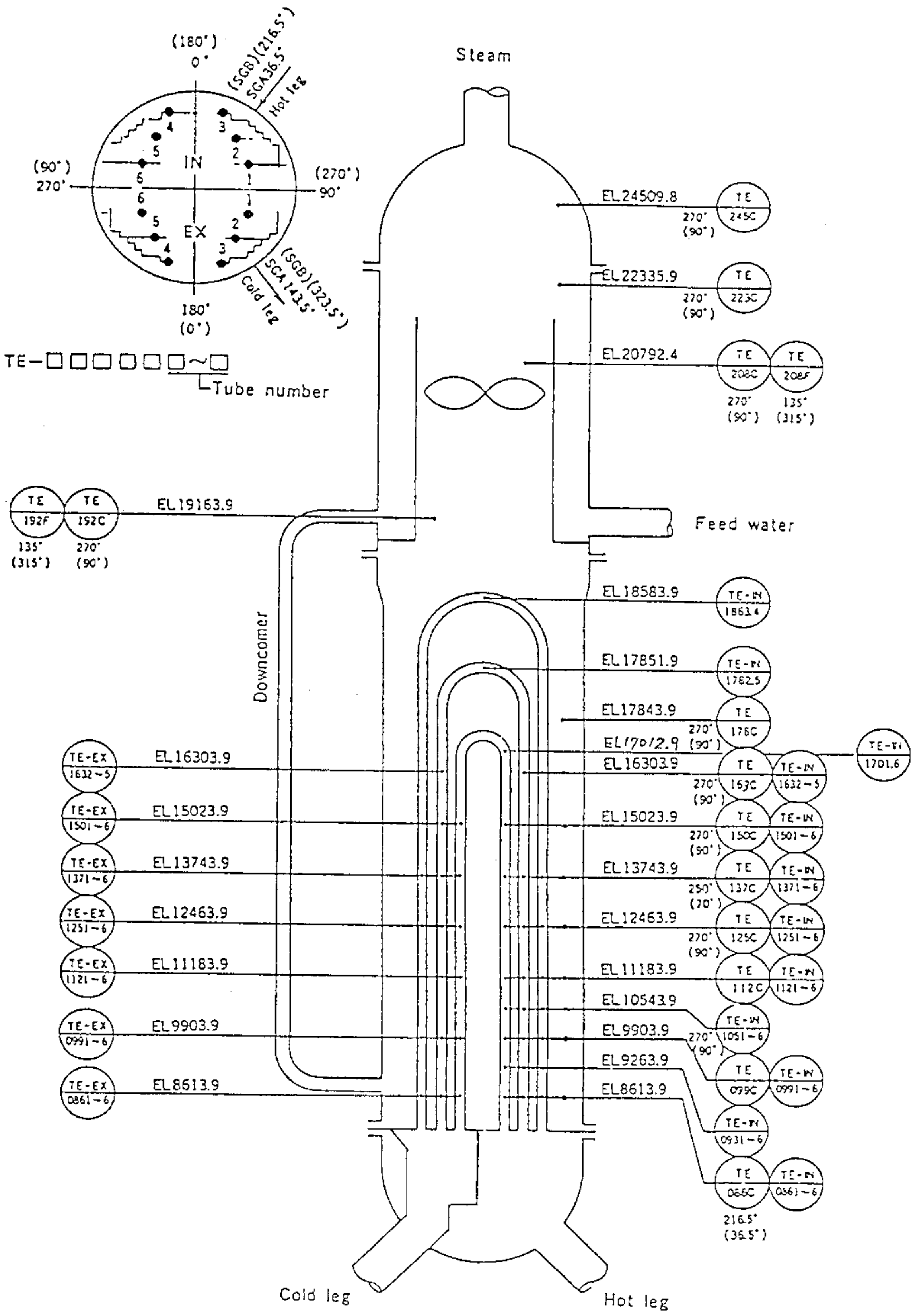


Fig. 6.12(a) Locations of Temperature Measurements for Steam Generators A and B (I)

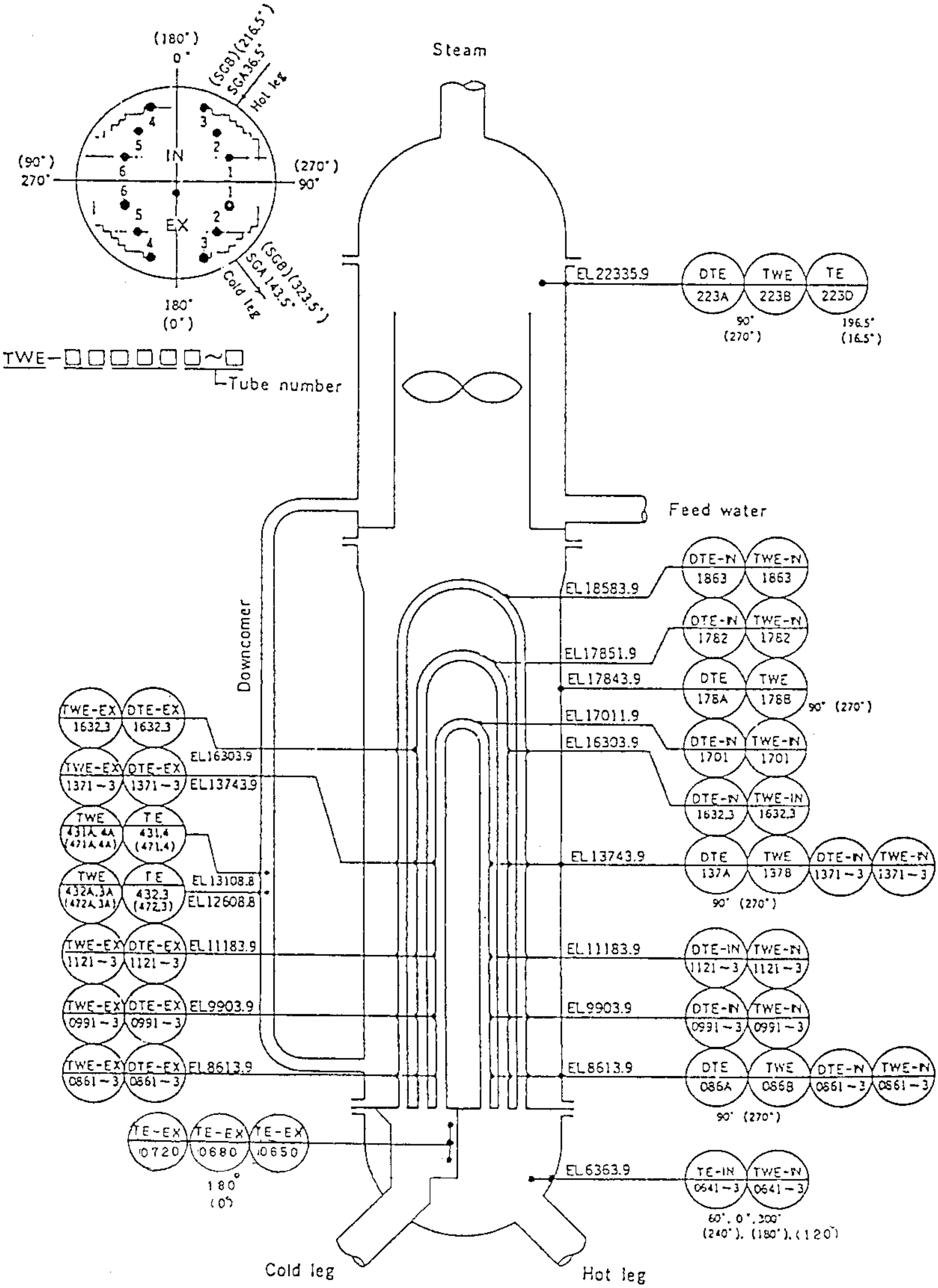


Fig. 6.12(b)　Locations of Temperature Measurements for Steam Generators A and B (II)

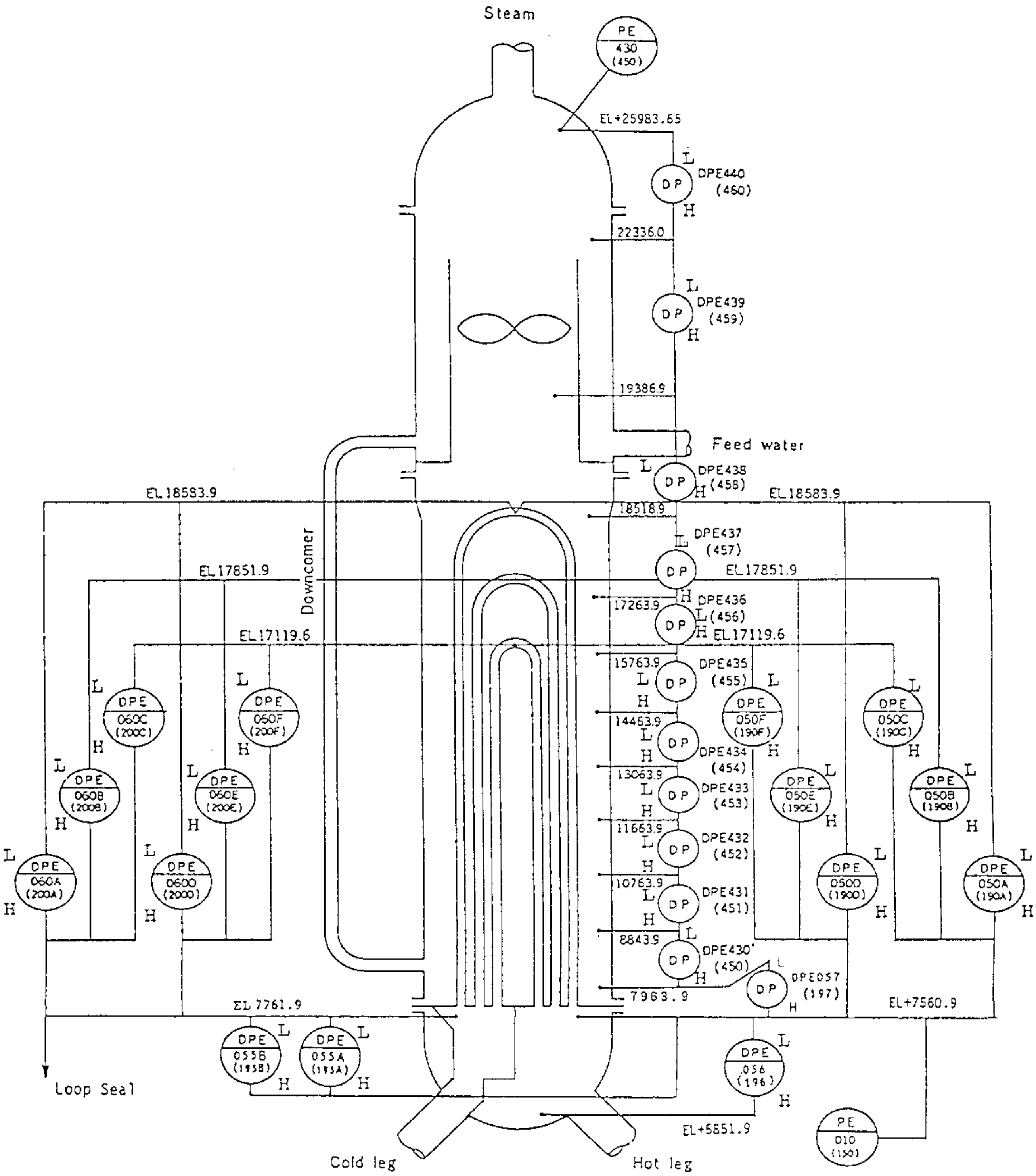


Fig. 6.13 Locations of Pressure and Differential Pressure Measurements for Steam Generators A and B

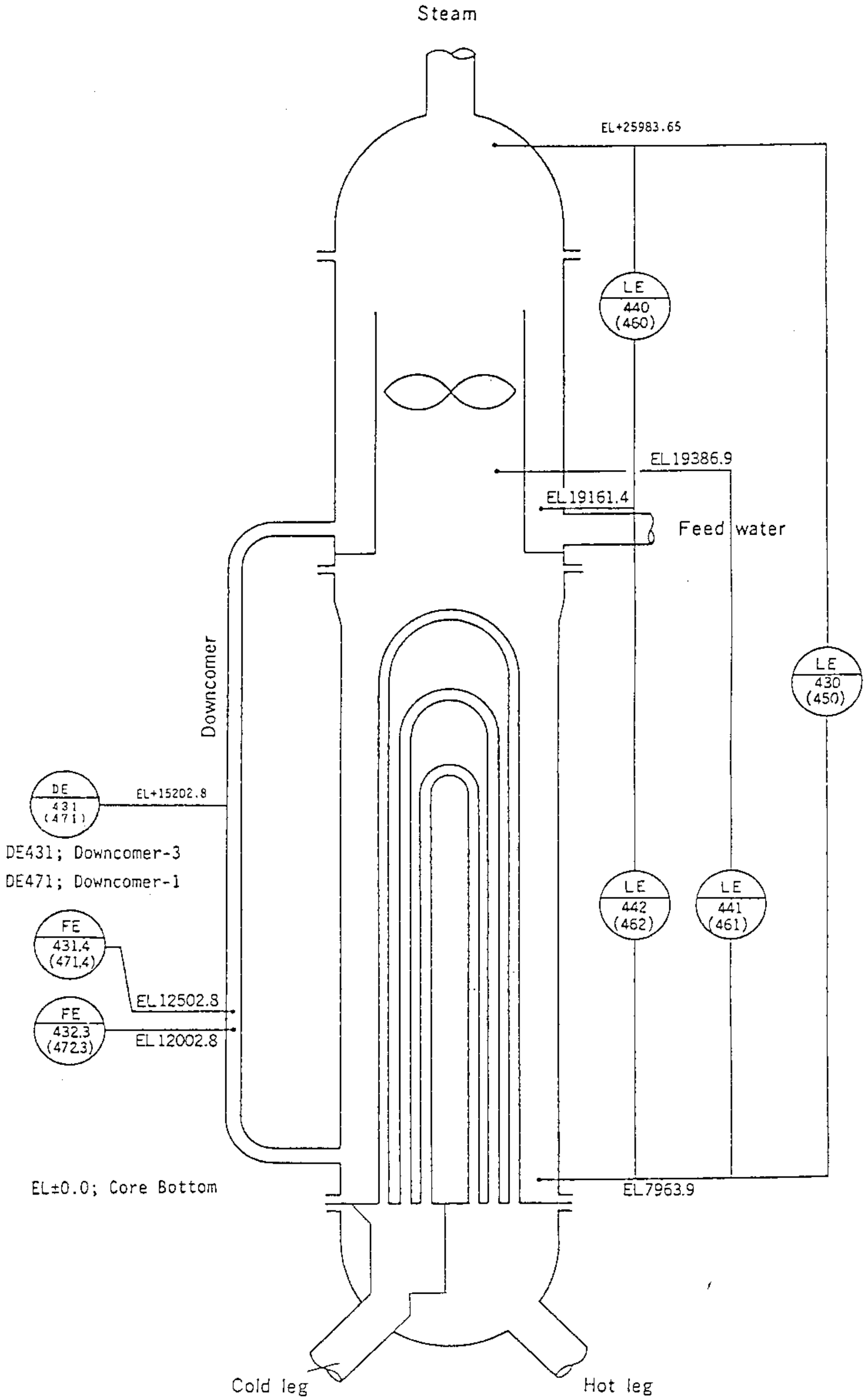


Fig. 6.14 Locations of Steam Generators A and B Secondary Liquid Level and Downcomer Flow Measurements

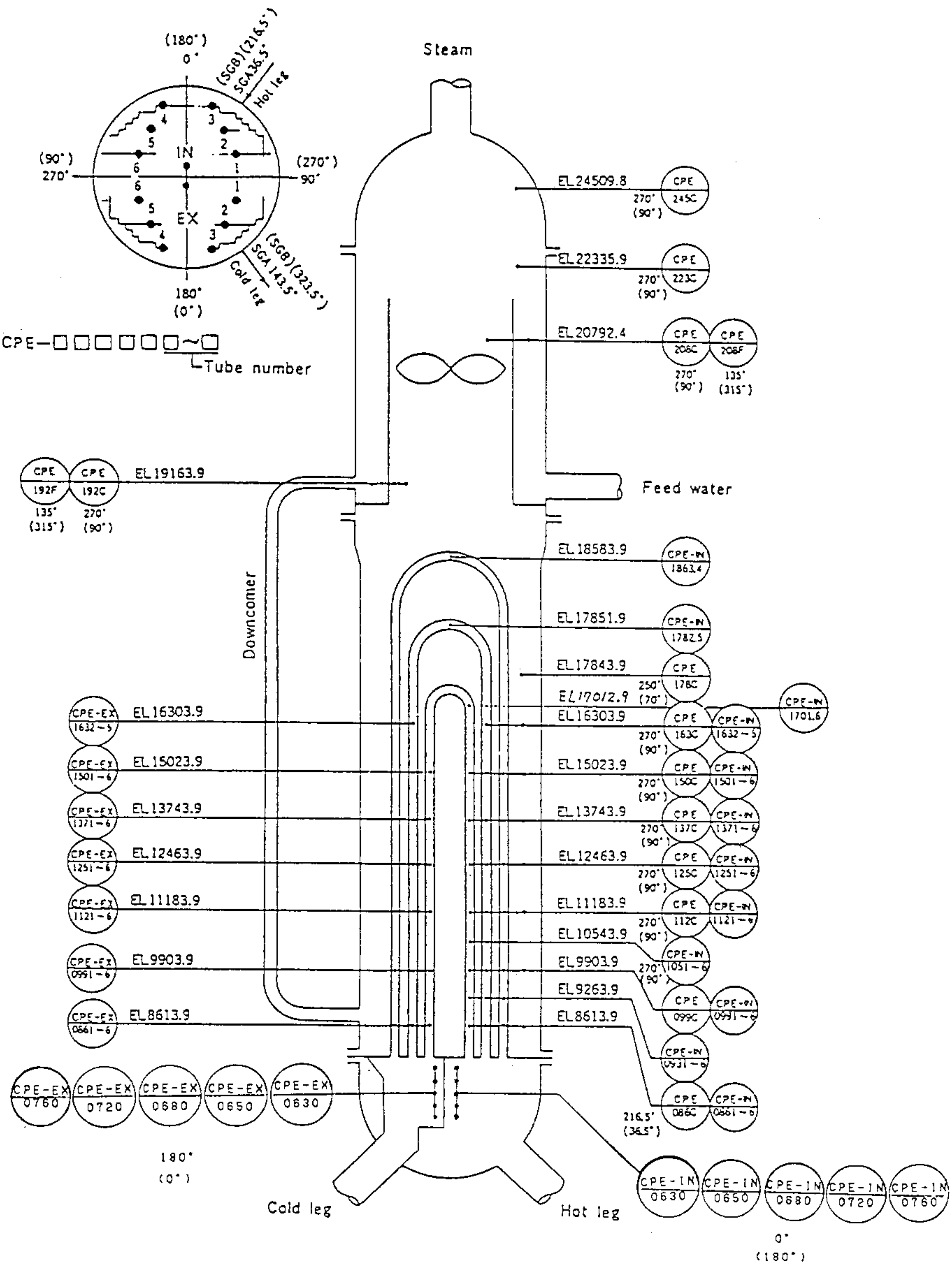


Fig. 6.15　　Locations of Steam Generators A and B Conductivity Probe Measurements

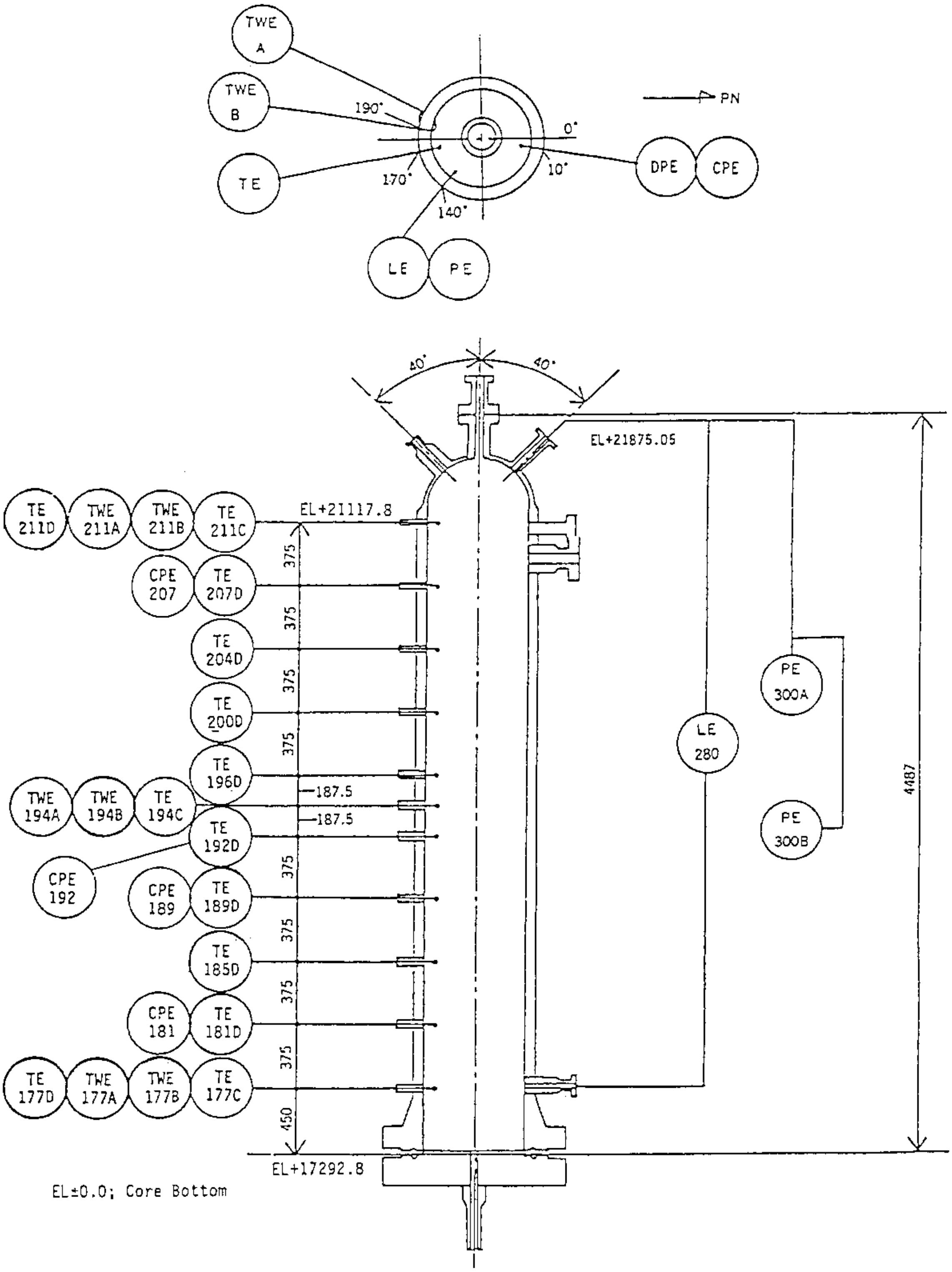


Fig. 6.16(a) Locations of Selected Instruments on Pressurizer (I)

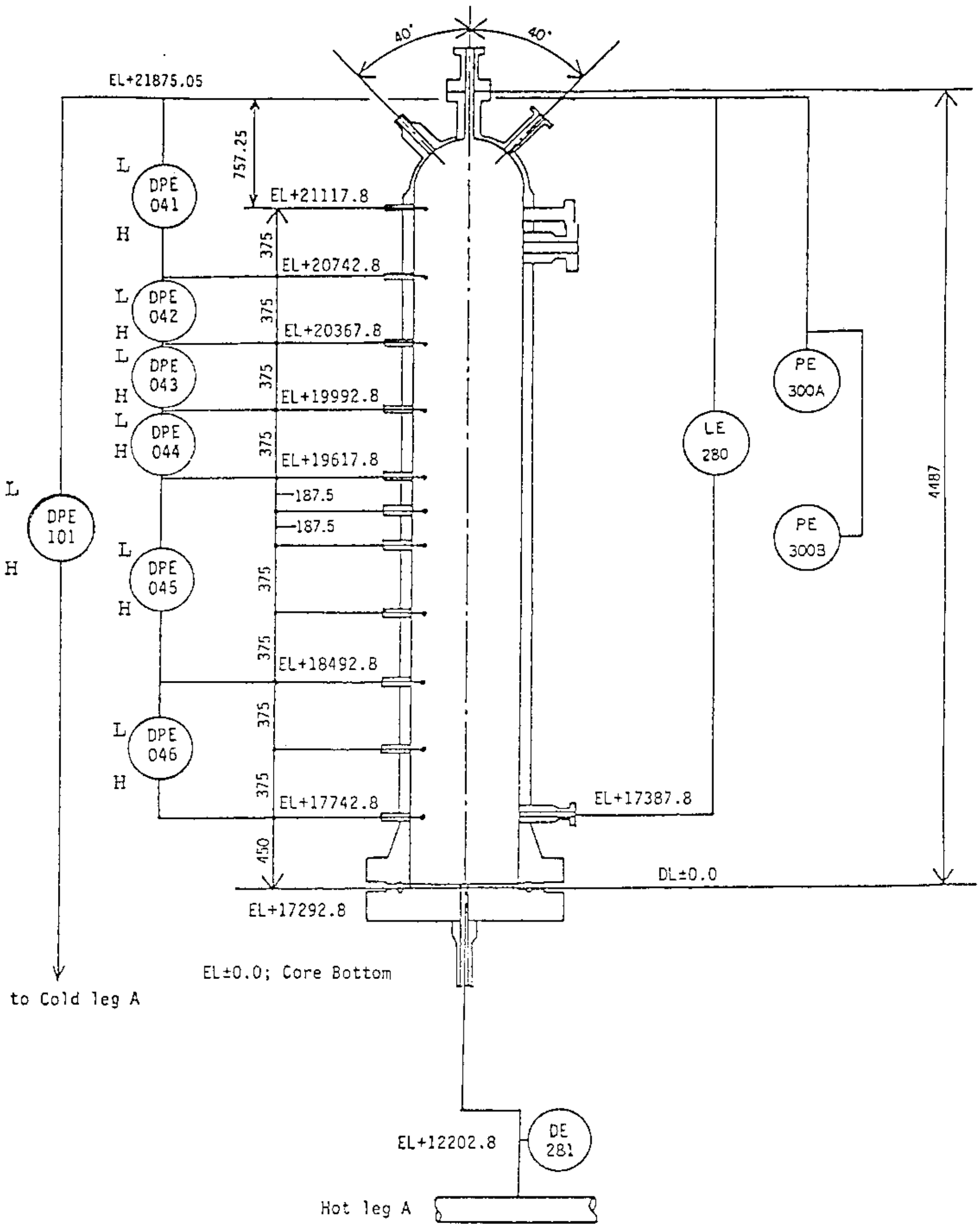


Fig. 6.16(b) Locations of Selected Instruments on Pressurizer (II)

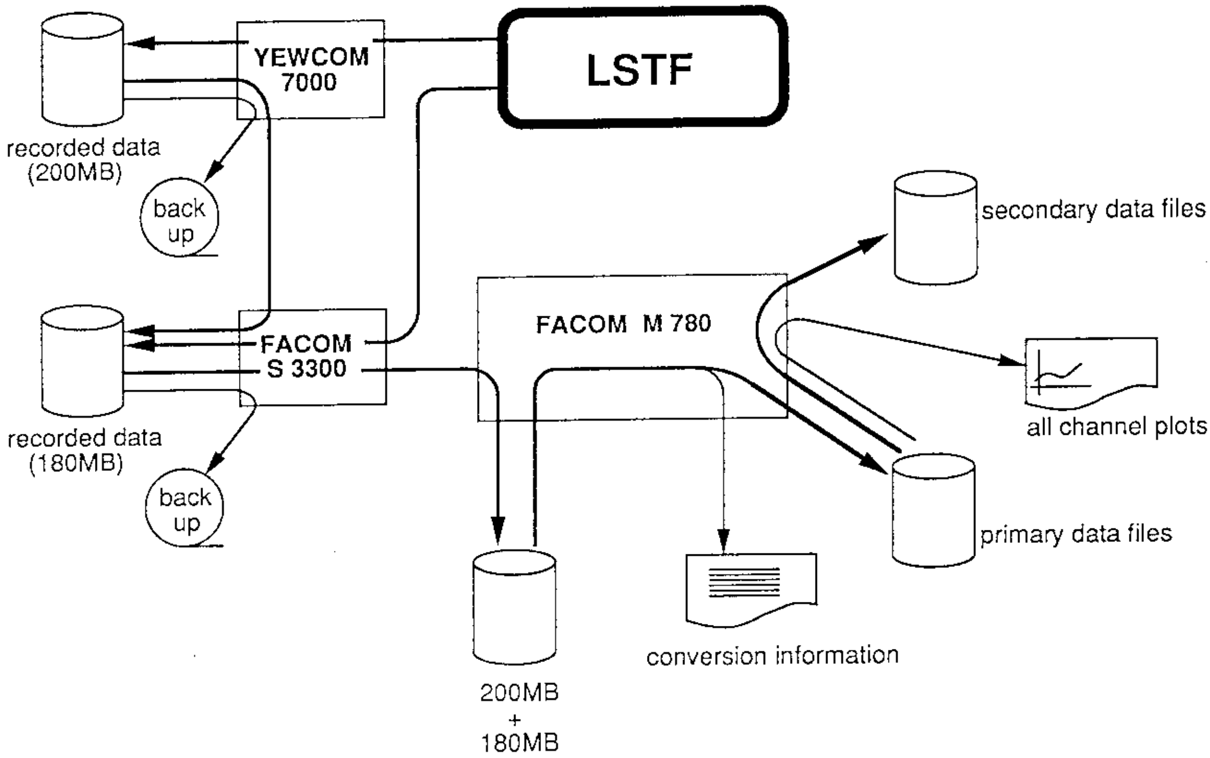


Fig. 6.17 Outline of Data Reduction Process

7. Control System

7.1 Block Diagram of System

Shown in Fig. 7.1 is the block diagram for the control system. The system consists mainly of the CENTUM, YEWCOM and FACOM computer systems which are discussed in Sections 7.2 and 7.3.

7.2 CENTUM System

Shown in Fig. 7.2 is the arrangement of the CENTUM system. The CENTUM system has a process-control unit and operation and monitoring sections. The process-control unit includes the feed-back control system, the sequence control system and the arithmetic computing unit.

(1) Feed-back Control System

Shown in Fig. 7.3 is the schematic for the feed-back control system. The system receives signals from the LSTF and make operational calculations to control the LSTF.

(2) Sequence Control System

Shown in Fig. 7.4 is the schematic diagram for the sequence control system. The system controls the LSTF based on the sequential program stored within it.

(3) Monitoring, Operation and Recording Systems

Shown in Fig. 7.5 are the monitoring, operating and recording systems for the operator of the LSTF.

7.3 YEWCOM and FACOM Systems

Shown in Fig. 7.6 are the constitutions of YEWCOM and FACOM. The instrument signals recorded by the data loggers, YEWCOM 7000 and FACOM S3300, are transferred into FACOM M780 computer system. YEWCOM has following functions.

(1) Data Acquisition Function

(2) Programming Functions

The following curves are programmed.

1) Decay heat curve : 1

2) Q-H curves of pump : 4

3) Pump rotation speed curve : 1

(3) Display

Test data of the LSTF are monitored on the color-display CRT, printer and X-Y plotter. The following is functions of the display:

1) Graphic display of cladding temperature on the CRT
2) Display of trend recording on the CRT and X-Y plotter
3) Display of event recording on the printer
4) Display of measured data on the CRT and printer

(4) Warning Function

7.4 Software for Control

The software for control consists of following programs. These programs can be easily modified, created and eliminated.

(1) Loop Connected Programs

1) Temperature control of the primary coolant loop (Fig. 7.7)
2) Pressure control of the PR (Fig. 7.8)
3) Liquid level control of the PR (Fig. 7.9)
4) Control of the turbine bypass (Fig. 7.10)
5) Pressure control of the SG secondary side (Fog. 7.11)
6) Liquid level control of the SG secondary side (Fig. 7.12)
7) Auxiliary feedwater flow rate control (Fig. 7.13)
8) Control of the charging pump flow rate (Fig. 7.14)

(2) Functional Control

1) Decay heat control of the simulated fuel rods
2) HPIS flow rate control
3) Charging pump flow rate control
4) LPIS flow rate control
5) Auxiliary feed water pump flow rate control
6) PC rotation speed control

(3) Sequence Control

1) Program for the TMI accident simulation tests
2) Program for the primary coolant loop small break tests
3) Program for the loss of feedwater tests
4) Program for the SG overfeeding tests
5) Program for the loss of load tests

6) Program for the feedwater line break tests
7) Program for the steam generator U-tube break tests
8) program for the main steam line break tests

A list of symbol marks used in Fig. 7.7 to 7.14 is shown in Fig. 7.15.

(4) Interlock Program

Shown in Table 7.1 are simulated reactor trip signals of the referenced PWR. Most of the reactor trip signals can be simulated with the LSTF by using the interlock program. ECC trip signals are shown in Table 7.2. ECC water is injected when the pressure of pressurizer becomes 12.3 MPa or the pressure at main steam line becomes 4.2 MPa in the LSTF.

Table 7.1 **Reactor Trip Signal** (1/3)

Reactor trip signal	Sensor	interlock	Set point	Capability of Simulation with LSTF
High neutron flux at neutron source region	Neutron flux detector at neutron source region	(P-6)* Manual block above set point (P-10) Automatic block above set point	10^5 cps	No
High neutron flux at medium region	Neutron flux detector at medium region	(P-10) Manual block above set point	+25% of normal	No
High neutron flux at power region				
a. Low set point	Neutron flux detector at power region	(P-10) Manual block above set point	+25% of normal	No
b. High set point	"	"	+100% of normal	No
High changing rate of neutron flux at power region				
a. Increasing	Neutron flux detector at power region		+5% of increasing rate	No
b. Decreasing	"		-5% of decreasing rate	

* Permission number

Table 7.1 (Cont'd) (2/3)

Reactor trip signal	Sensor	interlock	Set point	Capability of Simulation with LSTF
Low pressure at primary coolant loop	Pressure at PR	(P-7) Automatic block below set point	12.97 MPa	Yes
Low flow rate of primary coolant loop	Flow rate of primary coolant loop	one loop (P-8) Automatic block below set point more than two loop (P-7) Automatic block below set point	90% of normal	Yes
Low voltage of power unit for PC	Voltage of power unit for PC	(P-7) Automatic block below set point	70% of normal	No
Low frequency of power unit for PC	Frequency of power unit for PC	(P-7) Automatic block below set point	57.5 Hz	No
Turbine trip	Oil pressure at turbine autostop	(P-7) Automatic block below set point		Yes
Low flow rate of SG feedwater	Flow rate at SG feedwater line, flow rate at main steam line, water level in SG		40% of normal flow rate, 25% of measuring span	Yes

Table 7.1 (Cont'd) (3/3)

Reactor trip signal	Sensor	interlock	Set point	Capability of Simulation with LSTF
Low water level in SG	Water level in SG		10% of measuring span	Yes
High water level	Water level of PR	(P-7) Automatic block below set point	92% of measuring span	Yes
High acceleration due to earthquake				No
a. Horizontal direction	Horizontal acceleration sensor		2 - 3 m/s^2	
b. Vertical direction	Vertical acceleration sensor		1 - 1.5 m/s^2	
High temperature	Temperature at primary coolant, Pressure at PR, Neutron flux at power region			No
High power	Temperature at primary coolant, Neutron flux at power region			No
High pressure at primary coolant loop	Pressure at PR		16.6 MPa	Yes
Manual				Yes

Table 7.2 ECC Trip Signal

Ecc trip signal	Sensor	interlock	Set point	Capability of simulation with LSTF
a. Low pressure of Primary loop	Pressure at PR	(P-11) Manual block blow set point	12.27 MPa	Yes
b. Low pressure of main steam line	Pressure at main steam line	(P-11) Manual block below set point	4.24 MPa	Yes
c. High pressure of containment vessel	Pressure at containment vessel		+10% than designed pressure (0.14 MPa)	No
d. Manual				Yes

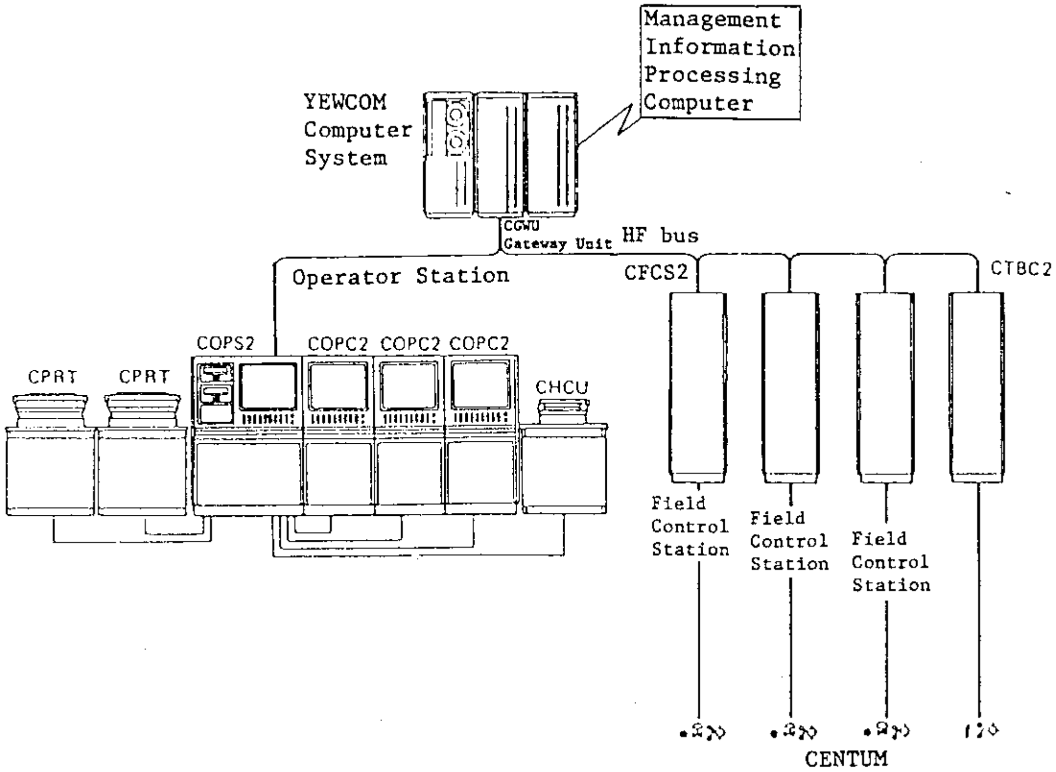


Fig. 7.1 Block Diagram of Control System

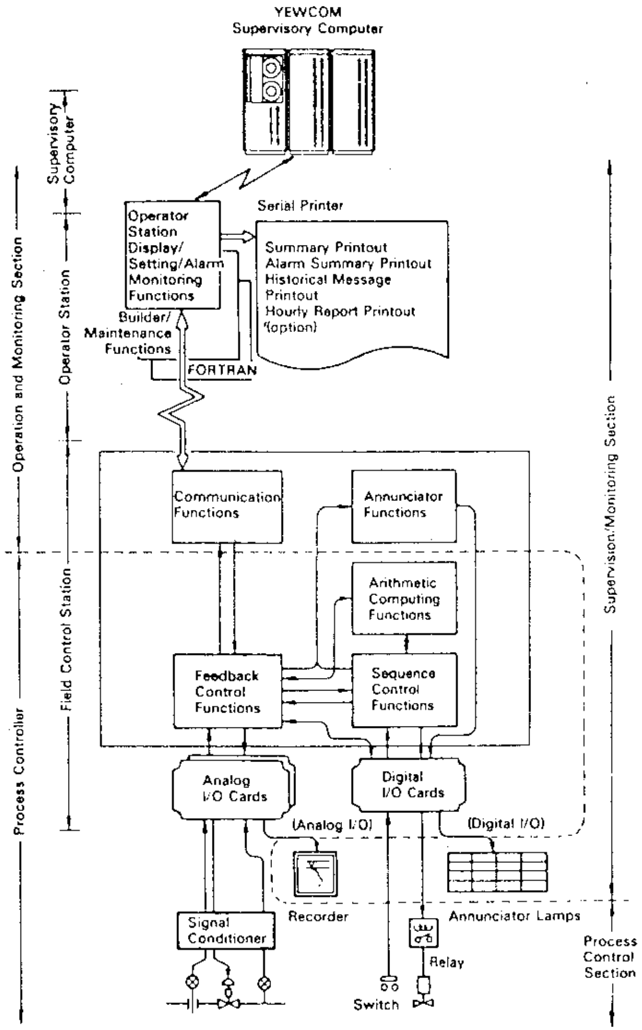


Fig. 7.2 Arrangement of the CENTUM System

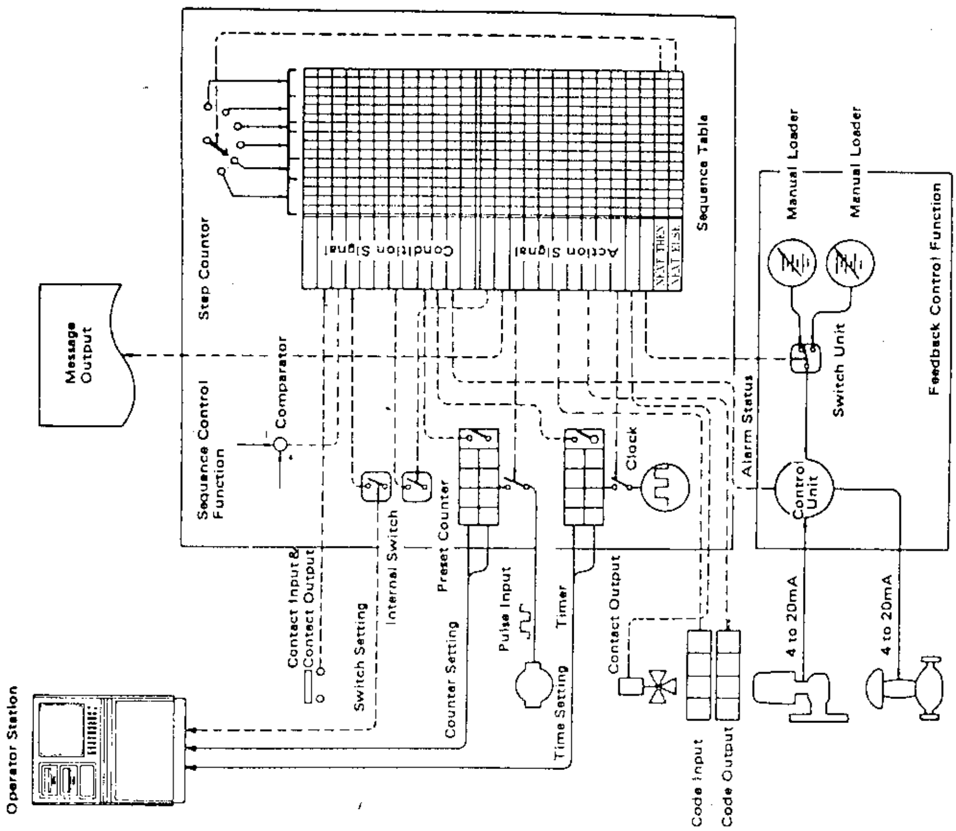


Fig. 7.4 Schematic of the Sequence Control System

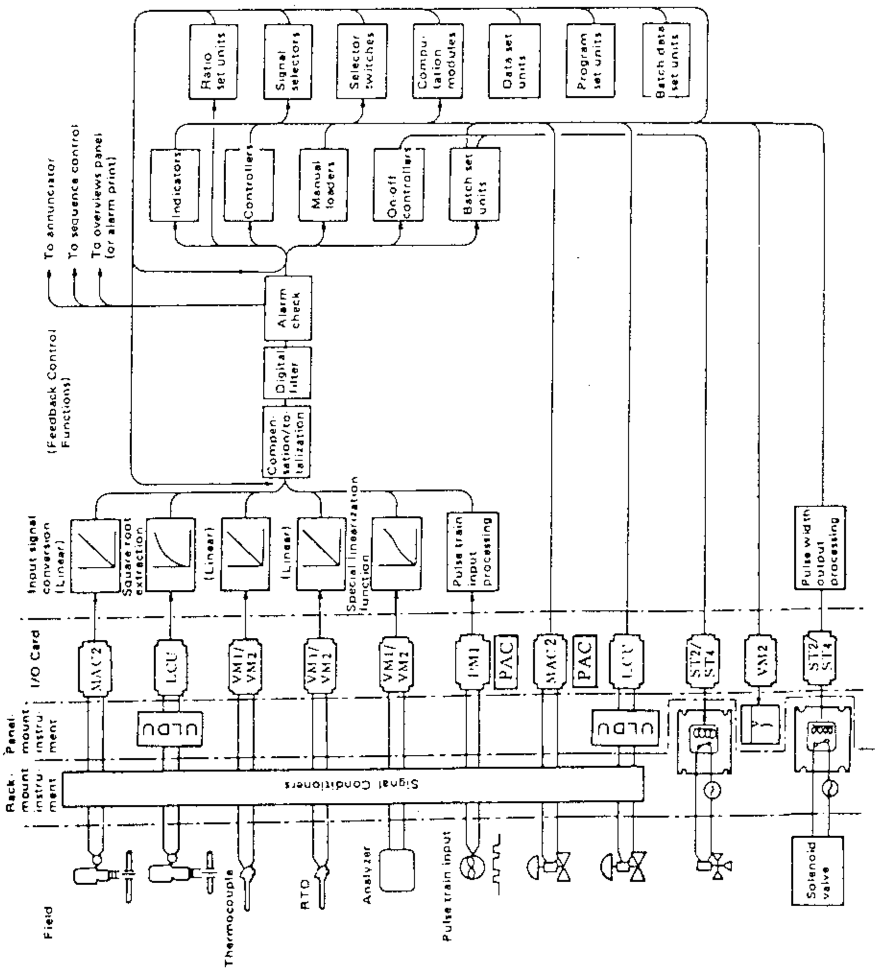


Fig. 7.3 Schematic of the Feedback Control System

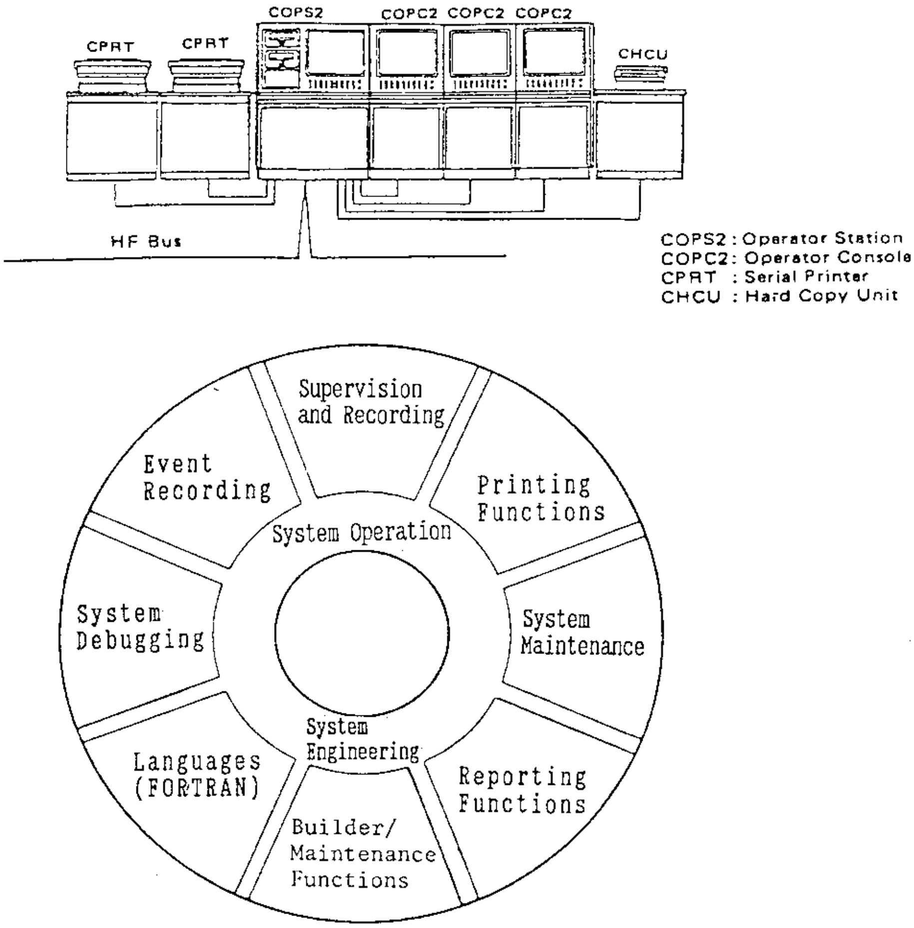
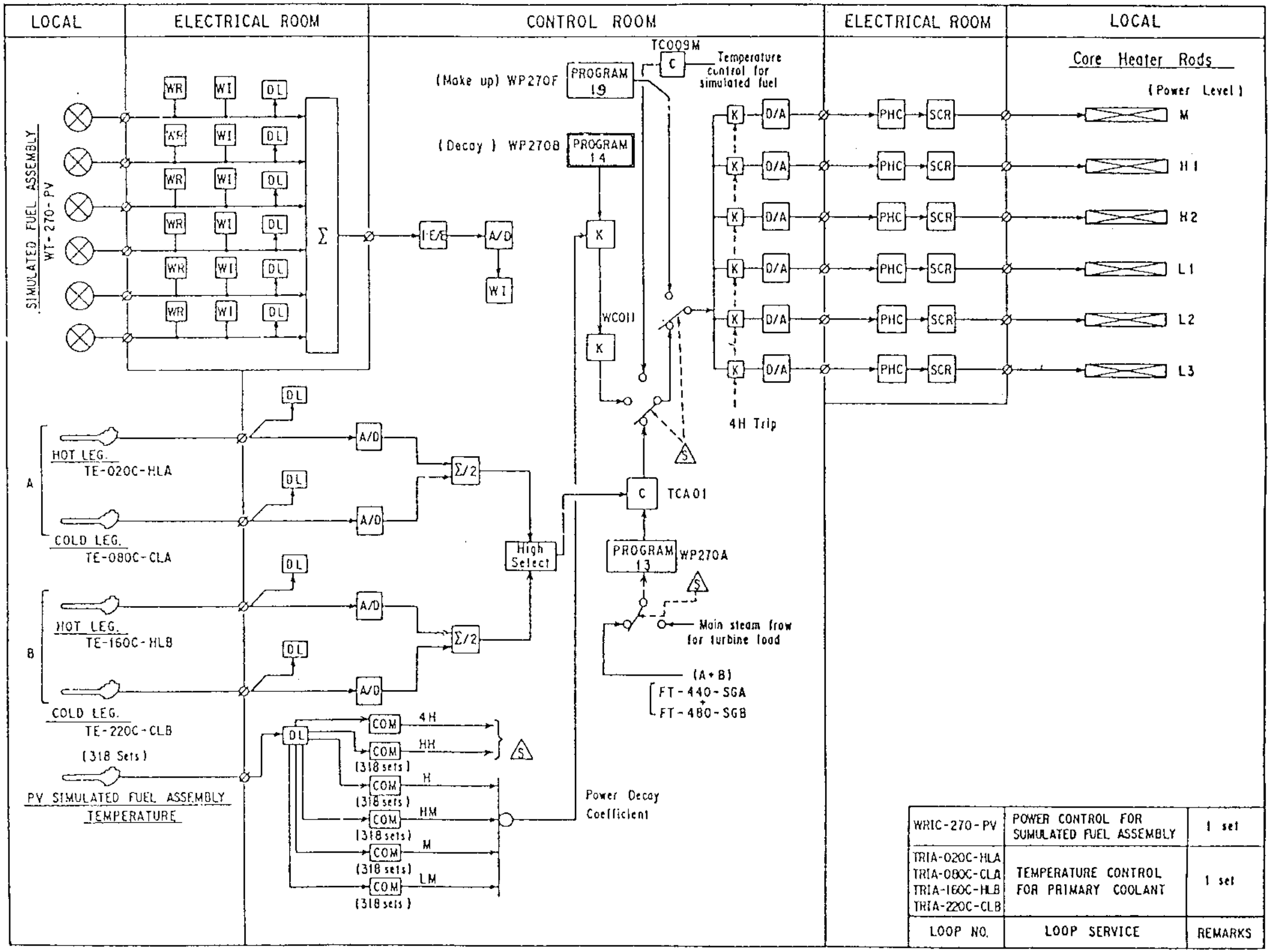


Fig. 7.5 Monitoring, Operating and Recording Systems for Operator

- FACOM S3300 — Data acquisition
  - On-line (PIO→Disk)
  - Off-line (Disk→Disk(M780))
  - Control of Sampling rate
- YEWCOM 7000
  - Data acquisition
    - On-line (PIO→Disk)
    - Off-line (Disk→Disk(FACOM))
    - Control of Sampling rate
  - Programming — Communication with CENTUM
  - Display
    - Real-time
      - Operational display
      - Temperature profile of simulated fuel rods
      - Trend
      - Status
    - Not real-time — Measured value
  - Warning
    - System accident
    - Process control Maximum temperature of simulated fuel rods

Fig. 7.6 Functions of YEWCOM and FACOM Systems



WRIC-270-PV	POWER CONTROL FOR SUMULATED FUEL ASSEMBLY	1 set
TRIA-020C-HLA TRIA-080C-CLA TRIA-160C-HLB THIA-220C-CLB	TEMPERATURE CONTROL FOR PRIMARY COOLANT	1 set
LOOP NO.	LOOP SERVICE	REMARKS

Fig. 7.7 Temperature Control of Primary Coolant System

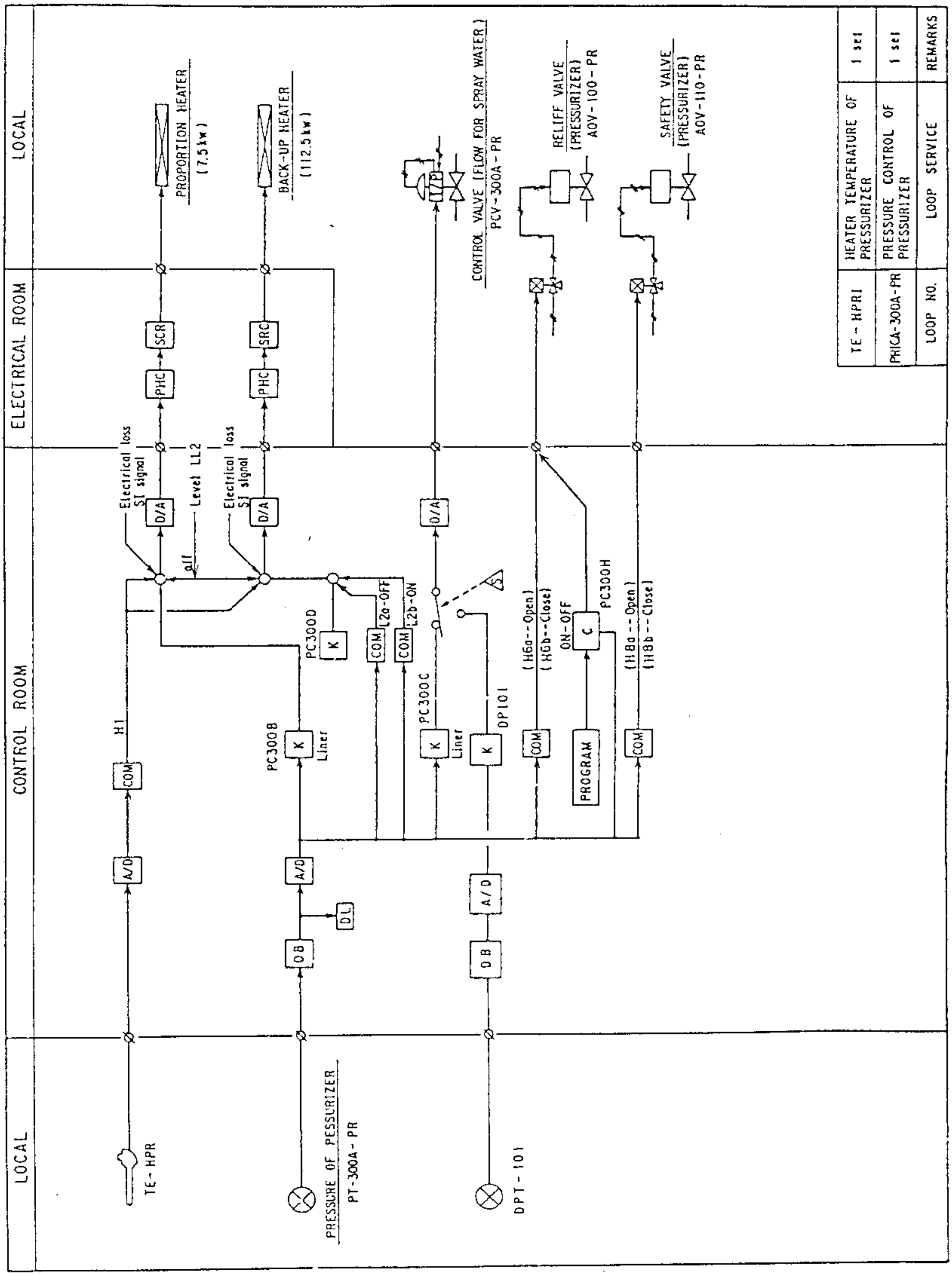


Fig. 7.8 Pressure Control of Pressurizer

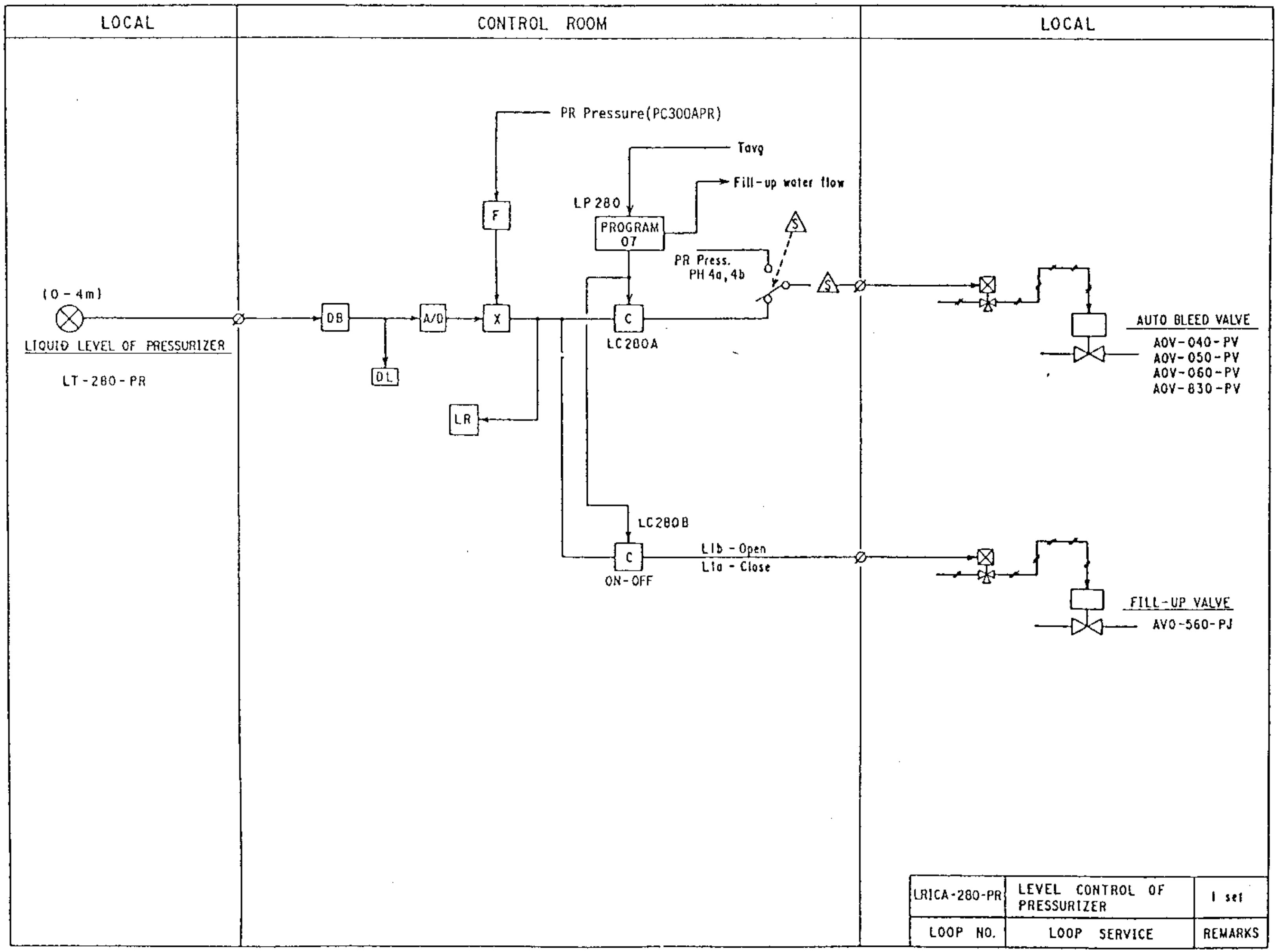


Fig. 7.9 Liquid Level Control of Pressurizer

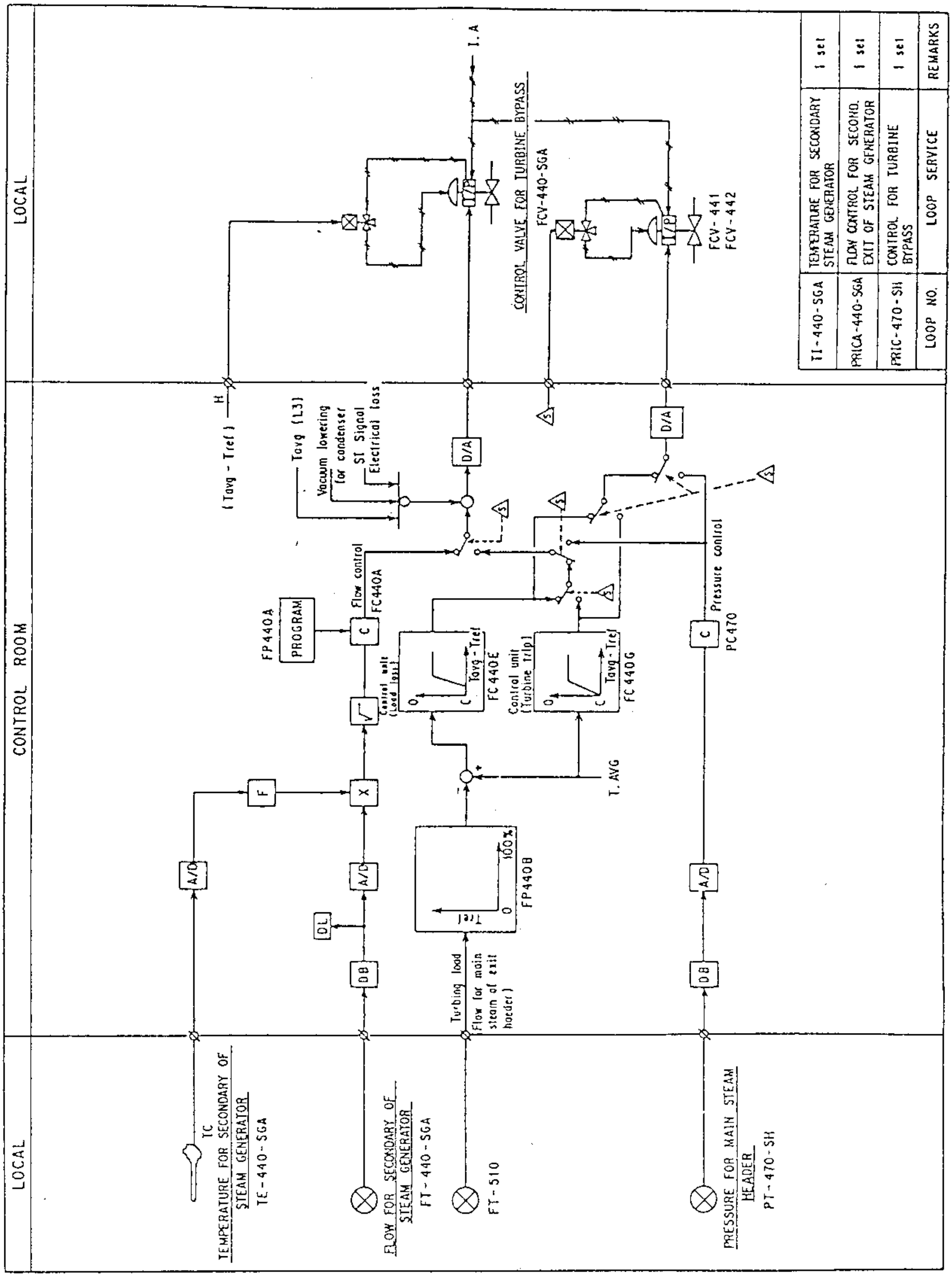


Fig. 7.10 Control of Turbine Bypass

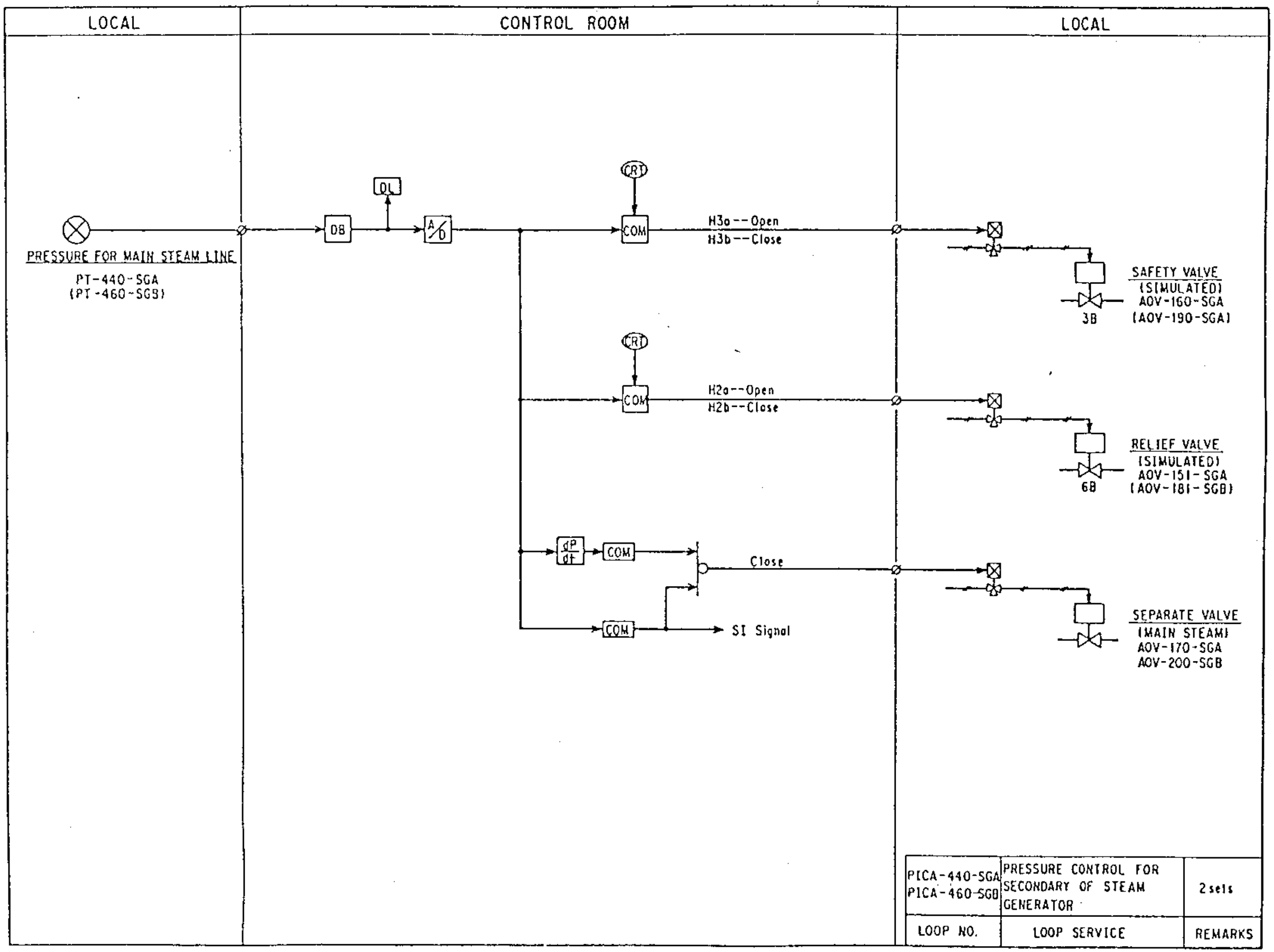


Fig. 7.11 Pressure Control of Steam Generator Secondary Side

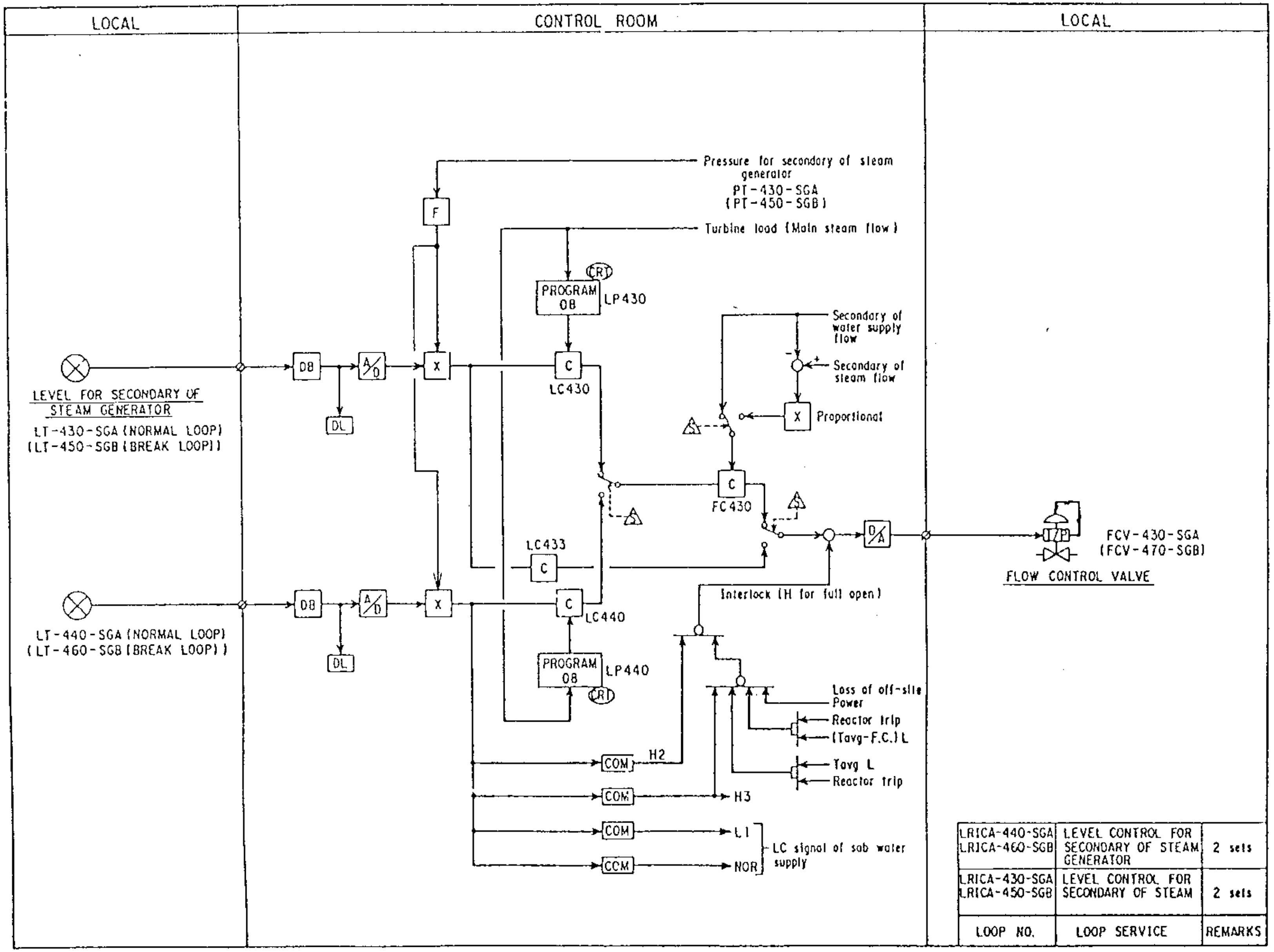


Fig. 7.12 Liquid Level Control of Steam Generator Secondary Side

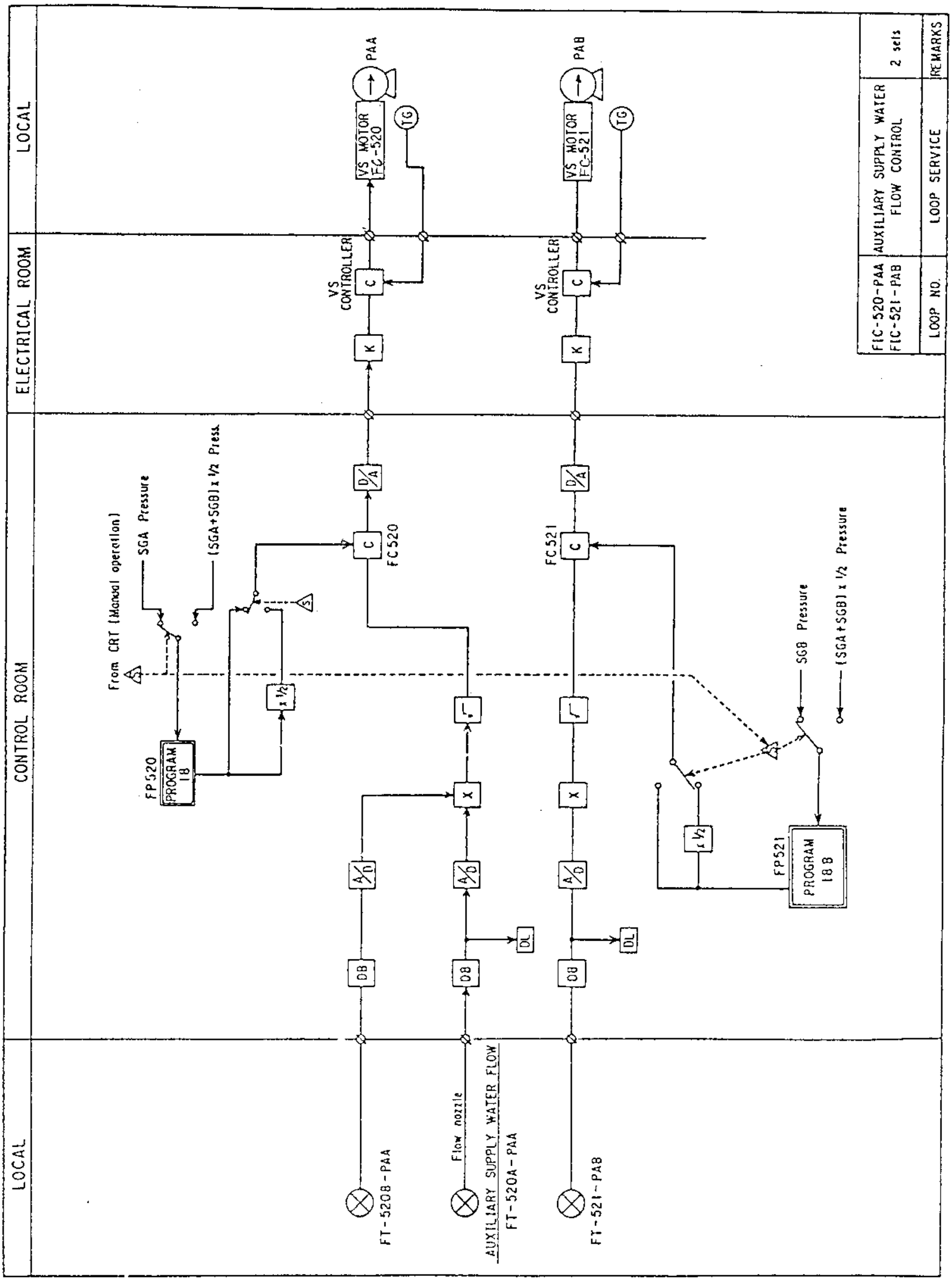


Fig. 7.13 Auxiliary Feed Water Control

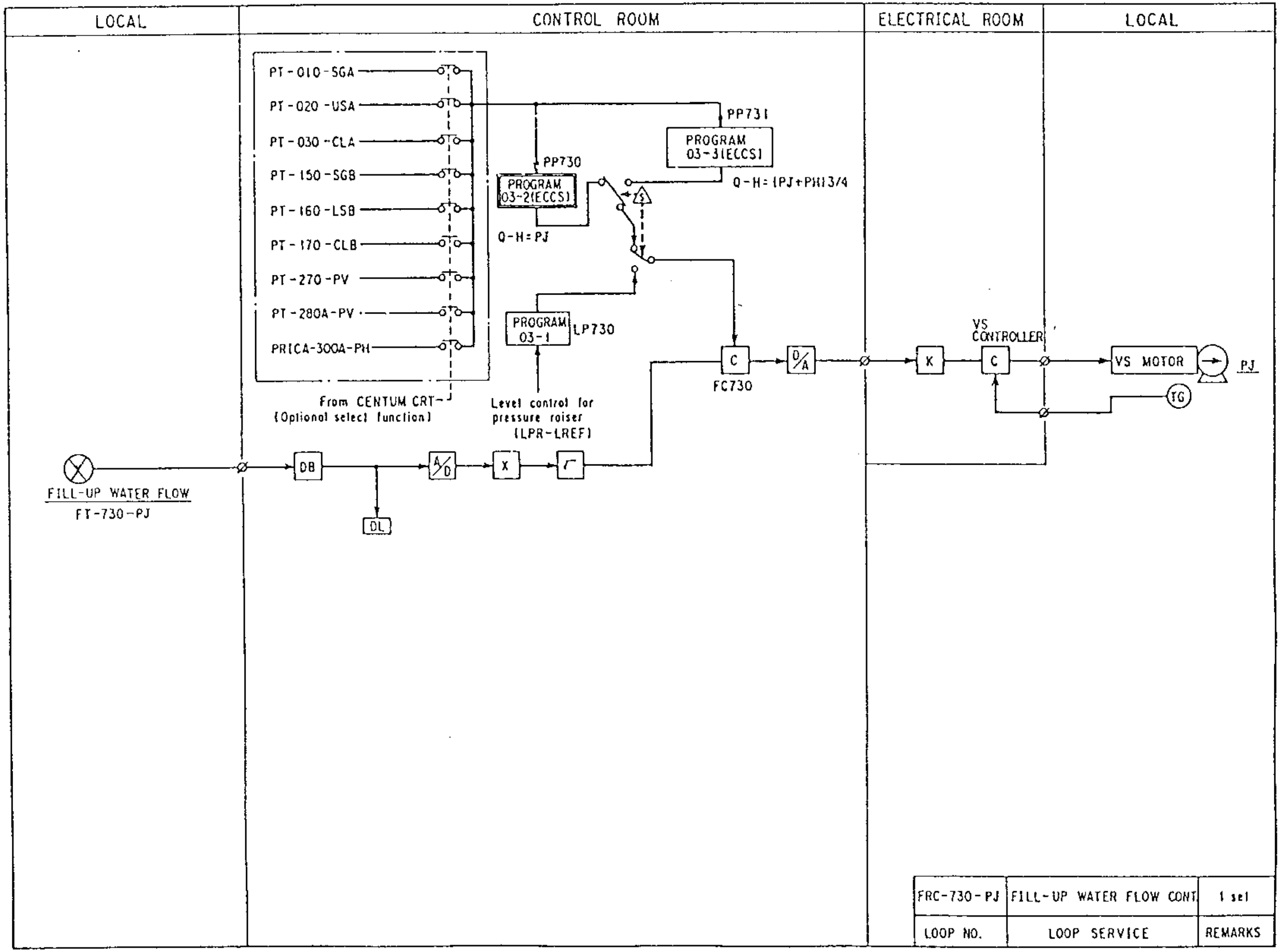


Fig. 7.14 Control of Charging Pump

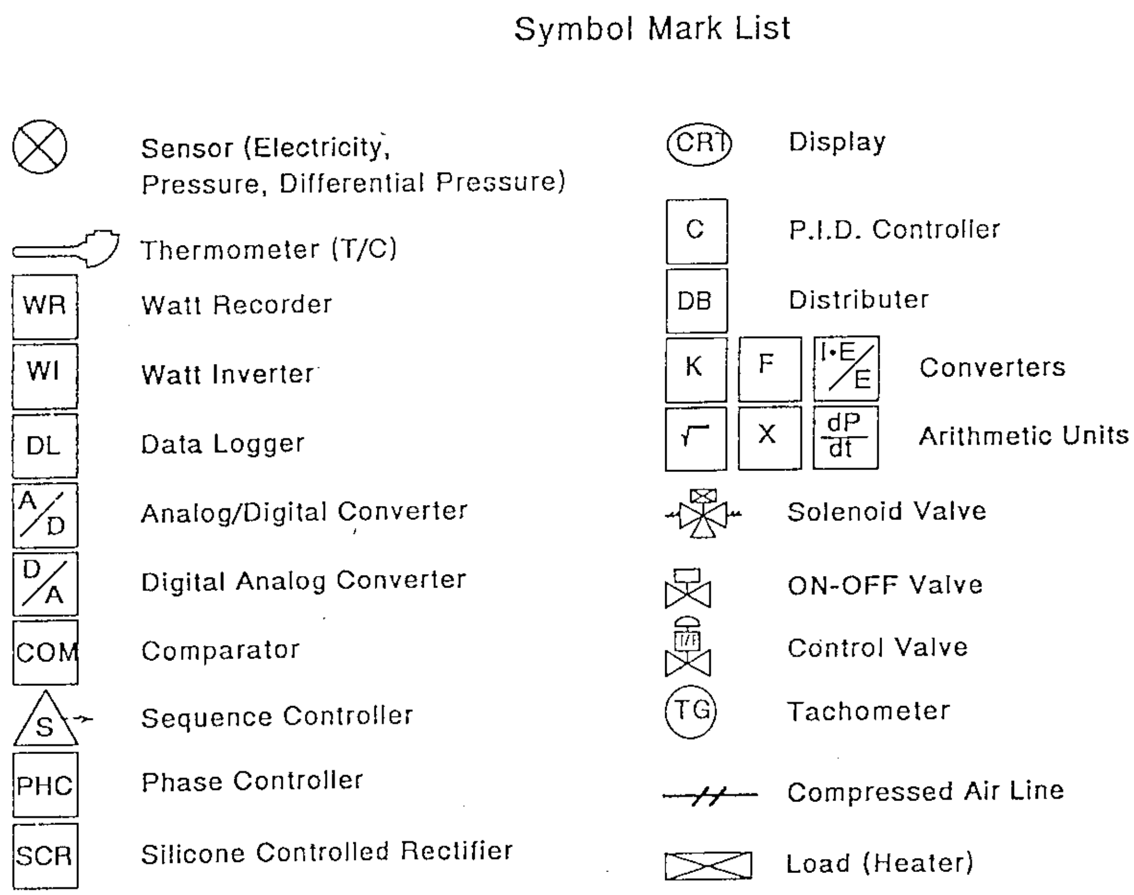


Fig. 7.15 Legend for Control Logics Flow Sheet

Acknowledgement

The authors wish to express their thanks to Miss T. Kurosawa for typing the manuscript.

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[1] ROSA-IV Group, ROSA-IV Large Scale Test Facility (LSTF) system description, JAERI-M 84-237, Japan Atomic Energy Research Institute (1984).

[2] Nakamura, H., et al., "System Description for ROSA-IV Two-Phase Flow Test Facility (TPTF)," JAERI-M 83-042 (1983).

[3] ROSA-IV Group, Supplemental description of ROSA-IV LSTF with No. 1 simulated fuel rod assembly, JAERI-M 89-113, Japan Atomic Energy Research Institute (1989).

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[5] Tanaka, M., Katada, K. and Tasaka, K., "Preanalysis of ROSA-IV LSTF for PWR Small Break LOCA Test with RELAP5/Mod0," JAERI-M 9356 (1981).

[6] Fineman, C.P., Tanaka, M. and Tasaka, K., "Loss of Feedwater Transient Calculations for the ROSA-IV LSTF and the Reference PWR with RELAP5/Mod1 (Cycle 1)," JAERI-M 83-088 (1983).

[7] Zuber, N., "Problems in Modeling of Small Break LOCA," NUREG-0724 (1980).

Acknowledgement

The authors wish to express their thanks to Miss T. Kurosawa for typing the manuscript.

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[1] ROSA-IV Group, ROSA-IV Large Scale Test Facility (LSTF) system description, JAERI-M 84-237, Japan Atomic Energy Research Institute (1984).

[2] Nakamura, H., et al., "System Description for ROSA-IV Two-Phase Flow Test Facility (TPTF)," JAERI-M 83-042 (1983).

[3] ROSA-IV Group, Supplemental description of ROSA-IV LSTF with No. 1 simulated fuel rod assembly, JAERI-M 89-113, Japan Atomic Energy Research Institute (1989).

[4] Ransom, V.H., et al., "RELAP5/Mod1 Code Manual," NUREG/CR-1826, EGG-2070 (1982).

[5] Tanaka, M., Katada, K. and Tasaka, K., "Preanalysis of ROSA-IV LSTF for PWR Small Break LOCA Test with RELAP5/Mod0," JAERI-M 9356 (1981).

[6] Fineman, C.P., Tanaka, M. and Tasaka, K., "Loss of Feedwater Transient Calculations for the ROSA-IV LSTF and the Reference PWR with RELAP5/Mod1 (Cycle 1)," JAERI-M 83-088 (1983).

[7] Zuber, N., "Problems in Modeling of Small Break LOCA," NUREG-0724 (1980).

APPENDICES

A.1 Pipe Standards

Pipe standards are shown in Tables A.1.1 through A.1.5.

Table A.1.1 Standard of Piping

Nominal Size (B)	Outer Diameter (mm)	Inner Diameter (mm)		
		Sch 40	Sch 80	Sch 160
1/2	21.7	16.1	14.3	12.3
3/4	27.2	21.4	19.4	16.2
1	34.0	27.2	25.0	21.2
1 1/4	42.7	35.5	32.9	29.9
1 1/2	48.6	41.2	38.4	34.4
2	60.5	52.7	49.5	43.1
2 1/2	76.3	65.9	62.3	57.3
3	89.1	78.1	73.9	66.9
3 1/2	101.6	90.2	85.4	76.2
4	114.3	102.3	97.1	87.3
5	139.8	126.6	120.8	108.0
6	165.2	151.0	143.2	128.8
8	216.3	199.9	190.9	170.3
10	267.4	248.8	237.2	210.2

* Sch40 is used in the break line.
Sch80 is used in the secondary coolant loop.
Sch160 is used in the primary coolant loop with the exception of leg pipings.

Table A.1.2 Standard of Butt Weld 45 Elbow

Nominal Size	D	B	t		
			Sch 40	Sch 80	Sch 160
1 1/2 B	48.6	23.7	3.7	5.1	7.1
2 B	60.5	31.6	3.9	5.5	8.7
2 1/2 B	76.3	39.5	5.2	7.0	9.5
3 B	89.1	47.3	5.5	7.6	11.1
3 1/2 B	101.6	55.3	5.7	8.1	12.7
4 B	114.3	63.1	6.0	8.6	13.5
5 B	139.8	78.9	6.6	-	-
6 B	165.2	94.7	7.1	-	-
8 B	216.3	126.3	8.2	-	-
10 B	267.4	157.8	9.3	-	-

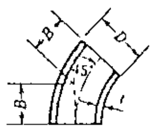


Table A.1.3 Standard of Butt Weld 90 Elbow

Nominal Size	D	A	t		
			Sch 40	Sch 80	Sch 160
1 1/2 B	48.6	57.2	3.7	5.1	7.1
2 B	60.5	76.2	3.9	5.5	8.7
2 1/2 B	76.3	95.3	5.2	7.0	9.5
3 B	89.1	114.3	5.5	7.6	11.1
3 1/2 B	101.6	133.4	5.7	8.1	12.7
4 B	114.3	152.4	6.0	8.6	13.5
5 B	139.8	190.5	6.6	-	-
6 B	165.2	228.6	7.1	-	-
8 B	216.3	304.8	8.2	-	-
10 B	267.4	381.0	9.3	-	-

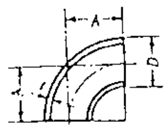


Table A.1.4 Standard of Socket Weld 45 Elbow

Nominal Size (B)	Outer Diameter (mm)	d_1	C	Sch 40				Sch 80				Sch 160			
				D	d	A	T	D	d	A	T	D	d	A	T
1/2	21.7	22.2	9.6	31	16.1	11.1	3.5	34	14.3	11.1	4.6	37	12.3	12.7	5.9
3/4	27.2	27.7	12.7	37	21.4	12.7	3.6	40	19.4	12.7	4.9	45	16.2	14.3	6.9
1	34.0	34.5	12.7	45	27.2	14.3	4.2	48	25.0	14.3	5.6	55	21.2	17.5	8.0

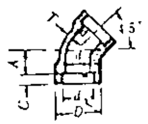
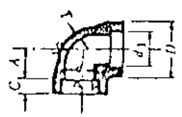


Table A.1.5 Standard of Socket Weld 90 Elbow

Nominal Size (B)	Outer Diameter (mm)	d_1	C	Sch 40				Sch 80				Sch 160			
				D	d	A	T	D	d	A	T	D	d	A	T
1/2	21.7	22.2	9.6	31	16.1	15.9	3.5	34	14.3	15.9	4.6	37	12.3	19.1	5.9
3/4	27.2	27.7	12.7	37	21.4	19.1	3.6	40	19.4	19.1	4.9	45	16.2	22.2	6.9
1	34.0	34.5	12.7	45	27.2	22.2	4.2	48	25.0	22.2	5.6	55	21.2	27.0	8.0



A.2 Material Properties

A.2.1 Primary and Secondary Systems

Structural materials except for the fuel assembly which are used in the primary and secondary systems and are considered to be important for making code inputs are SUS316LTP-S, SUS304TP-S, SCS13A and SB49. These materials (symbols), corresponding Japanese Industrial Standards and chemical composition are listed in Table A .2.1. Reference property data, i.e. density, specific heat and thermal conductivity, for these materials are presented in Tables A.2.2 through A.2.7. There are only small differences in properties among different stainless steels. The data in Tables A.2.2 through A.2.7 are presented only for reference. For further details, the reader should refer to Refs. (A.1) through (A.5), for example.

References

(A.1) JIS (Japanese Industrial Standard).

(A.2) Thermophysical Properties of Matter, The TPRC Data Series Volume 4, Specific Heat--Metallic Elements and Alloys, IFI/Plenum Data Corporation, New York (1973).

(A.3) Thermophysical Properties of Matter, The TPRC Data Series Volume 1, Thermal Conductivity--Metallic Elements and Alloys, IFI/Plenum Data Corporation, New York (1973).

(A.4) Sutenresuko Binran (Stainless Steel Handbook) (in Japanese), Nikkan Kogyo Shinbunsha (1973).

(A.5) Tekko Zairyo Binran (Steel Material Handbook) (in Japanese), Maruzen (1967).

A.2.2 Fuel Assembly

(1) Sample Matrical Testing

Properties of materials used in the 2nd fuel assembly (core insulator : Al_2O_3 (ceramics), outer insulator : MgO (packed), outer insulator : BN (packed), heating element : NCHW-1 (Nichrome) and cladding : NCF 600 (Inconel 600)) were measured by the manufacturer of the heater rods by using sample materials. The geometries of the samples are shown in Fig. A.2.1. Measured properties for the samples are presented in Tables A.2.8 through A.2.10.

(2) Data for Actual Heater Rod

The thermal conductivities of the outer insulators, packed MgO and packed BN were also measured by the manufacturer by using heater rods similar to those used in the LSTF. The measured thermal conductivities are presented in Tables A.2.11 (a) and (b). For the thermal conductivities of the packed MgO and packed BN, thase data are more representative of the real packed sipration than the sample data.

(3) Electric Resistivity of Heating Element

The temperature coefficient of electric resistivity for the heating element, NCHW-1 (Nichrome), is presented in Table A.2.12.

A.2.3 Heat Transfer Fluid (Oil)

For the second fuel assembly, ten differential pressure guages (transducers) were newly installed to measure differential pressures in the pressure vessel. For these ten differential pressure guages, nine coaxial pressure lead pipes were inserted into the pressure vessel. The flow channel between outer and inner tubes are cooled with heat transfer fluid (oil), Barrel-therm 400 (produced by Matsumura Sekyu Kenkyusho (Matsumura Petroleum Research Laboratory) Company), to prevent hot water inside the inner tube (i.e. pressure lead pipe) from flushing. The properties of Barrel-therm 400 are presented in Table A.2.13. The pressure lead pipes and differential pressure guages for measurement of differential pressures in the pressure vessel are described in Section 5.2.2 and Sections 6.2.4 and 6.4.2, respectively.

Table A.2.1 Symbol, Japanese Industrial Standard and Chemical Composition

Symbol (in Japanese Industrial Standard)	Japanese Industrial Standard	Chemical Composition (%)
SUS316LTP	JIS G 3459 Stainless Steel Pipes	C(≦0.030), Si(≦1.00), Mn(≦2.00) P(≦0.040), S(≦0.030), Ni(12.00∿16.00), Cr(16.00∿18.00) Mo(2.00∿3.00)
SUS304TP	JIS G 3459 Stainless Steel Pipes	C(≦0.08), Si(≦1.00), Mn(≦2.00) P(≦0.040), S(≦0.030), Ni(8.00∿11.00), Cr(18.00∿20.00)
SCS13A	JIS G 5121 Stainless Steel Castings	C(≦0.08), Si(≦2.00), Mn(≦1.50) P(≦0.040), S(≦0.040), Ni(8.00∿11.00), Cr(18.00∿21.00)
SB49	JIS G 3103 Carbon Steel and Molybdenum Alloy Steel Plates for Boilers and Other Pressure Vessels	C(≦0.31∿0.35), Si(0.15∿0.30) Mn(≦0.90), P(<0.035), S(≦0.040)

Table A.2.2 Density of Stainless Steel

* Data from JIS G 3459 in Ref. (A.1)

Temperature (K)	Density (kg/m^3)
—	7980 (for SUS316LTP) 7930 (for SUS304TP)

Table A.2.3 Density of Carbon Steel

* Data from JIS G 3193 in Ref. (A.1)

Temperature (K)	Density (kg/m^3)
—	7850

Table A.2.4 Specific Heat of Stainless Steel

* Curve 2 in Fig. 197 (Table 197) in Ref. (A.2).

Temperature (K)	Specific Heat (J/gK)
366	0.377
422	0.381
478	0.381
533	0.385
589	0.389
644	0.394
700	0.398
755	0.404
811	0.410
866	0.423
922	0.435
978	0.444
1033	0.456
1089	0.465
1144	0.473
1200	0.477
1255	0.482
1311	0.486

Table A.2.5 Specific Heat of Carbon Steel

* Data from Table 2.6 in Ref. (A.5).
Data for Carbon Steel (0.42%C, 0.64Mn)

Temperature (K)	Specific Heat (J/gK)
348	0.486
448	0.519
498	0.528
548	0.548
598	0.569
648	0.586
748	0.649
848	0.708
948	0.770
998	1.583
1048	0.624
1148	0.548

Table A.2.6 Thermal Conductivity of Stainless Steel

* Curve A in Fig. 331R (Table 331R) in Ref. (A.3).
Recommended curve for stainless steel 304.

Temperature (K)	Thermal Conductivity (W/cmK)
273.2	0.147
300	0.152
350	0.162
400	0.170
450	0.177
500	0.184
600	0.198
700	0.212
800	0.225
900	0.239
1000	0.253
1100	0.267
1200	0.281
1300	0.295
1400	0.309
1500	0.323
1600	0.337
1665	0.347

Table A.2.7 Thermal Conductivity of Carbon Steel

* Data from Fig. 2.1 in Ref. (A.5).
Data for Carbon Steel (0.42%C).

Temperature (K)	Thermal Conductivity (W/cmK)
273	0.519
373	0.507
473	0.482
573	0.461
673	0.423
773	0.382
873	0.341
973	0.299
1073	0.252
1173	0.248
1273	0.264
1373	0.279
1473	0.294

Table A.2.8 Specific Gravity

Material	Item	Temperature (K)									
		293	373	473	573	673	773	873	973	1073	1173
Al_2O_3	Coefficient of Thermal Expansion										
	Axial Direction (%)	0	0.050	0.115	0.187	0.261	0.349	0.429	0.514	0.593	0.700
	Radial Direction (%)	0	0.044	0.115	0.183	0.260	0.333	0.398	0.477	0.555	0.671
	Specific Gravity (-)	3.640	3.635	3.627	3.620	3.612	3.603	3.595	3.586	3.577	3.566
MgO	Coefficient of Thermal Expansion										
	Axial Direction (%)	0	0.088	0.201	0.330	0.455	0.590	0.719	0.857	0.989	1.143
	Radial Direction (%)	0	0.088	0.209	0.331	0.463	0.591	0.718	0.837	0.961	1.114
	Specific Gravity (-)	2.779	2.772	2.762	2.752	2.741	2.730	2.720	2.709	2.699	2.687
BN	Coefficient of Thermal Expansion										
	Axial Direction (%)	0	0.048	0.130	0.232	0.361	0.504	0.682	0.980	1.171	1.346
	Radial Direction (%)	0	0.097	0.306	0.586	0.877	1.183	1.514	2.108	2.663	3.123
	Specific Gravity (-)	1.925	1.921	1.914	1.905	1.895	1.883	1.871	1.849	1.832	1.817
NCHW-1	Coefficient of Thermal Expansion										
	Axial Direction (%), Radial Direction (%)	0	0.109	0.254	0.409	0.571	0.745	0.934	1.138	1.346	1.576
	Specific Gravity (-)	8.379	8.352	8.315	8.277	8.237	8.194	8.149	8.099	8.050	7.995
NCF600	Coefficient of Thermal Expansion										
	Axial Direction (%), Radial Direction (%)	0	0.111	0.256	0.412	0.558	0.708	0.869	1.046	1.239	1.466
	Specific Gravity (-)	8.451	8.423	8.386	8.347	8.311	8.274	8.234	8.191	8.145	8.090

* Measuring method : from measurement of thermal expansion coefficient

Table A.2.9 Specific Heat

Material	Item	Temperature (K)									
		293	373	473	573	673	773	873	973	1073	1173
Al_2O_3	Specific Heat (J/gK)	0.770	0.909	1.01	1.08	1.13	1.16	1.19	1.21	1.24	1.25
MgO	Specific Heat (J/gK)	0.896	1.00	1.08	1.13	1.18	1.21	1.23	1.25	1.27	1.29
BN	Specific Heat (J/gK)	0.745	1.02	1.22	1.37	1.48	1.58	1.66	1.74	1.79	1.83
HCHW-1	Specific Heat (J/gK)	0.440	0.456	0.473	0.486	0.502	0.523	0.574	0.586	0.595	0.603
HCF600	Specific Heat (J/gK)	0.440	0.465	0.486	0.502	0.511	0.490	0.578	0.586	0.595	0.599

* Measureing method : Except for 1173 K, adiabatic continuous method
For 1173 K, laser flash method

Table A.2.10 Thermal Conductivity

Material	Item	Temperature (K)									
		293	273	473	573	673	773	873	973	1073	1173
Al_2O_3	Thermal Diffusivity (cm^2/s)	0.0788	0.0513	0.0380	0.0322	0.0258	0.0224	0.0211	0.0192	0.0179	0.0163
	Thermal Conductivity (W/cmK)	0.221	0.170	0.140	0.126	0.105	0.0938	0.0900	0.0837	0.0791	0.0729
MgO	Thermal Diffusivity (cm^2/s)	0.0451	0.0329	0.0262	0.0229	0.0174	0.0143	0.0126	0.0116	0.0109	0.0102
	Thermal Conductivity (W/cmK)	0.112	0.0913	0.0783	0.0716	0.0561	0.0469	0.0423	0.0394	0.0373	0.0352
BN	Thermal Diffusivity (cm^2/s)	0.0502	0.0383	0.0302	0.0220	0.0183	0.0157	0.0151	0.0140	0.0127	0.0110
	Thermal Conductivity (W/cmK)	0.0720	0.0749	0.0703	0.0574	0.0515	0.0469	0.0469	0.0452	0.0417	0.0366
NCHW-1	Thermal Diffusivity (cm^2/s)	0.0364	0.0375	0.0393	0.0439	0.0455	0.0485	0.0518	0.0581	0.0549	0.0598
	Thermal COnductivity (W/cmK)	0.134	0.143	0.155	0.176	0.188	0.208	0.242	0.276	0.263	0.288
NCF600	Thermal Diffusivity (cm^2/s)	0.0385	0.0403	0.0437	0.0453	0.0470	0.0521	0.0549	0.0580	0.0553	0.0579
	Thermal Conductivity (W/cmK)	0.143	0.158	0.178	0.190	0.200	0.211	0.261	0.278	0.268	0.281

* Measuring method : Laser flash method

Table A.2.11 (a) Thermal Conductivity of MgO

For σ (Packing Density) = 2.91^{+1}

Temperature (K)	293	305	317	331	343	358	374	389	403
Thermal Conductivity (W/cmK)	0.0391	0.0399	0.0355	0.0400	0.0447	0.0469	0.0488	0.0476	0.0484

Temperature (K)	417	430	444	459	475	492	511	528
Thermal Conductivity (W/cmK)	0.0522	0.0543	0.0585	0.0611	0.0752	0.0645	0.0638	0.0651

For σ (Packing Density) = 2.78^{+1}

Temperature (K)	334	349	378	409	443	469
Thermal Conductivity (W/cmK)	0.0131	0.0155	0.0191	0.0204	0.0235	0.0308

Temperature (K)	483	500	512	527	545	554
Thermal Conductivity (W/cmK)	0.0319	0.0341	0.0364	0.0374	0.0390	0.0393

* Data measured by using a heater rod
+1 For LSTF heater rod, σ(packing density) is approximately 2.80.

Table A.2.11 (b) Thermal Conductivity of BN

Temperature	413+1	463+1	506+1	539+1	572+1	948+2	993+2	1023+2
Thermal COnductivity (W/cmK)	0.066	0.065	0.072	0.074	0.078	0.085	0.080	0.085

* Data measured by using heater rods
+1 Data measured by using a PWR-type heater rod
+2 Data measured by using a FBR-type heater rod (Values were read from a figure provided from a manufacturer. No digital values remain in a manufacturer.)

Table A.2.12 Temperature Coefficient of Electric Resistivity of NCHW-1

Temperature (K)	293	373	473	573	673	773	873	973	1073	1173	1273	1373
Temperature Coefficient (-)	1.000	1.013	1.025	1.040	1.049	1.053	1.048	1.044	1.046	1.055	1.058	1.067

* Data from a catalogue written by a manufacturer of the heating element (NCHW-1)
Electric resistivity at room temperature (~ 293 K) = 108 $\mu\Omega$cm

Table A.2.13 Properties of "Barrel-therm 400"

Representative properties

Appearance	Lemon Yellow
Specific Gravity 1514 °C	1.05
Flash Point coc	210 °C
Kinematic Viscosity 40 °C	17.5 mm^2/s
Average Molecular Weight	270
Expansion Coefficient	8.6×10^{-4}
Pour Point	-20 °C
Boiling Point	390 °C
Spontaneous Ignition Temperature	495 °C

Physical Properties

Temperature (°C)	Vapor Pressure (MPa)	Specific Heat (J/gK)	Thermal Conductivity (W/mK)	Density (kg/m^3)	Kinematic Viscosity (mm^2/s)
273	-	1.50	0.135	1059	192
293	-	1.56	0.134	1045	47.2
313	-	1.63	0.131	1032	17.5
333	-	1.70	0.129	1018	8.43
353	-	1.77	0.127	1004	4.81
373	-	1.84	0.124	990	3.09
393	-	1.91	0.122	976	2.15
413	-	2.00	0.120	962	1.60
433	-	2.05	0.117	948	1.23
453	-	2.11	0.116	936	0.99
473	3.9×10^{-4}	2.18	0.114	920	0.82
493	8.4×10^{-4}	2.25	0.112	906	0.70
513	1.76×10^{-3}	2.32	0.109	892	0.61
533	3.44×10^{-3}	2.39	0.107	878	0.54
553	6.41×10^{-3}	2.45	0.105	865	0.48
573	1.15×10^{-2}	2.52	0.102	852	0.44
593	1.97×10^{-2}	2.59	0.100	838	0.40
613	3.27×10^{-2}	2.65	0.098	824	0.37
633	5.16×10^{-2}	2.72	0.095	810	0.35

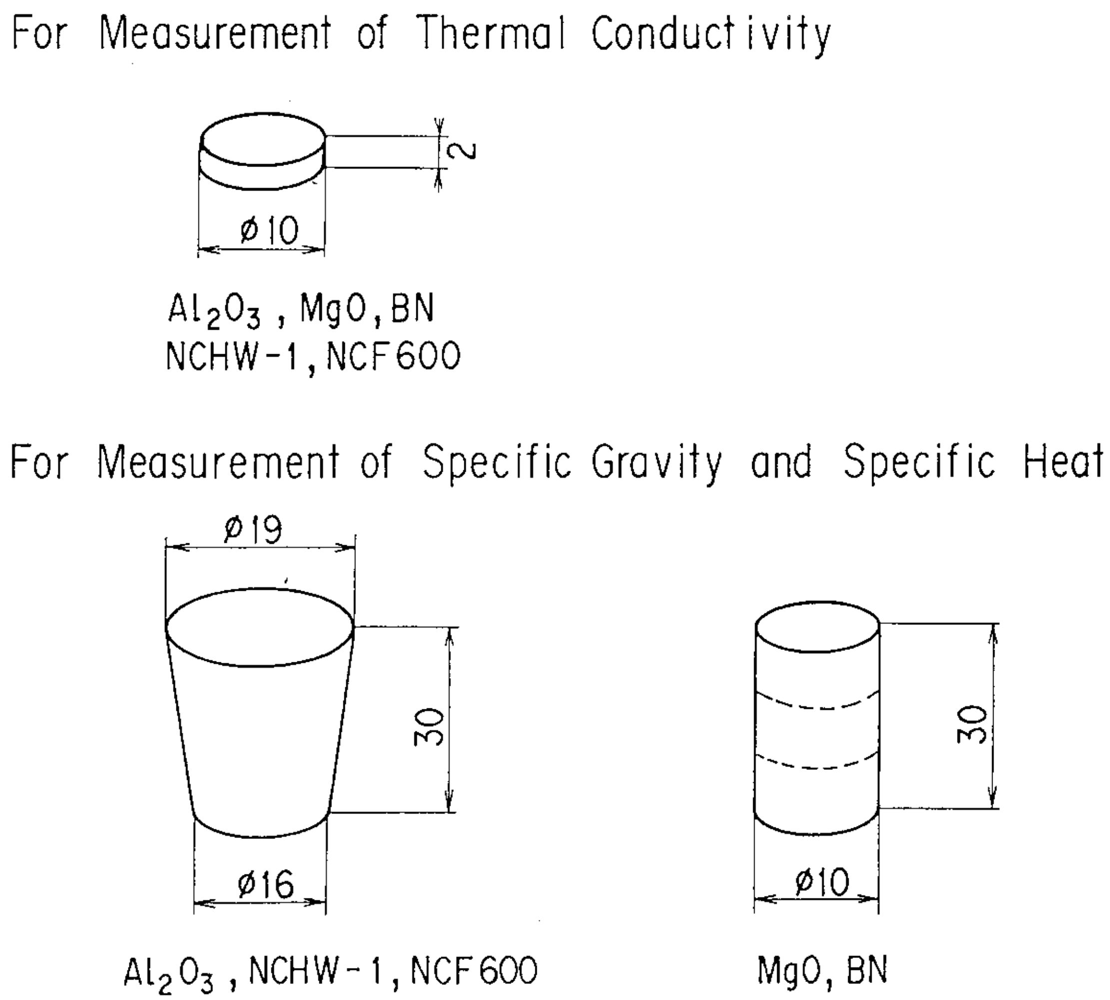


Fig. A.2.1 Geometries of Samples used for Property Measurement

A.3 Thermal Insulator Standards

The materials of the thermal insulators used in LSTF are the rock wool and the glass wool.

The location, the material and the thickness of the thermal insulators are shown in Table A.3.1. The thickness and the heat loss per unit length of the thermal insulators are shown in Table A.3.2 for pipings. The density of the thermal insulators are shown in Table A.3.3. The thermal conductivity of both thermal insulators are

$$\lambda(W/mK) = 0.0314 + 0.000163\theta ,$$

where θ is the average temperature of the thermal insulator. The outer surface of the thermal insulators is wrapped with thin steel plate of ~0.4 mm thick.

The thermal insulators were renewed at the hot and cold legs except nozzles, and at the break unit for the second fuel on December, 1988. Each of the new insulators is wrapped with the 0.4 mm thick glass cloth coated with the flame spraying aluminum or the silicone instead of the steel plate. However, the material, the thickness and the physical properties of the renewed insulators were not changed.

Table A.3.1 Thermal Insulators

Location Description	Material	Thickness (mm)
PV	Rock Wool A	125
SG	Rock Wool A	125
PR	Rock Wool A	125
ACC-Hot	Glass Wool A	75
ACC-Cold	Glass Wool A	75
JC	Rock Wool A	100
RHR-HX Tank	Glass Wool A	50
RHR-HX Tube	Glass Wool A	75
RWST	Glass Wool A	50
CWT	Glass Wool A	25
PC	Rock Wool A	125
PPR	Rock Wool A	125
PF	Rock Wool A	100
PL	Glass Wool A	75
PJ	Glass Wool A	25
PH	Glass Wool A	25
PA	Glass Wool A	25
PY	Glass Wool A	25
Primary Loop	Rock Wool A	125
Primary Loop ECCS Nozzle	Rock Wool A	100
Primary Loop Other Nozzle	Rock Wool B	(Table A.3.2(b))
ACC Piping	Glass Wool B	(Table A.3.2(b))
LPIS Piping	Glass Wool B	(Table A.3.2(a))
RHR Piping	Glass Wool B	(Table A.3.2(b))
HPIS Piping between Injection Nozzles and AOV	Rock Wool B	(Table A.3.2(b))
Break Unit	Rock Wool A	100
Blowdown Piping	Glass Wool B	(Table A.3.2(a))
ST Recirculation Piping	Glass Wool B	(Table A.3.2(a))
Secondary Coolant Loop Piping	Rock Wool B	(Table A.3.2(b))

Table A.3.2 Thickness and Heat Loss from Pipe Thermal Insulators

Upper Row: Thickness (mm)

Lower Row: Heat Loss per Unit Length (kcal/mh)
1 kcal/mh = 1.163 W/m

(a) Annual Usage 3000 Hours

Pipe Temp. °C	Nominal Pipe Diameter B													
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
100	20	20	20	20	20	20	20	20	20	20	25	25	25	25
	16	16	21	24	27	31	38	43	52	62	61	77	93	110
150	20	20	20	20	25	25	30	30	30	30	30	40	40	40
	28	32	37	43	41	48	51	57	70	82	94	95	114	133
200	20	25	25	30	30	30	40	40	40	40	50	50	50	50
	42	43	49	51	56	64	63	71	85	100	97	120	143	167
250	25	30	30	40	40	40	50	50	50	50	50	65	65	65
	52	54	61	60	64	75	76	84	101	117	134	136	161	186
300	30	40	40	40	40	50	50	50	65	65	65	75	75	75
	62	61	69	79	85	86	100	111	111	128	145	160	189	218
350	40	40	50	50	50	50	65	65	75	75	75	85	85	85
	68	77	77	88	95	108	107	118	127	146	165	184	217	249
400	40	50	50	50	50	65	75	75	75	85	85	85	100	100
	84	85	95	108	116	114	121	133	156	165	185	226	236	270

(b) Annual Usage 7500 Hours

Pipe Temp. °C	Nominal Pipe Diameter B													
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
100	20	25	25	30	30	30	40	40	40	40	40	50	50	50
	16	16	18	19	21	24	24	26	32	37	42	45	53	62
150	30	30	40	40	40	50	50	50	50	65	65	75	75	75
	23	26	25	29	31	31	36	41	48	47	53	58	69	80
200	40	40	50	50	50	50	64	65	75	75	75	85	85	85
	30	34	34	38	41	47	47	52	56	64	72	81	95	109
250	50	50	50	65	65	65	75	85	85	85	100	100	100	100
	37	42	47	46	50	56	60	61	71	81	82	99	116	133
300	50	65	65	75	75	75	85	85	100	100	100	120	120	120
	45	48	54	56	60	68	73	80	84	96	107	114	133	152
350	65	65	75	85	85	85	100	100	100	120	120	120	140	140
	55	61	64	67	72	80	84	92	106	108	120	144	151	171
400	65	75	85	85	85	100	100	120	120	120	120	140	140	140
	68	71	74	82	88	91	103	102	117	133	148	160	185	210

Table A.3.3 Density of Thermal Insulators

Name	Standard	Density
Rock Wool A	JIS A 9504	Less than 100 kg/m^3
Rock Wool B	JIS A 9504	Less than 200 kg/m^3
Glass Wool A	JIS A 9505	32 kg/m^3
Glass Wool B	JIS A 9505	More than 45 kg/m^3