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USERS' MANUAL FOR THE SSC-L CODE

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ENGINEERING AND ADVANCED REACTOR SAFETY DIVISION
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FOREWORD

As part of the Super System Code (SSC) development project for simulating thermohydraulic transients in LMFBRs, the SSC-L code was developed at Brookhaven. This code simulates thermohydraulic transients in loop-type designs. This report is Volume I of II of the Users' Manual for the SSC-L code as it existed on September 22, 1978. The second volume of this report will include description of the Plant Control and Protection Systems.

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1. ABSTRACT

A computer code, SSC-L, has been written on the CDC-7600 computing systems. This code simulates thermohydraulic transients in the entire liquid metal fast breeder reactor (LMFBR) plant. Physical models for various processes that may be encountered in preaccident and transient conditions are described in a separate report.(1) This report provides for all information related to the usage of this computer code to the potential users. It, together with the above mentioned report (BNL-NUREG-50773), provides a complete description of modeling details and usage instructions with the exception of a generalized Plant Control and Protection Systems (PCS and PPS). These have also been modeled. These functions are needed to apply SSC-L for simulating operational transients. Volume II of this report will include modeling details as well as users' instructions for PCS and PPS.

2. CODE DESCRIPTION

2.1 Guidelines

A set of practices intended to insure uniform and concise notation as well as to simplify code conversions and modifications has been maintained throughout SSC-L. These quidelines were developed so as to adhere to the formal standards of the American National Standards Institute (ANSI) and the American Nuclear Society (ANS). The SSC standards adhere closely to the language specifications of[2] "USA Standard FORTRAN," ANSI X3.9-1966 and to the recommendations set forth in the following documents:

ANS STD. 3-1971	"Recommended Programming Practices to Facilitate the Interchange of Digital Computer Programs"[3]
ANSI Standard N413-1974	"Guidelines for the Documentation of Digital Computer Programs"[4]
ANSI Standard X3.5-1968	"Flow Chart Symbols and Their Usage in Information Processing"[5]

Additionally, practices set forth in the preliminary draft of RDT F 1-4[6] were considered. Whenever possible, many of the recommendations contained in this pending standard were implemented into the SSC-L coding.

The system of units used in this advanced code is Systeme International d'Unite's (S.I. Units). To aid in conversion from/to SI units to engineering units, a set of conversion factors is provided in Appendix A.

2.2 Code Structure and Data Management

SSC is a deliberately structured ensemble of modules each of which performs a well-defined set of tasks. Each module is broken down into submodules such that each submodule performs a single task. Submodules are designed so that they may be easily replaced or exported from the code. As much as possible, all data linkage is maintained via labeled common blocks. To assure agreement of data definitions, all nonexecutable statements defining variables in a given common block are identical in every routine using that common (exception is made for a number of well-defined data management routines).

A variable dimensioning (dynamic allocation) scheme is used throughout the program. Data transfer of dimensional arrays is accomplished by passing a large container array via labeled common. The starting location and length of each array in the container are also passed in labeled common. For greater user understanding and readability, equivalence statements are employed at the module and submodule level to maintain the naming convention for variables stored in the container array (discussed later).This particular scheme of variable dimensioning was selected because of its data transfer efficiency and minimization of in-core storage.

A symbolic naming scheme was adopted for SSC and used throughout. This was done to avoid the problems caused by naming ambiguities and degeneracies prevalent in other large system codes. Symbolic names are restricted to six or fewer characters and are used for several different types of entities, specifically:

Variables used by several modules via labeled common,

Common block names,

Routine names, and

Statement functions.

2.3 Symbolic Naming Convention

The naming convention attempts to convey as much information as possible about an entity while maintaining the final label as mnemonic as possible. To this end, SSC names reserve two (and occasionally three) characters to identify general entity type and purpose and leave four characters to be assigned mnemonically. Specifically, the symbolic naming convention is as follows:

- LOCAL VARIABLES (including those shared via scratch COMMON):

  May not contain embedded digit; i.e., digits only at end.

  First character should conform to Table I.

- GLOBAL VARIABLES:

  First character is a letter specifying the type of quantity, e.g., P for pressure. See Table I.

  Second character is a digit indicating module which alters the value (i.e., region of reactor system). See Table II.

  Remaining characters (up to four; at least one) are assigned mnemonically, with no embedded digits (digits may occur at end).

  Examples: N1LOOP, T5FUEL, L6CLAD, L3DNB, Y1PIPE.

- ROUTINE NAMES:

  First two to four characters are mnemonically assigned, except that second may not be a digit.

  Next character is a digit indicating module (or region). See Table II.

  Last character(s): one or two letters, indicating overlay name. See Table III.

  Examples: READ1R, VRFY7R, MAIN9S, FUEL5S, PBAL9S.

Table I

Initial Letters Used to
Indicate Type of Quantity and Units

A	Area	m^2
B	Mass	kg
C	Material properties; constants	(See Table 6-2.)
D	Density	kg/m^3
E	Energy; enthalpy	J; J/kg
F	Fractions, factors	-
G	Mass flow rate per unit area	kg/s m^2
H	Heat Transfer Coefficient	W/m^2K
P	Pressure; power	N/m^2; W
Q	Surface heat flux; catch-all	W/m^2; --
R	Reactivity; angular measure	$\Delta k/k$; radians
S	Time	s
T	Temperature	K (not C)
U	Velocity, angular velocity or speed	m/s; rpm
V	Volume	m^3
W	Mass flow rate	kg/s
X	Distance (length or radius)	m
Y	Distance (width or diameter)	m
Z	Distance (height or axial)	m
I, J, K	Used for index values of dimensioned arrays (used in order).	
L	Control flags, counters, etc.	
M	Maximum compiled dimensions, other integer constraints	
N	Actual dimensions used (e.g., number of channels used).	

Table II

Digits Used to Indicate
Major Modules (or Regions)

1	Primary loop.
2	Secondary loop.
3	Tertiary loop and steam generator (but not turbine, condenser).
4	Turbine, condenser.
5	Fuel (and blanket) rods.
6	Reactor core coolant volumes.
7	Reactor vessel, structure, etc.
8	Plant protection and control systems.
9	Global or general quantities, not pertaining to a specific module or modules (or regions).
NOTE:	For entities pertaining to more than one region, the digit used is determined by whichever module creates or alters it.

For material properties constants (first character is "C"), the digits have a slightly different meaning:

1	Sodium.	2	Sodium vapor.
3	Water or steam.	4	Reactor fuel blanket.
5	Reactor fuel	6	Cladding of fuel rods.
7	Steel, other structural material.		

Also, for material properties constants, the third character is meaningful; for example:

A	Coefficient of thermal expansion.		
C	Specific heat capacity.	K	Thermal conductivity.
D	Density.	N	Dynamic viscocity.
E	Emissivity.	P	Pressure.
H	Enthalpy.	T	Temperature.

Table III

Final Letters Used for Routine Names

R	Routines of the data reading and restart segment.
S	Routines of the steady-state calculation.
T	Routines of the transient time-stepping segment.
U	Utility routines used by more than one program segment.
F	Functions other than those calculating material properties.
*	The final letters of material properties functions generally correspond to those used for the third character for material properties constants (See Table

2.4 Flow Chart

The modularized structure of the SSC-L code lends itself to a natural subdivision. The code is divided into three sequentially disjointed processes as shown in Figure 1. These routines are the main driver programs and are called in succession by the controller routine. Each performs a unique set of tasks and is executed only once for any given case. It should be noted that this program structure is compatible with over-layed loader procedures found on most large computer systems (e.g., OVERLAY and SEGLOAD). Contained in Appendix B is a cross reference table listing all the routines in SSC-L. A set of sample segmented loader directives formulated for the CDC 7600 SEGLOAD utility is given in Appendix C. The flow chart of each of the drivers, along with its associated subroutines, is shown in Figures 2 through 12. A brief description of all subroutines used in SSC-L follows. They are listed alphabetically according to which of the three main drivers they are called from.

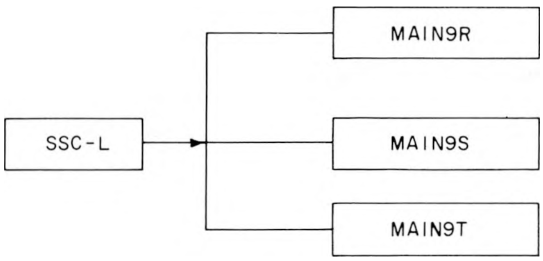

Figure 1. Three main driver programs of SSC-L.

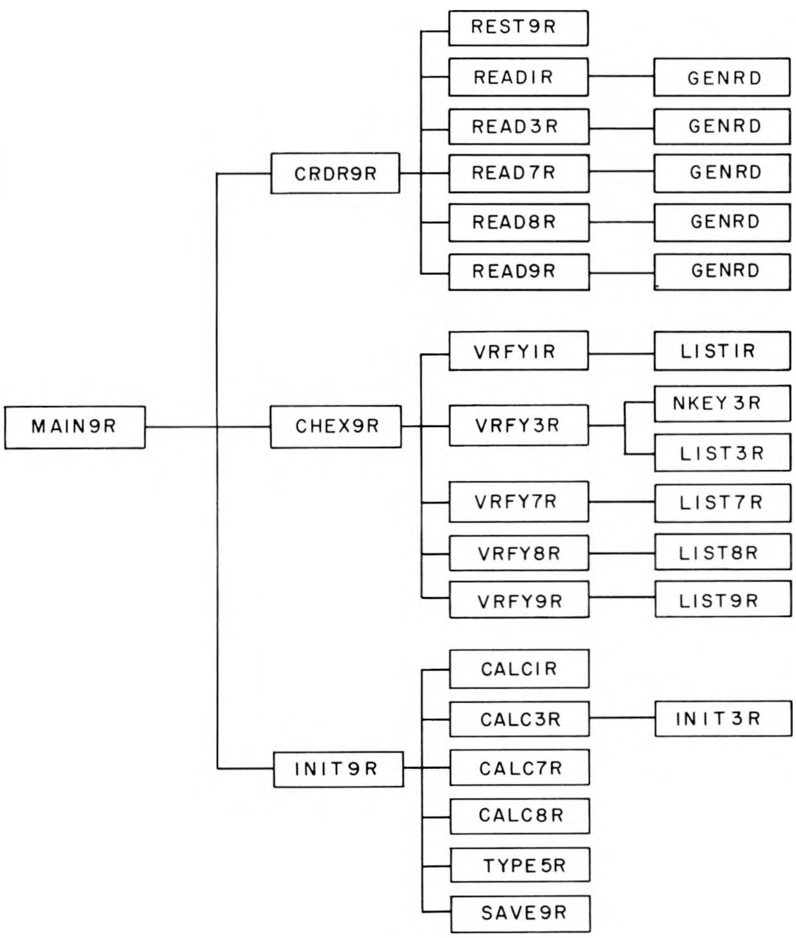

Figure 2. MAIN9R flow diagram.

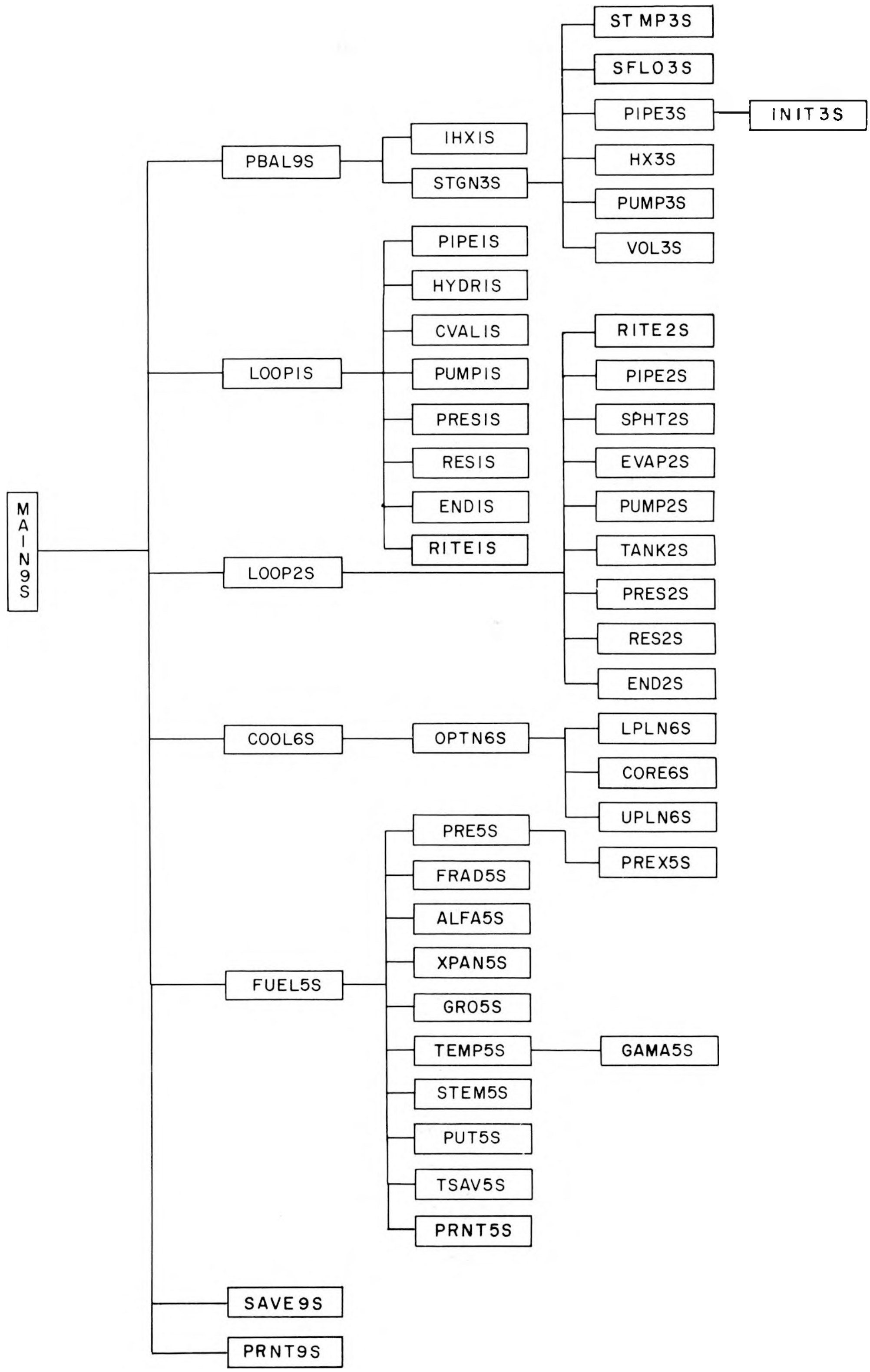

Figure 3. MAIN9S flow diagram.

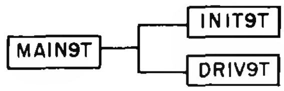

Figure 4. MAIN9T flow diagram.

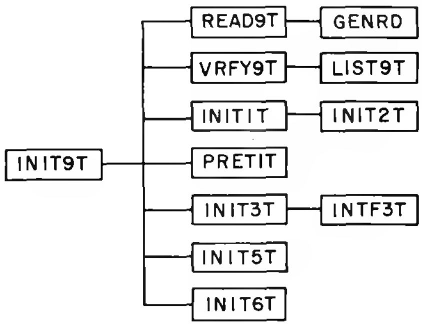

Figure 5. INIT9T flow diagram.

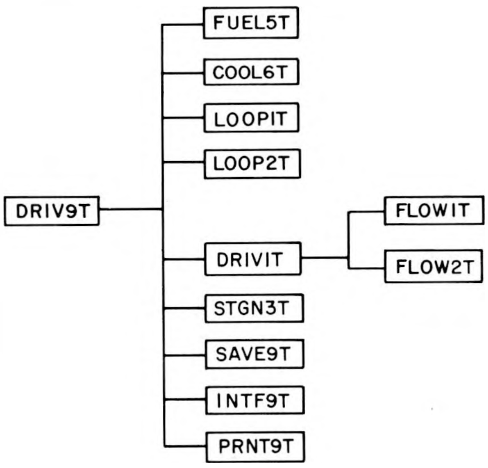

Figure 6. DRIV9T flow diagram.

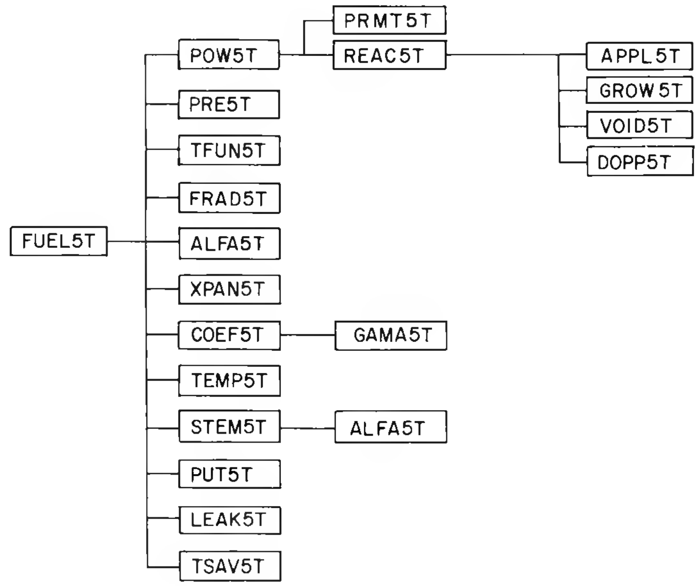

Figure 7. FUEL5T flow diagram.

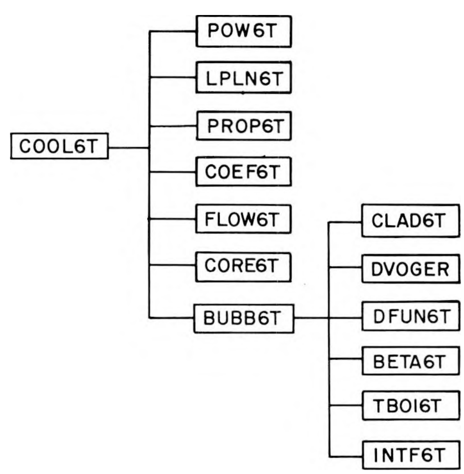

Figure 8. COOL6T flow diagram.

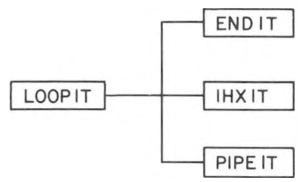

Figure 9. LOOP1T flow diagram.

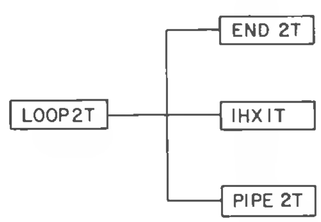

Figure 10. LOOP2T flow diagram.

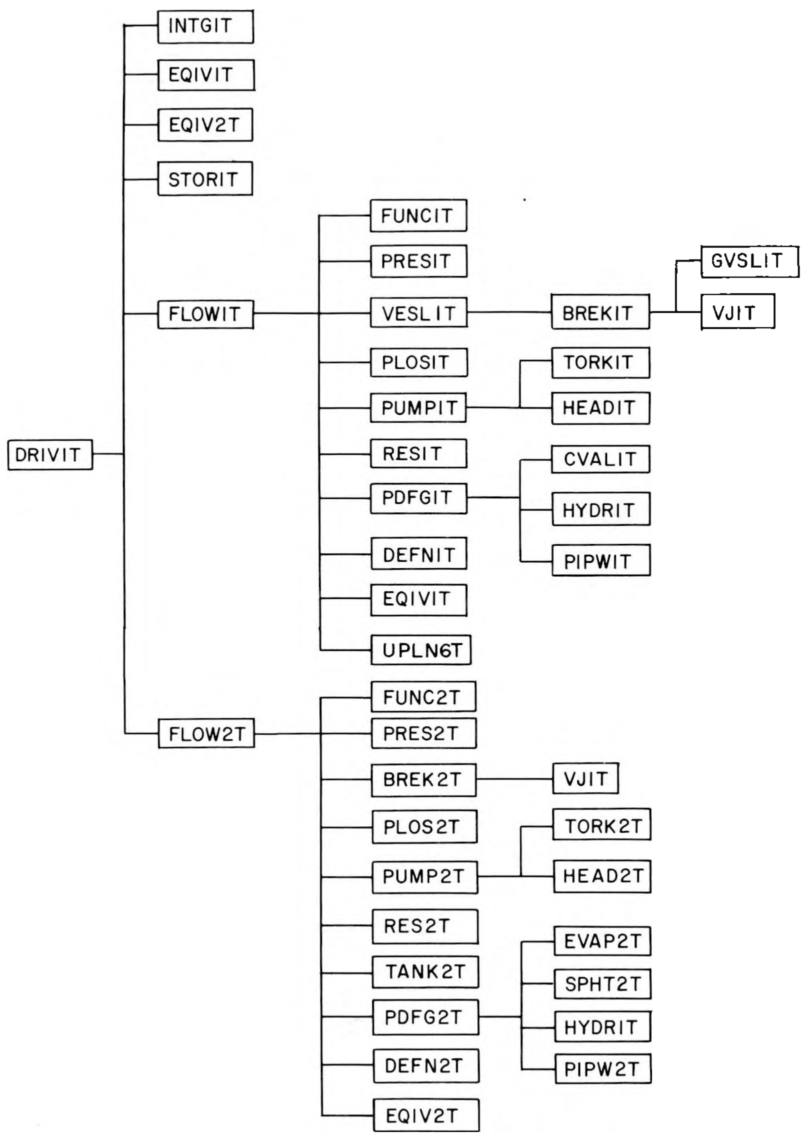

Figure 11. DRIV1T flow diagram.

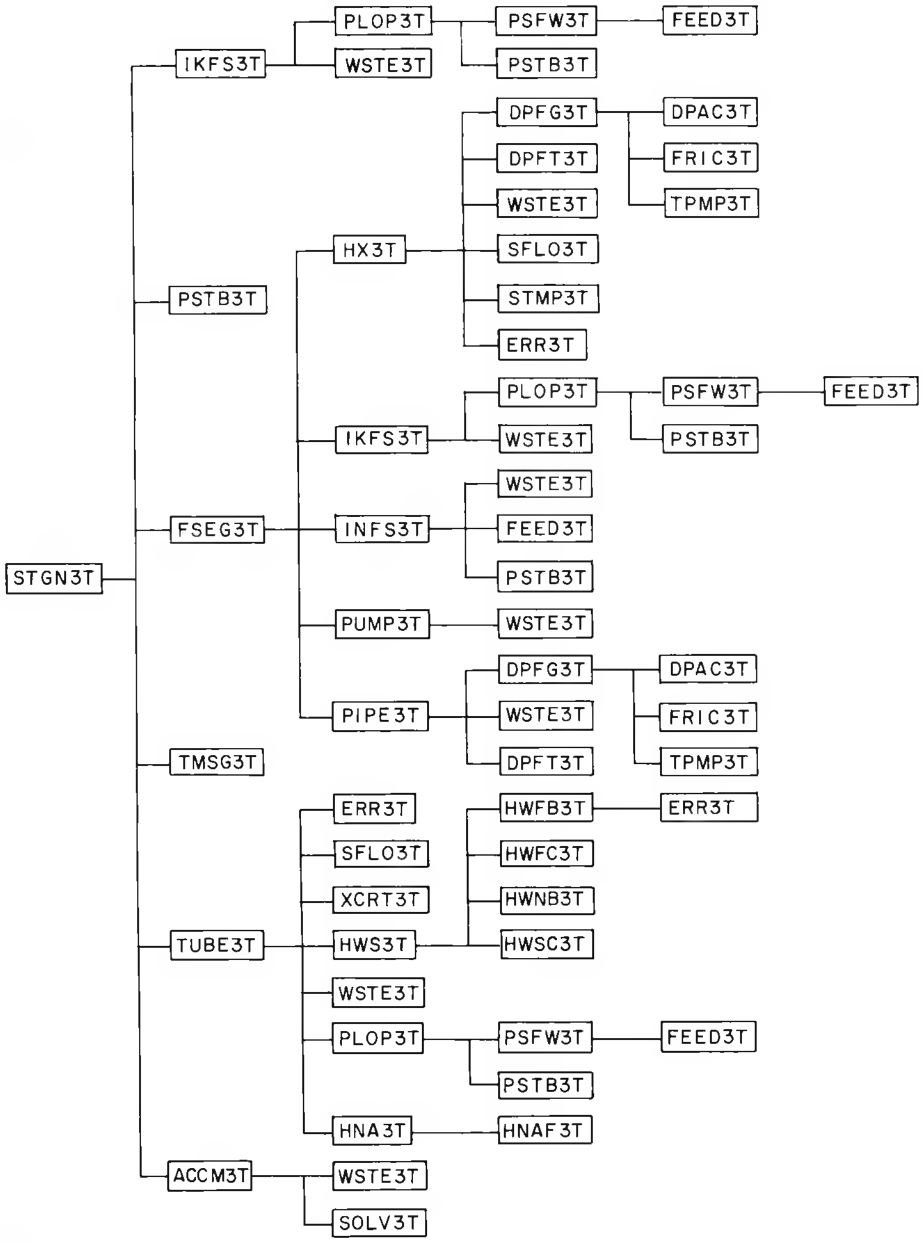

Figure 12. STGN3T flow diagram.

Input Processor Subroutines

MAIN9R

This routine is the main driver for the input-initialization module. It calls the three input processor submodules (CRDR9R, CHEX9R and INIT9R).

CALC1R

This routine manipulates certain primary and secondary loop input data and initializes subsequent loop structures where the user has chosen to default these values to those entered for the primary loop.

CALC3R

This routine loads the input data into the data arrays, using the component order information generated by VRFY3R.

CALC7R

This routine sets slice-type dependent arrays and determines normalized axial and radial power distributions.

CALC8R

This routine interprets the coded iterative scheme designated by the user for establishing the initial plant balance.

CHEX9R

This routine calls the verification routines.

CRDR9R

This routine is the primary controller for the processing of initialization data. It calls the free-format reader routines.

GENRD

This is a general purpose reader routine as developed by the Los Alamos Scientific Laboratory[7] and modified for current usage.

INIT3R

This routine initializes certain steam generator constants.

INIT9R

This routine calls a series of intermediate data management routines.

LIST1R - LIST9R

These routines list the data processed by the corresponding READ routines.

NKEY3R

This routine assists in the decoding of steam generator input.

READ1R

This routine processes free-format card-image input for the initialization of the primary and secondary loop modules.

READ3R

This routine processes free-format card-image input for the initialization of the steam generator modules.

READ7R

This routine processes free-format card-image input for the initialization of the in-vessel modules.

READ8R

This routine processes free-format card-image input for the initialization of the plant balance routine.

READ9R

This routine processes free-format card-images input for the initialization of the material property parameters.

REST9R

This routine reads a program generated file for the re-initialization of labeled commons in the event of a restart.

SAVE9R

This routine generates an ordered file for a re-initialization restart.

TYPE5R

This routine loads channel-dependent parameters for use in the slice-type-dependent in-vessel modules.

VRFY1R - VRFY9R

These routines validate the data processed by the corresponding READ routines against the criteria established in the data dictionary.

Steady-State Subroutines

MAIN9S

This routine is the main driver for the steady-state calculations.

ALFA5S

This module calculates the coefficient of thermal expansion for each node in the fuel slice.

COOL6S

This is the driver module for in-vessel coolant calculations.

CORE6S

This is the core coolant module. It calculates axial temperatures, enthalpy gradients, friction factors, heat transfer coefficients and pressures at each node in each channel.

CVAL1S

This routine computes the steady-state pressure drop over the check valve.

END1S

This routine calculates the temperature boundary conditions for the sub-pipe in the primary loop and, in doing so, accounts for the temperature rise across pump, as well as IHX plena temperatures at the proper locations.

END2S

This subroutine sets the inlet temperature and mass flow rate boundary conditions for pipe (J+1) in the intermediate coolant loop. Additionally, it accounts for temperature rise across pump and mass flow rate division due to branch lines for coolant flow at the steam generator.

EVAP2S

This subroutine calculates the pressure drop or loss coefficient on the shell side of the evaporator.

FRAD5S

This module calculates the average power generation for all radial nodes in any core channel slice.

FUEL5S

This is the driver module for fuel heat conduction calculations. It treats a fuel slice as the basic computational element, calls all major fuel computational modules, and controls convergence.

GAMA5S

The module calculates the thermal conductivity for fuel and clad nodes for the slice and heat transfer coefficients for the interfaces.

GRO5S

This module sets pointers for restructuring in the slice.

HX3S

This routine performs the heat exchanger model calculations. It determines the pressure drop in the inlet plenum of the heat exchanger, calls the routines which determine the enthalpy and pressure distributions in the heat transfer tube, and calculates the pressure drop in the outlet plenum of the heat exchanger. In addition, it determines the location of the DNB point and adjusts the total heat transfer area to produce specified outlet conditions.

HYDR1S

This subroutine solves the steady-state hydraulics momentum equations for both primary and secondary sides of the IHX.

IHX1S

This routine solves the steady-state energy equations for the IHX. IHX1S and HYDR1S are the only interface between the primary and intermediate loop modules.

LOOP1S

This routine drives the primary loop steady-state calculation. In particular, it interprets the logical variables in order to select the proper calling sequence to the various subroutines. This routine also copies the results of the computations for loop 1 into the arrays for the rest of the loops.

LOOP2S

This routine drives the intermediate loop steady-state computation. The rest of the description is the same as for LOOP1S.

LPLN6S

Coolant lower plenum module. It initializes values of temperature, enthalpy, and pressure for the first axial nodal interface of each channel. It calculates pressures at the bottom of the core.

OPTN6S

This routine computes the steady-state channel flow rate distribution or pressure loss coefficients, depending on user specified option.

PBAL9S

This routine performs the global thermal balance for the whole plant.

PIPE1S

This routine solves the steady-state energy and momentum equations for pipe J in the primary coolant loop. It is assumed that the pipe diameter is constant, and the pipe wall is in thermal equilibrium with the coolant.

PIPE2S

This routine solves the steady-state energy and momentum equations for pipe J in the intermediate coolant loop.

PIPE3S

This routine computes the pressure at the exit of a pipe from the pressure losses for each node in the pipe and the fitting at the end of the pipe.

PRE5S

This module performs the initialization for FUEL5S by obtaining data computed by other modules. Amoung others, it sets the NR nodal temperature to T6COOL(J,K), places the heat transfer coefficient for the slice in a local variable HCOOL, initializes tags for restructuring, and calls PREX5S to initialize nodal distances XI at temperature T5REF.

PRES1S

This subroutine determines the pressures at pipe endpoints around the primary loop.

PRES2S

This subroutine determines the pressures at pipe endpoints around the intermediate loop.

PREX5S

This module initializes nodal distances XI for either equal radius increments or equal area increments of the fuel slice.

PRNT5S

This routine prints steady-state results for the fuel calculations.

PRNT9S

This routine prints a plant-wide steady-state summary of results.

PUMP1S

This routine determines pump pressure rise by matching it with overall load in the primary circuit. It then sets up the polynomial equation for pump head and calls ROOT1U to calculate pump operating speed.

PUMP2S

This subroutine determines pump pressure rise by matching it with overall load in the intermediate circuit. It then sets up the polynomial equation for pump head and calls ROOT1U to calculate pump operating speed.

PUMP3S

This routine computes either the pump outlet pressure at rated pump speed or the pump speed if the pump outlet pressure is specified.

PUT5S

This module moves the calculated steady-state values for the slice into storage locations.

RES1S

This routine computes the height of cooolant in the primary pump tank, and the mass of cover gas above the coolant level.

RES2S

This routine computes the height of coolant in the intermediate pump tank, and the mass of cover gas above the coolant level.

RITE1S

This routine prints the primary loop steady-state solution.

RITE2S

This routine prints the secondary loop steady-state solution.

SAVE9S

This routine creates an ordered file containing information necessary to re-initialize all common blocks to computed steady-state values.

SFLO3S

This routine determines the sodium flow rate per tube.

SPHT2S

This subroutine calculates the pressure drop or loss coefficient on the shell side of the superheater.

STEM5S

This module calculates the temperature of the fuel rod structure and fission gas plenum for steady-state.

STGN3S

This routine is the main driver for the steam generator calculations. In particular, it calls the various subroutines in the order in which the respective modules appear in the steam generator loops and copies the results of the computation for the intact loop into the arrays representing the damaged loop.

STMP3S

This routine determines the sodium inlet temperature.

TANK2S

This subroutine computes the pressure in the loop at the location of the surge tank, and further, calculates the mass of gas in the surge tank.

TEMP5S

This module calculates the steady-state radial temperature distribution in the rod and cladding for any slice.

TSAV5S

This routine determines the average temperature in each rod slice (except fission gas plenum slices).

UPLN6S

This upper plenum coolant module calculates the upper plenum temperatures, the exit enthalpy, outlet, and top of core pressures and finds pressure loss factors for each channel.

VOL3S

This routine calculates the mixed mean enthalpy in a volume based on the liquid level in the volume and the pressure specified in the volume.

XPAN5S

This module adjusts radii due to thermal expansion for each node in the fuel slice.

Transient Subroutines

MAIN9T

This is the overall driver routine for the transient calculations.

ACCM3T

This routine calculates coefficients for accumulators, eliminates flow segment terms from accumulator equations, and advances the accumulator variables.

ALFA5T

This module calculates coefficient of thermal expansion for each node.

APPL5T

This module calculates the applied reactivity contributions (e.g., those due to scram and/or control rods) during the transient.

BETA6T

This program calculates plenum and bubble critical pressure ratio between fission gas.

BOIL6T

This routine calculates liquid and bubble temperatures in upper and lower slugs.

BREK1T

This routine computes pressures at eventual break in primary loop.

BREK2T

This routine computes pressures at eventual break in intermediate loop.

BUBB6T

This is the main driver for the sodium boiling/fission gas release calculations.

CLAD6T

This program provides cladding boundary conditions for sodium boiling/fission gas release calculations.

COEF5T

This module calculates appropriate coefficients for the transient temperature calculations of fuel rod.

COEF6T

This routine calculates coefficients for the various pressure loss terms used in FlOW6T.

COOL6T

This module is the driver for the transient coolant claculations. It provides initial conditions; determines step size; and then employs several submodules to calculate temperature, pressure, enthalpy, and mass flow rate of the coolant in all axial nodes of all channels. It then stores values for fuel calculations.

CORE6T

This module calculates the enthalpy, temperature, and pressure of liquid sodium for single-phase flow at all axial nodes of all channels. It also acts as a subdriver for two-phase flow and directs calculations to the bubble model.

CVAL1T

This routine computes the pressure loss across the check valve.

DEFN1T

This routine defines pipe flow rates, and input and output pump flow rates for primary loop.

DEFN2T

This routine defines pipe flow rates, and input and output pump flow rates for intermediate loop.

DFUN6T

This program calculates derivatives for DVOGER during sodium boiling/ fission gas release calculations.

DOPP5T

This module calculates the reactivity feedback due to the Doppler effect.

DPAC3T

This determines the coefficients of momentum flux pressure loss in control volume.

DPFG3T

This determines coefficients of total flow resistance in control volume.

DPFT3T

This routine determines coefficients of pressure drop in a fitting using form loss coefficient.

DRIV1T

This routine is the driver for heat transport system transient hydraulics.

DRIV9T

This routine is the driver routine for the transient calculations. It also handles the overall timestep control.

DVOGER

This is an ISML routine[8] which integrates a system of differential equations according to Gear's method.

END1T

This routine sets transient thermal boundary conditions from one pipe to the next in primary loop.

END2T

This routine sets transient thermal boundary conditions from one pipe to the next in intermediate loop.

EQIV1T

This routine equivalences the names of primary loop variables and their time derivatives in terms of names used in the integrating subroutine.

EQIV2T

This routine equivalences the names of intermediate loop variables and their time derivatives in terms of names used in the integrating subroutine.

ERR3T

This writes error message.

EVAP2T

This routine computes pressure loss across the shell side of evaporator.

FEED3T

This routine determines coefficients for feedwater flow rate.

FLOW1T

This routine sets proper calling sequence to primary loop hydraulic computation submodules.

FLOW2T

This routine sets proper calling sequence to intermediate loop hydraulic computation submodules.

FLOW6T

This module simulates the flow redistribution model. It calculates the mass flow rate in each channel and bypass channel.

FRAD5T

This module calculates average power for all radial nodes in any rod slice. It also calculates the power generation multiplier to be used later in calculating the transient volumetric power generation.

FRIC3T

This determines friction factor as function of Reynolds number and surface roughness.

FSEG3T

This is a main driver for flow segment calculations.

FUEL5T

This module is the driver for the fuel rod and structure calculations. By calling series of modules in succession; it calculates, quantities such as temperature and radii of the fuel, cladding, and structure nodes.

FUNC1T

This routine calculates the time derivatives of differential equations (other than pump and reservoir) for primary loop hydraulics.

FUNC2T

This routine calculates the time derivatives of differential equations (other than pump and reservoir) for intermediate loop hydraulics.

GAMA5T

This module calculates the thermal conductivity and emissivity for fuel and clad nodes and also computes the heat transfer coefficient for gaseous mixtures in the gap.

GROW5T

This module calculates the reactivity feedback due to axial expansion.

GVSL1T

This routine computes coolant level in guard vessel, pressure external to break, and time derivative for accumulated volume of coolant in the guard vessel.

HEAD1T

This routine computes head of primary pumps and defines its operational region.

HEAD2T

This routine computes head of intermediate pumps and defines its operational region.

HNA3T

This routine computes overall sodium side heat transfer coefficient.

HNAF3T

This routine computes sodium side surface heat transfer coefficient.

HWFB3T

This routine determines heat transfer coefficient in film boiling.

HWFC3T

This routine determines heat transfer coefficient in forced convection to liquid.

HWNB3T

This routine determines heat transfer coefficient in nucleate boiling of sub-cooled or saturated water.

HWS3T

This routine is the main driver for overall heat transfer coefficient calculation on water side of heat exchanger.

HWSC3T

This determines heat transfer coefficient in forced convection to superheated steam.

HX3T

This determines coefficients for energy and flow equation for water side of heat exchanger and advances sodium temperatures.

HYDR1T

This routine computes transient hydraulics in IHX.

IHX1T

This routine solves transient energy equations in the IHX.

IKFS3T

This routine determines pointers for all arrays needed in the flow segment calculations.

INIB1T

This routine calculates cladding temperature and cladding inside and outside radii for the new nodalization required by BUBB6T.

INIT1T

This routine sets variables needed for the first call to the primary loop hydraulic integration scheme.

INIT2T

This routine sets variables needed for the first call to the secondary loop hydraulic integrating routine.

INIT3T

This routine initializes transient variables used by the steam generator modules.

INIT5T

This routine initializes variables used in the fuel and reactivity calculations.

INIT6T

This routine initiates variables used by the in-vessel coolant hydraulics modules.

INIT9T

This routine is the intermediate controller for the transient initialization routines.

INFS3T

This determines coefficients of inlet enthalpy and flow rate of a flow segment in terms of accumulator conditions.

INTF3T

This routine interfaces the required boundary conditions between all intermediate sodium loops and all steam generator heat exchangers.

INTF6T

This program calculates temperatures at upper and lower sodium vapor/liquid interface during sodium boiling/fission gas release calculations.

INTF9T

This routine checks the adequacy of all extrapolated interface conditions.

INTG1T

This routine advances the hydraulic equations using the predictor-corrector method of the Adams type.

LEAK5T

This routine tests for cladding rupture due to fission gas pressure for each axial fuel slice in current channel. Cladding rupture conditions exists if difference between fission gas pressure and coolant pressure exceeds critical value defined by cladding dimensions and material yield point for the calculated cladding temperature.

LIST9T

This routine lists the data processed by READ9T.

LOOP1T

This routine is the main driver for transient thermal computations in primary loop.

LOOP2T

This routine is the main driver for transient thermal computations in intermediate loop.

LPLN6T

This module performs transient lower plenum calculations. It extrapolates boundary conditions. It terminates its procedure by calculating coolant and metal temperatures and pressures at the bottom of the core.

PDCY5T

This module handles the advancement in time of the decay heat power generation.

PDFG1T

This routine sets the logic to compute pressure losses across different elements of primary loops.

PDFG2T

This routine sets the logic to compute pressure losses across different elements of intermediate loops.

PIPE1T

This routine solves transient energy equations in the primary loop piping.

PIPE2T

This routine solves transient energy equations in the intermediate loop piping.

PIPE3T

This routine determines coefficients for energy and flow equations for a pipe.

PIPW1T

This routine computes pressure losses in pipe sections in primary loops.

PIPW2T

This routine computes pressure losses in pipe sections in intermediate loops.

PLOP3T

This routine determines reference pressure for a flow segment.

PLOS1T

This routine computes pressure losses in appropriate sections of primary loop from the losses in individual components.

PLOS2T

This routine computes pressure losses in appropriate sections of intermediate loop from the losses in individual components.

POW5T

This module serves as the driver for the rod transient fission power generation calculations.

POW6T

This routine calculates power to coolant for use in COOL6T.

PRE5T

This module transfers the temperature from storage arrays into local scratch arrays for the particular slice in question, at the start of each timestep.

PRES1T

This routine sets inlet and outlet pressures of uniform mass flow rate sections in primary loops.

PRES2T

This routine sets inlet and outlet pressures of uniform mass flow rate sections in intermediate loops.

PRET1T

This routine initializes the primary and secondary loop variables for the thermal calculations.

PRMT5T

This module handles the advancement in time of the fission power generation.

PRNT9T

This routine is the main printing routine for the transient.

PROP6T

This routine calculates all properties used in the in-vessel coolant energy and fluid dynamics subroutines.

PSFW3T

This determines reference pressure for a flow segment.

PSTB3T

This determines turbine inlet pressure.

PUMP1T

This routine computes primary pump variables and time derivative for pump speed.

PUMP2T

This routine computes intermediate pump variables and time derivative for pump speed.

PUMP3T

This determines coefficients for energy and flow equations for a pump.

PUT5T

At the time this module is invoked, all formal calculations of the fuel and clad and structure have been completed for that timestep and for the given axial node. This module then moves all temperatures and radii so far calculated from local scratch variables into storage arrays for subsequent timesteps.

REAC5T

This module initiates calls to other modules to obtain the various applied and feedback reactivity contributions.

READ9T

This routine reads free-format card-image input for the initialization of transient parameters.

RES1T

This routine computes variables and time derivatives for level in primary pump reservoir.

RES2T

This routine computes variables and time derivatives for level in intermediate pump reservoir.

SAVE9T

This routine creates an ordered file containing information necessary to re-initialize all common blocks to a given master clock solution.

SFLO3T

This routine determines mass flow rate from input boundary conditions.

SOLV3T

This routine solves accumulator equations by Gaussian elimination with pivoting.

SPHT2T

This routine computes pressure loss across the shell side of superheater.

STEM5T

This module calculates the temperature of the structure and the fission gas plenum at any axial slice.

STGN3T

This is the main driver for the steam generator calculation. It calls routines which computes accumulator conditions, backsubstitutes accumulator conditions to advance flow segment variables, and determines the maximum change in water side variables during this step.

STMP3T

This routine determines sodium temperature at heat exchanger inlet from boundary conditions.

STOR1T

This routine stores the intermediate updated values of flow rate.

TANK2T

This routine computes pressures and time derivative for level in surge tank.

TEMP5T

This module calculates the radial temperatures for rod and cladding of any axial slice for the new timestep.

TFUN5T

In this module, the previous temperature of the fuel and cladding are extrapolated to the present time to evaluate material properties.

TMSG3T

This calculates timestep in the steam generating system.

TORK1T

This routine computes hydraulic and friction torques for primary pumps.

TORK2T

This routine computes hydraulic and friction torques for intermediate pumps.

TPMP3T

This determines two-phase friction multiplier on the water/steam side of the steam generator.

TSAV5T

This module calculates certain fuel slice dependent quantities required in GROW5T, DOPP5T, and VOID5T.

TUBE3T

This calculates surface heat fluxes and tube wall temperatures in heat exchanger.

UPLN6T

This routine updates the time derivatives for: sodium level; temperature of sodium in two mixing zones; temperature of cover gas; and temperatures of the inner structure, thermal liner, and the vessel closure head. It terminates by calculating the pressure at the vessel outlet.

VGSL1T

This routine retrieves information to interface with reactor vessel and sets calling sequence to compute pressures at eventual break in primary loops.

VJ1T

This routine determines velocity of jet out of a pipe break.

VOID5T

This module calculates the reactivity feedback due to sodium voiding.

VRFY9T

This routine validates the data processed by the READ9T routine against the criteria established in the data dictinary.

WSTE3T

This determines water properties as function of enthalpy and pressure.

XCRT3T

This routine determines water quality at DNB point as function of pressure, and flow rate.

XPAN5T

This module recalculates the radii of the fuel and cladding, necessary because of the thermal expansion of the radial nodes. Two methods are employed in calculating radii, equal area increment, and equal radii increment. calculating radii; equal area increment, and equal radii increment.

3. DATA DICTIONARY

S U P E R   S Y S T E M   C O D E

COMPUTER CODE FOR REACTOR SAFETY ANALYSIS OF
THERMOHYDRAULIC TRANSIENTS IN THE ENTIRE
LIQUID METAL FAST BREEDER REACTOR (LMFBR)
PLANT.

DEVELOPED BY:
THE CODE DEVELOPMENT AND VERIFICATION GROUP
ENGINEERING AND ADVANCED REACTOR SAFETY DIVISION
BROOKHAVEN NATIONAL LABORATORY,
FOR THE U. S. NUCLEAR REGULATORY COMMISSION.
UNDER CONTRACT NO. EY-76-C-02-0016

FOR FURTHER DETAILS, REFER TO THE FOLLOWING DOCUMENTATION:

(1) AN ADVANCED THERMOHYDRAULIC SIMULATION CODE FOR TRANSIENTS
IN LMFBR'S (SSC-L CODE)
BNL-NUREG- 50773 (FEBRUARY 1978)

(2) PREACCIDENT MODELING OF AN LMFBR PLANT FOR SSC-L
BNL-NUREG- 50602 (DECEMBER 1976)

(3) SSC ADVANCED THERMOHYDRAULIC TRANSIENT CODE FOR LMFBRS
QUARTERLY REPORTS:
BNL- 50467
BNL-NUREG- 50502
BNL-NUREG- 50527
BNL-NUREG- 50543
BNL-NUREG- 50607
BNL-NUREG- 50624
BNL-NUREG- 50661
BNL-NUREG- 50683
BNL-NUREG- 50747
BNL-NUREG- 50785
BNL-NUREG- 50820

C O D I N G   C O N V E N T I O N S

IN DEVELOPING A LARGE SYSTEM CODE, IT IS ADVISABLE (EVEN NECESSARY) TO DEVELOP PROGRAMMING STANDARDS AND CONVENTIONS TO INSURE UNIFORM AND CONCISE NOTATION. SINCE AN UNDERSTANDING OF SUCH CONVENTIONS IS ALSO USEFUL TO THOSE LATER MAINTAINING OR MODIFYING THE CODE, THEY ARE DISCUSSED BELOW, ALONG WITH OTHER FACTORS AFFECTING PORTABILITY.

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GLOBAL QUANTITIES, DATA DEFINITIONS:

SSC CODING STANDARDS REQUIRE THAT ALL NON-LOCAL QUANTITIES BE DEFINED IN A CENTRAL DATA DICTIONARY, BEFORE BEING INTRODUCED. THIS INSURES THAT CODERS USING THESE QUANTITIES USE THEM WITH THE SAME DEFINITION. AN ABBREVIATED VERSION OF THESE DATA DICTIONARY ENTRIES APPEARS IN THE BLOCK DATA SUBPROGRAM DEFINING EACH LABELLED COMMON, AND OPTIONALLY ELSEWHERE.

COMMON BLOCKS:

SEPARATE LABELLED COMMON BLOCKS CONTAIN DATA RELEVANT TO SPECIFIC REGIONS OF THE REACTOR SYSTEM AND/OR TO PARTICULAR CALCULATIONAL MODULES. EXCEPT FOR ROUTINES CALLED FROM SEVERAL PLACES, ALL LINKAGE IS VIA THESE COMMONS, TO ASSURE AGREEMENT OF DATA DEFINITION. ALL NONEXECUTABLE STATEMENTS DEFINING VARIABLES IN A GIVEN COMMON MUST BE IDENTICAL IN E V E R Y ROUTINE USING THAT COMMON.

SCRATCH AREAS, FOR DATA LOCAL TO A SPECIFIC MODULE BUT NOT SAVED BETWEEN CALLS TO THAT MODULE, ARE DEFINED AT THE END OF BLANK COMMON.

****

CODING PRACTICES, STATEMENT SEQUENCES, COMMENTS.

FOR READABILITY (AND CONCISENESS), CERTAIN UNIFORM CODING PRACTICES HAVE BEEN ESTABLISHED. THESE ARE MORE MORE FORMALLY DESCRIBED IN PROGRAM WRITEUPS AND OTHER DOCUMENTATION (SSC.1 AND AMD 16.4.7).

- CODE IS HIGHLY MODULARIZED. MOST ROUTINES CONTAIN FEWER THAN 100 EXECUTABLE STATEMENTS. UNSTRUCTURED GO TO STATEMENTS ARE AVOIDED.

- FOLLOWING THE HEADER CARD OF EACH SUBPROGRAM IS A COMMENT CARD STATING THE PROGRAM VERSION AND DATE, FOLLOWED BY COMMENT CARDS GIVING THE DATE, AUTHOR, AND PURPOSE OF EACH CODING CHANGE.

- CODE IS PARAMETERIZED. (USE OF PARAMETER STATEMENT IS ANTICIPATED.)

- ALL SPECIFICATION STATEMENTS PERTAINING TO TO A SINGLE LABELLED COMMON ARE GROUPED TOGETHER (IN A COMDECK - SEE UPDATE, BELOW). SCRATCH DATA AREAS ARE DEFINED AT THE END OF BLANK COMMON. COMMENTS DESCRIBING DATA IN LABELLED COMMONS APPEAR IN BLOCK DATA.

- CODE STRUCTURE IS DESCRIBED PRECEEDING FIRST EXECUTABLE STATEMENT.
- STATEMENT NUMBERS CONVEY INFORMATION ABOUT CODE STRUCTURE.
- FORMAT STATEMENTS USUALLY FOLLOW THE I/O STATEMENT USING THEM.

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SYMBOLIC NAMING CONVENTION -- SUBPROGRAMS:

SUBROUTINE NAMES CONSIST OF UP TO 4 ARBITRARY CHARACTERS, FOLLOWED BY A DIGIT FROM TABLE II INDICATING A PORTION OF THE REACTOR SYSTEM, FOLLOWED BY A LETTER FROM TABLE IV. INDICATING THE TYPE OF ROUTINE. FUNCTIONS ARE NAMED SIMILARLY, EXCEPT THAT FOR MATERIAL PROPERTIES, THE FINAL LETTER IS FROM TABLE III.

SYMBOLIC NAMING CONVENTIONS -- GLOBAL VARIABLES:

GLOBAL VARIABLES (IN LABELLED COMMONS) HAVE UNIQUE NAMES, OF A FORM NOT USED FOR ANY OTHER NAMES. EXCEPT FOR MODULES WHICH READ DATA, EQUIVALENCE STATEMENTS ARE NEVER USED TO CREATE DEGENERATE NAMES. LOCAL VARIABLES AND OTHER ENTITIES SHOULD NOT HAVE SUCH NAMES; I.E. DO NOT USE A DIGIT AS EITHER SECOND OR NEXT-TO-LAST CHARACTER.

SYMBOLIC NAMES OF GLOBAL VARIABLES (IN LABELLED COMMONS) BEGIN WITH A LETTER WHICH INDICATES TYPE OF QUANTITY, FOLLOWED BY A DIGIT WHICH SPECIFIES A REGION OF THE REACTOR SYSTEM. (FOR INSTANCE, PRESSURES BEGIN WITH LETTER P; VALUES FOR FUEL RODS HAVE THE DIGIT 5 AS SECOND CHARACTER. SEE TABLES I. AND II.) MATERIAL PROPERTIES PARAMETERS (BEGIN WITH C) ALSO USE A LETTER FROM TABLE III. AS THIRD CHARACTER.

TABLE I. INITIAL LETTERS TO INDICATE TYPE OF QUANTITY (SI UNITS).

A	AREA	M2
B	MASS	KG
C	MATERIAL PROPERTIES; CONSTANTS	(SEE TABLE II-B)
D	DENSITY	KG / M3
E	ENERGY; ENTHALPY	JOULE ; J / KG
F	FACTORS; FRACTIONS	-
G	MASS FLOW RATE PER UNIT AREA	KG / (M2*S)
H	HEAT TRANSFER COEFFICIENT	W / (M2*K)
P	PRESSURE; POWER	PASCAL ; WATTS
Q	SURFACE HEAT FLUX; CATCH-ALL	W / M2 ; --
R	REACTIVITY; ANGULAR MEASURE	DELTA-K/K ; RADIANS
S	TIME	SECOND
T	TEMPERATURE	KELVIN (NOT C.)
U	VELOCITY	M / S
V	VOLUME	M**3
W	MASS FLOW RATE	KG / S
X	DISTANCE (LENGTH OR RADIUS)	M
Y	DISTANCE (WIDTH OR DIAMETER)	M
Z	DISTANCE (HEIGHT OR AXIAL)	M

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 I,J,K  USED FOR INDEX VALUES OF DIMENSIONED ARRAYS (USED IN ORDER).
 L      CONTROL FLAGS, COUNTERS, ETC.
 M      MAXIMUM COMPILED DIMENSIONS; OTHER INTEGER CONSTRAINTS.
 N      ACTUAL DIMENSIONS USED (E.G. NUMBER OF CHANNELS USED).

TABLE II-A.  DIGITS USED TO INDICATE MAJOR REGIONS OF THE REACTOR SYS
----------
 1      PRIMARY LOOP (NOT INCLUDING IHX NOR VESSEL).
 2      SECONDARY LOOP, INCLUDING IHX (BUT NOT STEAM GENERATOR).
 3      TERTIARY LOOP AND STEAM GENERATOR (BUT NOT TURBINE, CONDENSER)
 4      TURBINE, CONDENSER.
 5      FUEL AND BLANKET RODS.
 6      REACTOR CORE COOLANT VOLUMES.
 7      REACTOR VESSEL, PLENA, STRUCTURE, ETC.
 8      - (NOT YET ASSIGNED) -
 9      GLOBAL OR GENERAL VALUES, NOT PERTAINING TO A SPECIFIC REGION.
 0      USED FOR DATA TABLES ONLY.

NOTE:   FOR ENTITIES PERTAINING TO MORE THAN ONE REGION, THE DIGIT
        USED IS DETERMINED BY WHICHEVER MODULE CREATES OR ALTERS IT.

TABLE II-B.  FOR MATERIAL PROPERTIES, DIGITS HAVE DIFFERENT MEANING:
----------
 1      SODIUM LIQUID                  2     SODIUM VAPOR
 3      WATER OR STEAM.                4     REACTOR FUEL BLANKET.
 5      REACTOR FUEL.                  6     CLADDING OF FUEL RODS.
 7      STEEL, OTHER STRUCTURAL.       8     GAS (REACTOR COVER GAS, ETC
 9      CONSTANTS: C9PI=3.14...

TABLE III.  LETTERS USED FOR MATERIAL PROPEPTIES:
---------     (AS 3RD CHAR. OF VARIABLE, OR FINAL LETTER OF FUNCTION.)
 A      COEFFICIENT OF THERMAL EXPANSION.
 C      SPECIFIC HEAT CAPACITY.        D     DENSITY.
 E      EMISSIVITY.                    F     FACTORS.
 H      HEAT TRANSFER COEFF.           K     THERMAL CONDUCTIVITY.
 N      DYNAMIC VISCOSITY.

TABLE IV.  FINAL LETTERS USED FOR ROUTINE NAMES:
---------
 R      SUBROUTINES OF THE DATA READING AND RESTART OVERLAY.
 S      SUBROUTINES OF THE STEADY-STATE CALCULATION OVERLAY.
 T      SUBROUTINES OF THE TRANSIENT TIME-STEPPING OVERLAY.
 U      UTILITY ROUTINES USED BY VARIOUS OVERLAYS, RESIDENT IN ROOT.

 F      FUNCTIONS OTHER THAN THOSE CALCULATING MATERIAL PROPERTIES.
 *      SEE TABLE III FOR FINAL LETTERS OF MATERIAL PROPERTIES FUNCTIO

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FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
A1BREK	A	BREAK AREA IN PRIMARY PIPE	M2	VD9V	BREK1T VRFY9T WRIT1T LIST9T	READ9T	T-1003
A1GAP	A	X-SECTIONAL AREA BETWEEN BROKEN PRIMARY PIPE AND GUARD VESSEL(OR PIPE)	M2	VD9V	LIST9T BREK1T WRIT1T VRFY9T	READ9T	T-1003
A1IHX	S	FLOW AREA ON PRIMARY SIDE OF IHX	M2	DATX1V	IHX1T HYDR1S LIST1R XI1T IHX1S CALC1R HYDR1T	CALC1R READ1R	N-100
A1PIPE	A	X-SECTIONAL AREA FOR FLOW THROUGH EACH P IPE OF EACH PRIMARY LOOP	M2	VD9V	RSET1T XI1T PIPE1T PRET1T HYDR1S PIPW1T BREK1T PIPE1S CALC1R HYDR1T RITE1S	RSET1T CALC1R	
A1RES	S	X-SECTIONAL AREA OF PRIMARY PUMP TANK	M2	DATA1V	RITE1S LIST1R RES1S RES1T	READ1R	N-112
A1SHEL	S	HEAT TRANSFER AREA OF IHX SHELL	M2	A1TCV	LIST1R PRET1T	READ1R	N-100
A1WALL	A	PRIMARY PIPE WALL HEAT TRANSFER AREA PER CONTROL VOLUME	M2	VD9V	PIPE1T	PRET1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
A2BREK	A	BREAK AREA IN SECONDARY PIPE	M2	VD9V	WRIT2T VRFY9T LIST9T BREK2T	READ9T	T-1201
A2DOWN	S	X-SECTIONAL AREA FOR FLOW THROUGH CENTRA L DOWNCOMER IN IHX	M2	DAT12V	RITE1T HYDR1S HYDR1T	CALC1R	
A2EV	S	FLOW AREA THROUGH SHELL SIDE OF EVAPORAT OR	M2	DATE2V	RITE2S EVAP2S RITE1T EVAP2T	CALC1R	
A2GAP	A	X-SECTIONAL AREA BETWEEN BROKEN SECONDAR Y PIPE AND GUARD PIPE(IF ANY)	M2	VD9V	BREK2T WRIT2T VRFY9T LIST9T	READ9T	T-1201
A2IHX	S	FLOW AREA THROUGH IHX TUBE BUNDLE	M2	DAT12V	IHX1T IHX1S PRET1T RITE1T HYDR1S HYDR1T	CALC1R	
A2INHX	S	X-SECTIONAL AREA OF IHX SECONDARY INLET PIPE	M2	DAT12V	HYDR1S HYDR1T	CALC1R	
A2OUHX	S	X-SECTIONAL AREA OF IHX SECONDARY OUTLET PIPE	M2	DAT12V	HYDR1S HYDR1T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
A2PIPE	A	X-SECTIONAL AREA FOR FLOW THROUGH EACH P IPE OF EACH INTERMEDIATE LOOP	M2	VD9V	PRET1T PIPE2T RITE2S EVAP2T PIPW2T SPHT2S RSET2T BREK2T EVAP2S PIPE2S SPHT2T CALC1R RITE1T	RSET2T CALC1R	
A2RES	S	X-SECTIONAL AREA OF INTERMEDIATE PUMP TA NK	M2	DATA2V	RES2T RITE2S RES2S LIST1R	READ1R	N-122
A2SH	S	FLOW AREA THROUGH SHELL SIDE OF SUPERHEA TER	M2	DATS2V	SPHT2T RITE2S RITE1T SPHT2S	CALC1R	
A2TANK	S	X-SECTIONAL AREA OF SURGE TANK	M2	DATA2V	RITE2S TANK2T LIST1R TANK2S	READ1R	N-122
A2WALL	A	SECONDARY PIPE WALL HEAT TRANSFER AREA P ER CONTROL VOLUME	M2	VD9V	PIPE2T	PRET1T	
A3CONV	S	RELATIVE AREA CONVERGENCE CRITERION FOR HEAT EXCHANGER AREA OPTION	-	DATI3V	TUBE3T	CALC3R	S-1002
A3NA	A	TOTAL SODIUM FLOW AREA IN HEAT EXCHANGER TUBE BUNDLE	M2	DATG3V	HX3S TUBE3T CALC1R	INIT3R CALC3R	S-301
A6FLOW	A	COOLANT FLOW AREA PER ROD FOR EACH CHANN EL (SET EQUAL TO A6ROD)	M2	VD9V	STEM5S STEM5T	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
A6GL	S	AREA BETWEEN GAS AND LIQUID IN VESSEL UP PER PLENUM	M2	DAT26V	UPLN6S UPLN6T LIST7R INIT6T CALC7R	READ7R	V-28
A6GM1	S	AREA BETWEEN GAS AND METAL 1 IN VESSEL U PPER PLENUM	M2	DAT26V	LIST7R UPLN6S INIT6T	READ7R	V-28
A6GM2	S	AREA BETWEEN GAS AND METAL 2 IN VESSEL U PPER PLENUM	M2	DAT26V	UPLN6S INIT6T LIST7R	READ7R	V-28
A6GM3	S	AREA BETWEEN GAS AND METAL 3 IN VESSEL U PPER PLENUM	M2	DAT26V	INIT6T LIST7R	READ7R	V-28
A6JET	S	AREA OF CORE JET FLOW	M2	DAIN6V	LIST7R INIT6T UPLN6T	READ7R	V-28
A6LFBP	S	FLOW AREA OF LOWER REGION OF BYPASS CHAN NEL	M2	DAT26V	INIT6T LIST7R FLOW6T UPLN6S CORE6T	READ7R	V-29
A6LM1	S	AREA BETWEEN LIQUID AND METAL 1 IN VESSE L UPPER PLENUM	M2	DAT26V	LIST7R INIT6T UPLN6S	READ7R	V-28
A6LM2	S	AREA BETWEEN LIQUID AND METAL 2 IN VESSE L UPPER PLENUM	M2	DAT26V	LIST7R INIT6T UPLN6S	READ7R	V-28
A6LPLF	S	X-SECTIONAL FLOW AREA OF LOWER PLENUM	M	DAT26V	LIST7R INIT6T	READ7R	V-24

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
A6ROD	A	SODIUM FLOW AREA PER ROD IN EACH CHANNEL	M2	VD9V	PROP6T INIT6T LIST7R VOID5T OPTN6S CALC7R CORE6S COEF6T		V-7
A6UFBP	S	FLOW AREA OF UPPER REGION OF BYPASS CHAN NEL	M2	DAT26V	INIT6T UPLN6S LIST7R FLOW6T CORE6T	READ7R	V-29
A6UPLF	S	X-SECTIONAL FLOW AREA OF UPPER PLENUM	M2	DAT26V	INIT6T	CALC7R	
B1GAS	A	MASS OF COVER GAS PRESENT IN EACH PRIMAR Y PUMP TANK	KG	VD9V	RITE1S LOOP1S RES1T	RES1S LOOP1S	
B1SHEL	S	MASS OF IHX SHELL	KG	A1TCV	LIST1R PRET1T	READ1R	N-100
B1WALL	A	MASS OF PRIMARY PIPE WALL FOR A CONTROL VOLUME	KG	VD9V	PIPE1T	PRET1T	
B2RES	A	MASS OF COVER GAS PRESENT IN EACH INTERM EDIATE PUMP TANK	KG	VD9V	LOOP2S RITE2S RES2T	RES2S LOOP2S	
B2TANK	A	MASS OF COVER GAS PRESENT IN EACH SURGE(EXPANSION) TANK	KG	VD9V	RITE2S LOOP2S TANK2T	LOOP2S TANK2S	
B2WALL	A	MASS OF INTERMEDIATE PIPE WALL FOR A CON TROL VOLUME	KG	VD9V	PIPE2T	PRET1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
B5STRC	A	MASS OF STRUCTURE(E.G., HEX CAN) ASSOCIA TED WITH EACH CHANNEL	KG	VD9V	STEM5S LIST7R STEM5T		V-19
B6CGAS	S	MASS OD COVER GAS IN VESSEL OUTLET PLENU M	KG	DAIN6V	EQIVIT UPLN6T	INIT6T EQIVIT	
B6LPMC	S	MASS OF METAL IN VESSEL LOWER INLET PLEN UM	KG	DAIN6V	LIST7R LPLN6T	READ7R	V-24
B6UMC1	S	MASS HEAT CAPACITY OF METAL 1 IN UPPER P LENUM	J/K	DAIN6V	UPLN6T LIST7R	READ7R	V-28
B6UMC2	S	MASS HEAT CAPACITY OF METAL 2 IN UPPER P LENUM	J/K	DAIN6V	UPLN6T LIST7R	READ7R	V-28
B6UMC3	S	MASS HEAT CAPACITY OF METAL 3 IN UPPER P LENUM	J/K	DAIN6V	UPLN6T LIST7R	READ7R	V-28
C1C0	S	ADDITIVE CONSTANT FOR LIQUID SODIUM SPEC . HEAT CAP. FUNCTION(5-30) REF.1	J/(KG*K)	DATAC1	IHX1S HCAP1C LIST9R	BLKDAT READ9R	M-10
C1C1	S	FIRST ORDER COEF. FOR LIQUID SODIUM SPEC . HEAT CAP. FUNCTION(5-30) REF.1	J/(KG*K2)	DATAC1	LIST9R IHX1S HCAP1C	READ9R BLKDAT	M-10
C1C2	S	SECOND ORDER COEF. FOR LIQUID SODIUM SPE C. HEAT CAP. FUNCTION (5-30) REF.1	J/(KG*K3)	DATAC1	HCAP1C IHX1S LIST9R	BLKDAT READ9R	M-10
C1DT1	S	LOWER SATURATED LIQUID SODIUM TEMP. BOUN D FOR EQUATION (5-38) REF.1	K	DATAC1	LIST9R	READ9R BLKDAT	M-10
C1DT2	S	UPPER SATURATED LIQUID SODIUM TEMP. BOUN D FOR EQUATION (5-38) REF.1	K	DATAC1	LIST9R	BLKDAT READ9R	M-10

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C1D0	S	ADDITIVE CONSTANT FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1	KG/(M3)	DATAC1	TANK2S DENS1D PUMP1S RES1S PIPE1S SPHT2S EVAP2S PUMP2S CVAL1S RES2S LIST9R HYDR1S PIPE2S ALFA1A	READ9R BLKDAT	M-10
C1D1	S	FIRST ORDER COEF. FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1	KG/(M3*K)	DATAC1	HYDR1S RES1S SPHT2S EVAP2S PUMP1S PIPE1S LIST9R TANK2S RES2S CVAL1S ALFA1A PUMP2S PIPE2S DENS1D DRHO1R	BLKDAT READ9R	M-10

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C1D2	S	SECOND ORDER COEF. FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1	KG/(M3*K2)	DATAC1	DRHO1R PUMP2S CVAL1S PUMP1S SPHT2S ALFA1A EVAP2S PIPE1S PIPE2S RES2S DENS1D LIST9R TANK2S HYDR1S RES1S	BLKDAT READ9R	M-10
C1D3	S	THIRD ORDER COEF. FOR SATURATED LIQUID S ODIUM DENSITY FUNCTION (5-38) REF.1	KG/(M3*K3)	DATAC1	PIPE2S SPHT2S ALFA1A EVAP2S DRHO1R PUMP1S HYDR1S RES2S DENS1D LIST9R TANK2S PIPE1S CVAL1S PUMP2S RES1S	READ9R BLKDAT	M-10
C1H0	S	ADDITIVE CONSTANT FOR SATURATED LIQUID S ODIUM ENTHALPY FUNCTION (5-31) REF.1	J/KG	DATAC1	LIST9R ENTH1H	BLKDAT READ9R	M-10
C1H1	S	FIRST ORDER COEF. FOR SATURATED LIQUID S ODIUM ENTHALPY FUNCTION (5-31) REF.1	J/(KG*K)	DATAC1	LIST9R ENTH1H	READ9R BLKDAT	M-10
C1H2	S	SECOND ORDER COEF. FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1	J/(KG*K2)	DATAC1	ENTH1H LIST9R	BLKDAT READ9R	M-10

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C1H3	S	THIRD ORDER COEF. FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1	J/(KG*K3)	DATAC1	ENTH1H LIST9R	READ9R BLKDAT	M-10
C1K0	S	ADDITIVE CONSTANT FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1	W/(M*K)	DATAC1	COND1K LIST9R IHX1S	BLKDAT READ9R	M-10
C1Ki	S	FIRST ORDER COEF. FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1	W/(M*K2)	DATAC1	COND1K LIST9R IHX1S	BLKDAT READ9R	M-10
C1K2	S	SECOND ORDER COEF. FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1	W/(M*K3)	DATAC1	IHX1S LIST9R COND1K	READ9R BLKDAT	M-10
C1N1	S	ADDITIVE CONSTANT FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1	LN(N*S/M2)	DATAC1	HYDR1S LIST9R PIPE2S VISC1N EVAP2S SPHT2S IHX1S PIPE1S	READ9R BLKDAT	M-10
C1N2	S	FIRST ORDER COEF. FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1	LN(N*S/M2)*K	DATAC1	VISC1N HYDR1S IHX1S EVAP2S PIPE2S PIPE1S LIST9R SPHT2S	BLKDAT READ9R	M-10
C1N3	S	FIRST ORDER COEF. FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1	LN(N*S/(M2*K))	DATAC1	SPHT2S IHX1S PIPE2S VISC1N LIST9R HYDR1S EVAP2S PIPE1S	BLKDAT READ9R	M-10
C1PT1	S	SATURATED SODIUM VAPOR PRESSURE TEMP. CRITERION FOR EQUATION(5-35) AND (5-36) REF.1	K	DATAC1	SVPS1P LIST9R	READ9R BLKDAT	M-10

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C1P1	S	ADDITIVE CONSTANT FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-35) REF.1	LN(N/M2)	DATAC1	LIST9R SVPS1P	BLKDAT READ9R	M-10
C1P2	S	FIRST ORDER COEF. FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-35) REF.1	LN(N/M2)*K	DATAC1	LIST9R SVPS1P	READ9R BLKDAT	M-10
C1P3	S	FIRST ORDER COEF. FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-35) REF.1	LN(N/(M2*K))	DATAC1	SVPS1P LIST9R	BLKDAT READ9R	M-10
C1P4	S	ADDITIVE CONSTANT FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-36) REF.1	LN(N/M2)	DATAC1	LIST9R SVPS1P	READ9R BLKDAT	M-10
C1P5	S	FIRST ORDER COEF. FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-36) REF.1	LN(N/M2)*K	DATAC1	SVPS1P LIST9R	READ9R BLKDAT	M-10
C1P6	S	FIRST ORDER COEF. FOR SODIUM SATURATED V APOR PRESSURE FUNCTION (5-36) REF.1	LN(N/(M2*K))	DATAC1	LIST9R SVPS1P	BLKDAT READ9R	M-10
C1TS0	S	CONSTANT USED IN CALCULATING SODIUM SATU RATION TEMP. AS A FUNCTION OF PRESSURE (5-37) REF.1	K*LN(N/M2)	DATAC1	LIST9R SATT1S	BLKDAT READ9R	M-10
C1TS1	S	CONSTANT USED IN CALCULATING SODIUM SATU RATED TEMP. AS A FUNCTION OF PRESSURE (5 -37) REF.1	LN(N/M2)	DATAC1	SATT1S LIST9R	BLKDAT READ9R	M-10
C1TT1	S	INITIAL GUESS FOR SATURATED SODIUM TEMP. CALCULATION	K	DATAC1	TEMP1T LIST9R	BLKDAT READ9R	M-10
C1T1	S	FRACTION OF INITIAL TEMP. GUESS TO INCRE MENT FOR SECOND PASS IN SATURATED SODIUM TEMP. ITERATION	-	DATAC1	LIST9R TEMP1T	READ9R BLKDAT	M-10
C1T2	S	RELATIVE CONVERGENCE CRITERION FOR SATUR ATED SODIUM TEMP. CALCULATION	-	DATAC1	LIST9R TEMP1T	BLKDAT READ9R	M-10

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C2EV	A	MULTIPLIER FOR FLOW AREA OR PRESSURE LOSSES IN EVAPORATOR	-	VD9V	RITE1T PLOS2T WGHT2T	WGHT2T	
C2PIPE	A	FLOW AREA MULTIPLIER FOR BRANCHING PIPES	-	VD9V	DEFN2T RITE1T	WGHT2T	
C2SH	A	MULTPIPLIER FOR FLOW AREA OR PRESSURE LOSSES IN SUPERHEATER(S)	-	VD9V	RITE1T WGHT2T PLOS2T	WGHT2T	
C4AT0	A	REFERENCE TEMPERATURE FOR C4A0	K	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40
C4AT1	A	LOWER BLANKET MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1	K	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40
C4AT2	A	UPPER BLANKET MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1	K	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4A0	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-10) REF.1	M/(M*K)	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4A1	A	FIRST ORDER COEF. FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-10) REF.1	M/(M*K2)	DATAC4	LIST9R CALC7R	BLKDTR READ9R	M-40
C4A2	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-11) REF.1	M/(M*K)	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4CT1	A	LOWER BLANKET MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1	K	DATAC4	LIST9R	BLKDTR READ9R	M-40
C4CT2	A	UPPER BLANKET MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1	K	DATAC4	LIST9R	BLKDTR READ9R	M-40

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C4C0	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL S PEC. HEAT CAP. FUNCTION (5-2) REF.1	J/(KG*K)	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40
C4C1	A	FIRST ORDER COEF. FOR BLANKET MATERIAL S PEC. HEAT CAP. FUNCTION (5-2) REF.1	1/K	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4C2	A	SECOND ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1	1/K2	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4C3	A	THIRD ORDER COEF. FOR BLANKET MATERIAL S PEC. HEAT CAP. FUNCTION (5-2) REF.1	1/K3	DATAC4	CALC7R LIST9R	BLKDTR READ9R	M-40
C4C4	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL S PEC. HEAT CAP. FUNCTION (5-4) REF.1	J/(KG*K)	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40
C4C5	A	FIRST ORDER COEF. FOR BLANKET MATERIAL S PEC. HEAT CAP. FUNCTION (5-4) REF.1	J/(KG*K2)	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4C6	A	INVERSE SECOND ORDER COEF. FOR BLANKET M ATERIAL SPEC. HEAT CAP. FUNCTION(5-2) RE F.1	K2	DATAC4	LIST9R CALC7R	BLKDTR READ9R	N-40
C4D0	A	FIRST ORDER COEF. FOR BLANKET MATERIAL D ENSITY FUNCTION (5-15) REF.1	KG/M3	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4D1	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL D ENSITY FUNCTION (5-16) REF.1	KG/M3	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4ET0	A	BLANKET MATERIAL TEMP. CRITERION FOR EQU ATIONS (5-17) AND (5-18) REF.1	K	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4E0	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL E MISSIVITY FUNCTION (5-17) REF.	-	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C4E1	A	FIRST ORDER COEF. FOR BLANKET MATERIAL E MISSIVITY FUNCTION (5-18) REF.	1/K	DATAC4	CALC7R LIST9R	BLKDTR READ9R	M-40
C4K0	A	ADDITIVE CONSTANT FOR BLANKET MATERIAL T HERMAL CONDUCTIVITY FUNCTION (5-1) REF.1	W/(M*K)	DATAC4	LIST9R CALC7R	READ9R BLKDTR	M-40
C4K1	A	FIRST ORDER COEF. FOR BLANKET MATERIAL T HERMAL CONDUCTIVITY FUNCTION (5-1) REF.1	-	DATAC4	CALC7R LIST9R	READ9R BLKDTR	M-40
C4K2	A	SECOND ORDER COEF. FOR BLANKET MATERIAL THERMAL CONDUCTIVITYFUNCTION (5-1) REF.	1/K	DATAC4	LIST9R CALC7R	BLKDTR READ9R	M-40
C4K3	A	THIRD ORDER COEF. FOR BLANKET MATERIAL T HERMAL CONDUCTIVITY FUNCTION (5-1) REF.1	1/K3	DATAC4	CALC7R LIST9R	BLKDTR READ9R	M-40
C4K4	A	FIRST ORDER COEF. ON POROSITY FOR BLANKE T MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1	-	DATAC4	LIST9R CALC7R	BLKDTR READ9R	M-40
C4K5	A	SECOND ORDER COEF. ON POROSITY FOR BLANK ET MATERIAL THERMAL CONDUCTIVITY FUNCTIO N(5-1) REF.1	-	DATAC4	CALC7R LIST9R	BLKDTR READ9R	M-40
C4TCGG	A	TEMPERATURE AT ONSET OF COLMNAR GRAIN GR OWTH FOR BLANKET MATERIALS	K	DATAC4	LIST9R CALC7R	BLKDTR READ9R	M-40
C4TEGG	A	TEMPERATURE AT ONSET OF EQUI-AXED GRAIN GROWTH FOR BLANKET MATERIALS	K	DATAC4	CALC7R LIST9R	BLKDTR READ9R	M-40
C4TMLT	A	BLANKET MATERIAL MELTING TEMP.	K	DATAC4	LIST9R CALC7R	BLKDTR READ9R	M-40
C5AF	A	PARAMETERS USED IN CALCULATING FUEL THER MAL EXPANSION COEF. FOR EACH SLICE		VD9V	GROW5T ALFA5S ALFA5T	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C5AT0	A	REFERENCE TEMPERATURE FOR C5A0	K	DATAC5	LIST9R CALC7R	READ9R BLKDTR	M-50
C5AT1	A	LOWER FUEL MATERIAL TEMP. BOUND FOR EQUA TION (5-9) REF.1	K	DATAC5	LIST9R CALC7R	BLKDTR READ9R	M-50
C5AT2	A	UPPER FUEL MATERIAL TEMP. BOUND FOR EQUA TION (5-9) REF.1	K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5A0	A	ADDITIVE CONSTANT FOR FUEL MATERIAL COEF . OF THERMAL EXPANSION (5-10) REF.1	M/(M*K)	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5A1	A	FIRST ORDER COEF. FOR FUEL MATERIAL COEF . OF THERMAL EXPANSION (5-10) REF.1	M/(M*K2)	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5A2	A	ADDITIVE CONSTANT FOR FUEL MATERIAL COEF . OF THERMAL EXPANSION (5-11) REF.1	M/(M*K)	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5CF	A	PARAMETERS USED IN CALCULATING FUEL SPEC IFIC HEAT FOR EACH SLICE		VD9V	ALFA5T	CALC7R	
C5CT1	A	LOWER FUEL MATERIAL TEMP. BOUND FOR EQUA TIONS (5-2) THRU (5-4) REF.1	K	DATAC5	LIST9R	BLKDTR READ9R	M-50
C5CT2	A	UPPER FUEL MATERIAL TEMP. BOUND FOR EQUA TIONS (5-2) THRU (5-4) REF.1	K	DATAC5	LIST9R	BLKDTR READ9R	M-50
C5C0	A	ADDITIVE CONSTANT FOR FUEL MATERIAL SPEC . HEAT CAP. FUNCTION(5-2) REF.1	J/(KG*K)	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5C1	A	FIRST ORDER COEF. FOR FUEL MATERIAL SPEC . HEAT CAP. FUNCTION(5-2) REF.1	1/K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C5C2	A	SECOND ORDER COEF. FOR FUEL MATERIAL SPE C. HEAT CAP. FUNCTION (5-2) REF.1	1/K2	DATAC5	LIST9R CALC7R	READ9R BLKDTR	M-50
C5C3	A	THIRD ORDER COEF. FOR FUEL MATERIAL SPEC . HEAT CAP. FUNCTION(5-2) REF.1	1/K3	DATAC5	LIST9R CALC7R	BLKDTR READ9R	M-50
C5C4	A	ADDITIVE CONSTANT FOR FUEL MATERIAL SPEC . HEAT CAP. FUNCTION(5-4) REF.1	J/(KG*K)	DATAC5	LIST9R CALC7R	BLKDTR READ9R	M-50
C5C5	A	FIRST ORDER COEF. FOR FUEL MATERIAL SPEC . HEAT CAP. FUNCTION(5-4) REF.1	J/(KG*K2)	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5C6	A	INVERSE SECOND ORDER COEF. FOR FUEL MATE RIAL SPEC. HEAT CAP. FUNCTION(5-2) REF.1	K2	DATAC5	LIST9R CALC7R	BLKDTR READ9R	M-50
C5DCG	A	THEORETICAL DENSITY OF COLUMNAR GRAIN GR OWTH FUEL FOR EACH SLICE TYPE	KG/M3	VD9V	ALFA5T CALC7R	CALC7R	
C5DEG	A	THEORETICAL DENSITY OF EQUIAXED GRAIN GR OWTH FUEL FOR EACH SLICE TYPE	KG/M3	VD9V	ALFA5T CALC7R	CALC7R	
C5DF13	A	C5DUN/C5DCG	-	VD9V	XPAN5S TEMP5S COEF5T	CALC7R	
C5DF23	A	C5DEG/C5DCG	-	VD9V	COEF5T XPAN5S TEMP5S	CALC7R	
C5DF	A	PARAMETERS USED TO CALCULATE FUEL DENSIT Y FOR EACH SLICE		VD9V	ALFA5T GROW5T	CALC7R ALFA5T	
C5DUN	A	THEORETICAL DENSITY OF UNRESTRUCTED FUEL FOR EACH SLICE TYPE	KG/M3	VD9V	ALFA5T CALC7R	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C5D0	A	FIRST ORDER COEF. FOR FUEL MATERIAL DENS ITY FUNCTION (5-15) REF.1	KG/M3	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5D1	A	ADDITIVE CONSTANT FOR FUEL MATERIAL DENS ITY FUNCTION (5-16) REF.1	KG/M3	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5EF	A	PARAMETERS USED IN CALCULATING FUEL EMMI SSIVITY FOR EACH SLICE TYPE		VD9V	GAMA5S GAMA5T	CALC7R	
C5ET0	A	FUEL MATERIAL TEMP. CRITERION FOR EQUATI ONS (5-17) AND (5-18) REF.1	K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5E0	A	ADDITIVE CONSTANT FOR FUEL MATERIAL EMIS SIVITY FUNCTION (5-17) REF.1	-	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5E1	A	FIRST ORDER COEF. FOR FUEL MATERIAL EMIS SIVITY FUNCTION (5-18) REF.1	1/K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5FGAS	A	CONSTANT FACTOR USED IN CALCULATING FISS ION GAS PRESSURE IN EACH CHANNEL	N*M/K	VD9V	FUEL5S FUEL5T	FUEL5S	
C5KF	A	PARAMETERS USED IN CALCULATING FUEL COND UCTIVITY OF EACH SLICE TYPE		VD9V	GAMA5S CALC7R GAMA5T	CALC7R	
C5KGAP	A	PARAMETERS USED TO CALCULATE CONDUCTIVIT Y OF EACH FISSION GAS IN EACH CHANNEL		VD9V	GAMA5S GAMA5T	CALC7R	
C5KPOR	A	FRACTIONAL POROSITY OF FUEL OF EACH SLIC E TYPE	-	VD9V	CALC7R	CALC7R	
C5K0	A	ADDITIVE CONSTANT FOR FUEL MATERIAL THER MAL CONDUCTIVITY FUNCTION (5-1) REF.1	W/(M*K)	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C5K1	A	FIRST ORDER COEF. FOR FUEL MATERIAL THER MAL CONDUCTIVITY FUNCTION (5-1) REF.1	-	DATAC5	CALC7R LIST9R	READ9R BLKDTR	M-50
C5K2	A	SECOND ORDER COEF. FOR FUEL MATERIAL THE RMAL CONDUCTIVITY FUNCTION (5-1) REF.1	1/K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5K3	A	THIRD ORDER COEF. FOR FUEL MATERIAL THER MAL CONDUCTIVITY FUNCTION (5-1) REF.1	1/K3	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50
C5K4	A	FIRST ORDER COEF. ON POROSITY FOR FUEL M ATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1	-	DATAC5	LIST9R CALC7R	READ9R BLKDTR	M-50
C5K5	A	SECOND ORDER COEF. ON POROSITY FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1	-	DATAC5	LIST9R CALC7R	READ9R BLKDTR	M-50
C5LMDA	A	DECAY CONSTANT OF I-TH DELAYED NEUTRON G ROUP	1/S	DATD5V	LIST9T INIT5T PRMT5T	READ9T	T-5004
C5LMD2	A	C5LMDA*C5LMDA	1/S2	DATD5V	PRMT5T	INIT5T	
C5LN	S	PROMT NEUTRON GENERATION TIME	S	DATD5V	INIT5T LIST9T PRMT5T	READ9T	T-5001
C5TCGG	A	TEMPERATURE AT ONSET OF COLMNAR GRAIN GR OWTH FOR FUEL MATERIALS	K	DATAC5	LIST9R CALC7R	READ9R BLKDTR	M-50
C5TEGG	A	TEMPERATURE AT ONSET OF EQUIAXED GRAIN G ROWTH FOR FUEL MATERIALS	K	DATAC5	LIST9R CALC7R	BLKDTR READ9R	M-50
C5TMLT	A	FUEL MATERIAL MELTING TEMP.	K	DATAC5	CALC7R LIST9R	BLKDTR READ9R	M-50

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C6AF	A	PARAMETERS USED IN CALCULATING CLADDING THERMAL EXPANSION COEF. FOR EACH SLICE T YPE		VD9V	ALFA5T ALFA5S	CALC7R	
C6AT0	A	REFERENCE TEMPERATURE FOR C6A0	K	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6AT1	A	MAXIMUM TEMP. RANGE FOR CLADDING COEF. O F EXPANSION	K	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6A0	A	ADDITIVE CONSTANT FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-2 1) REF.1	M/(M*K)	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6A1	A	FIRST ORDER COEF. FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-2 1) REF.1	M/(M*K2)	DATAC6	LIST9R CALC7R	READ9R BLKDTR	M-60
C6A2	A	SECOND ORDER COEF. FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5- 21) REF.1	M/(M*K3)	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6CF	A	PARAMETERS USED IN CALCULATING CLADDING SPECIFIC HEAT CAPACITY FOR EACH SLICE		VD9V	ALFA5T STEM5T	CALC7R	
C6C0	A	ADDITIVE CONSTANT FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K)	DATAC6	CALC7R LIST9R	READ9R BLKDTR	M-60
C6C1	A	FIRST ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K2)	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6C2	A	SECOND ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K3)	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6C3	A	THIRD ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K4)	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C6DF	A	PARAMETERS USED IN CALCULATING CLADDING DENSITY FOR EACH SLICE		VD9V	ALFA5T STEM5T	CALC7R	
C6D0	A	ADDITIVE CONSTANT FOR CLADDING MATERIAL DENSITY FUNCTION (5-22) REF.1	KG/M3	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6EF	A	PARAMETERSUSED IN CALCULATING CLADDING E MISSIVITY FOR EACH SLICE TYPE		VD9V	GAMA5S GAMA5T	CALC7R	
C6ET0	A	REFERENCE TEMPERATURE FOR C6E0	K	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6E0	A	ADDITIVE CONSTANT FOR CLADDING MATERIAL EMISSIVITY FUNCTION (5-23) AND (5-24) RE F.1	-	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6E1	A	FIRST ORDER COEF. FOR CLADDING MATERIAL EMISSIVITY FUNCTION (5-24) REF.1	1/K	DATAC6	CALC7R LIST9R	READ9R BLKDTR	M-60
C6KF	A	PARAMETERS USED IN CALCULATING CLADDING THERMAL CONDUCTIVITY FOR EACH SLICE TYPE		VD9V	GAMA5T GAMA5S	CALC7R	
C6K0	A	ADDITIVE CONSTANT FOR CLADDING MATERIAL THERMAL CONDUCTIVITYFUNCTION (5-19) REF. 1	W/(M*K)	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6K1	A	FIRST ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITYFUNCTION (5-19) REF. 1	W/(M*K2)	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6K2	A	SECOND ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) RE F.1	W/(M*K3)	DATAC6	LIST9R CALC7R	BLKDTR READ9R	M-60
C6K3	A	THIRD ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF .1	W/(M*K4)	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C6RE	S	CRITICAL REYNOLDS NUMBER AT REGIME TRANS ITION	-	DATF6V	FRIC6C	BLKDAT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C6TMLT	A	CLADDING MATERIAL MELTING TEMP.	K	DATAC6	CALC7R LIST9R	BLKDTR READ9R	M-60
C7AF	A	PARAMETERS USED IN CALCULATING STRUCTURA L THERMAL EXPANSION COEF. FOR EACH SLICE		VD9V	ALFA5S ALFA5T	CALC7R	
C7A0	A	ADDITIVE CONSTANT FOR STRUCTURAL MATERIA L COEF. OF THERMAL EXPANSION FTION (5-21) REF.1	M/(M*K)	DATAC7	ALFA7A LIST9R CALC7R	READ9R BLKDAT	M-70
C7A1	A	FIRST ORDER COEF. FOR STRUCTURAL MATERIA L COEF. OF THERMAL EXPANSION FTION (5-21) REF.1	M/(M*K2)	DATAC7	LIST9R ALFA7A CALC7R	READ9R BLKDAT	M-70
C7A2	A	SECOND ORDER COEF. FOR STRUCTURAL MATERI AL COEF. OF THERMAL EXPANSION FUNCTION (5-21) REF.1	M/(M*K3)	DATAC7	LIST9R CALC7R ALFA7A	BLKDAT READ9R	M-70
C7CF	A	PARAMETERS USED IN CALCULATING STRUCTURA L SPECIFIC HEAT CAPACITY FOR EACH SLICE		VD9V	STEM5T	CALC7R	
C7C0	A	ADDITIVE CONSTANT FOR STRUCTURAL MATERIA L SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K)	DATAC7	LIST9R CALC7R HCAP7C	READ9R BLKDAT	M-70
C7C1	A	FIRST ORDER COEF. FOR STRUCTURAL MATERIA L SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K2)	DATAC7	CALC7R HCAP7C LIST9R	READ9R BLKDAT	M-70
C7C2	A	SECOND ORDER COEF. FOR STRUCTURAL MATERI AL SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K3)	DATAC7	CALC7R HCAP7C LIST9R	BLKDAT READ9R	M-70
C7C3	A	THIRD ORDER COEF. FOR STRUCTURAL MATERIA L SPEC. HEAT CAP. FUNCTION (5-20) REF.1	J/(KG*K4)	DATAC7	LIST9R HCAP7C CALC7R	READ9R BLKDAT	M-70
C7DF	A	PARAMETER USED TO CALCULATE STRUCTURAL D ENSITY FOR EACH SLICE TYPE		VD9V	STEM5T STEM5S	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C7DT0	A	TEMP. AT WHICH REFERENCE DENSITY IS SPEC IFIED (5-22) REF.1	K	DATAC7	CALC7R LIST9R DENS7D	READ9R BLKDAT	M-70
C7D0	A	ADDITIVE CONSTANT FOR STRUCTURAL MATERIA L DENSITY FUNCTION (5-22) REF.1	KG/M3	DATAC7	DENS7D CALC7R LIST9R	BLKDAT READ9R	M-70
C7KF	A	PARAMETERS USED TO CALCULATE STRUCTURAL THERMAL CONDUCTIVITY FOR EACH SLICE TYPE		VD9V	STEM5S STEM5T	CALC7R	
C7K0	A	ADDITIVE CONSTANT FOR STRUCTURAL MATERIA L THERMAL CONDUCTIVITY FUNCTION (5-19) R EF.1	W/(M*K)	DATAC7	CALC7R IHX1S COND7K LIST9R	BLKDAT READ9R	M-70
C7K1	A	FIRST ORDER COEF. FOR STRUCTURAL MATERIA L THERMAL CONDUCTIVITY FUNCTION (5-19) R EF.1	W/(M*K2)	DATAC7	IHX1S LIST9R COND7K CALC7R	BLKDAT READ9R	M-70
C7K2	A	SECOND ORDER COEF. FOR STRUCTURAL MATERI AL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1	W/(M*K3)	DATAC7	COND7K CALC7R IHX1S LIST9R	READ9R BLKDAT	M-70
C7K3	A	THIRD ORDER COEF. FOR STRUCTURAL MATERIA L THERMAL CONDUCTIVITY FUNCTION (5-19) R EF.1	W/(M*K4)	DATAC7	CALC7R COND7K IHX1S LIST9R	READ9R BLKDAT	M-70
C8FCVG	S	CONVERGENCE CRITERION WITHIN WHICH F5GAS FOR EACH CHANNEL MUST ADD UP TO	-	BNDS7R	VRFY7R	BLKDTR	
C8K1	A	FIRST ORDER COEF. FOR COVER GAS THERMAL CONDUCTIVITY FUNCTION	W/(M*K)	DATAC8	CALC7R LIST9R	READ9R BLKDTR	M-80
C8K2	A	SECOND ORDER COEF. FOR COVER GAS THERMAL CONDUCTIVITY FUNCTION	W/(M*K2)	DATAC8	LIST9R CALC7R	BLKDTR READ9R	M-80

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C8K3	A	THIRD ORDER COEF. FOR COVER GAS THERMAL CONDUCTIVITY FUNCTION	W/(M*K3)	DATAC8	CALC7R LIST9R	BLKDTR READ9R	M-80
C9BOLZ	S	STEFAN-BOLTZMANN CONSTANT	W/(M2*K4)	DATC9V	GAMA5S GAMA5T	BLKDAT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C9GRAV	S	GRAVITATIONAL ACCELERATION	M/S2	DATC9V	RES1T	BLKDAT	
					PUMP1T		
					PIPW1T		
					RES2S		
					UPLN6T		
					UPLN6S		
					HYDR1T		
					LPLN6T		
					TANK2S		
					CORE6S		
					FLOW6T		
					SPHT2S		
					RES2T		
					PIPE2S		
					PUMP2T		
					LPLN6S		
					PIPW2T		
					COEF6T		
					PUMP2S		
					TANK2T		
					RES1S		
					SPHT2T		
					PINT1S		
					PUMP1S		
					EVAP2T		
					INIT1T		
					HYDR1S		
					PUMP3T		
					DPFG3S		
					DPFT3S		
					GVSL1T		
					PUMP3S		
					DPFG3T		
					DPFT3T		
					PIPE1S		
					HX3T		
					EVAP2S		
					OPTN6S		
					INIT2T		

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
C9PI	S	PI	-	DATC9V	DPFG3S PIPE3S IHX1S INIT1T VJ1T PRET1T FRIC6C CALC1R INIT6T PUMP1T TUBE3T HX3T PIPE3T COEF6T HX3S FUEL5S TSAV5S FRAD5S PROP6T TSAV5T STEM5T DOPP5T STEM5S FRAD5T GROW5T CORE6S	BLKDAT	
C9RGAS	S	GAS CONSTANT FOR COVER GAS	M2/(S2*K)	DATC9V	UPLN6T RES2T TANK2S RES2S INIT6T RES1T INIT1T TANK2T RES1S	BLKDAT	
D1RHOT	S	DENSITY OF IHX TUBE MATERIAL	KG/M3	A1TCV	PRET1T	PRET1T	
D1RHOW	S	DENSITY OF PRIMARY PIPE WALL	KG/M3	A1TCV	PRET1T	PRET1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
D1RHO	A	COOLANT DENSITY AT PRIMARY PUMP INLET	KG/M3	VD9V	WRIT1T PIPE1T INIT1T PUMP1T RES1T	INIT1T RES1T	
D2RHOW	S	DENSITY OF SECONDARY PIPE WALL	KG/M3	A2TCV	PRET1T	PRET1T	
D2RHO	A	COOLANT DENSITY AT INTERMEDIATE PUMP INL ET	KG/M3	VD9V	PUMP2T RES2T INIT2T	RES2T INIT2T	
D2TANK	A	COOLANT DENSITY IN SURGE TANK	KG/M3	VD9V	INIT2T TANK2T	INIT2T TANK2T	
D5COOL	A	SODIUM DENSITY AT AXIAL NODAL INTERFACES FOR VOID REACTIVITY CALCULATIONS	KG/M3	VD9V	DOPP5T	INIT5T	
D6COOL	A	DENSITY OF SODIUM IN EACH CORE CHANNEL A T EACH NODAL INTERFACE	KG/M3	VD9V	COEF6T CORE6T	PROP6T	
E1BYP	A	ENTHALPY OF IHX PRIMARY BYPASS FLOW	J/KG	VD9V	IHX1T	PRET1T IHX1T	
E1DOWN	A	COOLANT ENTHALPY IN IHX DOWNCOMER	J/KG	VD9V	IHX1T	IHX1T PRET1T	
E1INHX	A	ENTHALPY OF COOLANT ENTERING IHX PRIMARY SIDE	J/KG	VD9V	END1T IHX1T	END1T LOOP1S IHX1T	
E1INP	A	COOLANT ENTHALPY AT PRIMARY PUMP INLET	J/KG	VD9V		RES1T	
E1NAS	A	ENTHALPY OF COOLANT AT EACH NODE OF SECO NDARY SIDE OF IHX	J/KG	VD9V	IHX1T	IHX1T LOOP1S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
E1NA	A	PRIMARY COOLANT ENTHALPY AT EACH NODE	J/KG	VD9V	LOOP1S END1T RSET1T PIPE1T IHX1T LOOP1T	LOOP1S RSET1T PIPE1T IHX1T	
E1OUHX	A	ENTHALPY OF COOLANT EXITING IHX PRIMARY SIDE	J/KG	VD9V	IHX1T END1T	IHX1T END1T LOOP1S	
E1PNAS	A	TEMPORARY ARRAY USED TO STORE ADVANCED T IME COOLANT ENTHALPY IN IHX SECONDARY SI DE	J/KG	VD9V	IHX1T	IHX1T	
E1PNA	A	TEMPORARY ARRAY USED TO STORE ADVANCED T IME PRIMARY COOLANT ENTHALPY	J/KG	VD9V	END1T PIPE1T IHX1T	LOOP1T END1T PIPE1T IHX1T	
E1PUMP	A	ENTHALPY RISE ACROSS PRIMARY PUMP	J/KG	VD9V	PUMP1T END1T WRIT1T	PUMP1T LOOP1S	
E2INEV	A	ENTHALPY OF COOLANT ENTERING EVAPORATOR SHELL SIDE	J/KG	VD9V	LOOP2T END2T	LOOP2S LOOP2T	
E2INHX	A	ENTHALPY OF COOLANT ENTERING IHX SECONDA RY SIDE	J/KG	VD9V	IHX1T END2T	LOOP2S IHX1T END2T	
E2INP	A	COOLANY ENTHALPY AT SECONDARY PUMP INLET	J/KG	VD9V		RES2T	
E2INSH	A	ENTHALPY OF COOLANT ENTERING SUPERHEATER SHELL SIDE	J/KG	VD9V	END2T LOOP2T	LOOP2S LOOP2T	
E2NA	A	SECONDARY COOLANT ENTHALPY	J/KG	VD9V	LOOP2S PIPE2T LOOP2T END2T RSET2T	LOOP2S PIPE2T RSET2T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
E2OUEV	A	ENTHALPY OF COOLANT EXITING EVAPORATOR S HELL SIDE	J/KG	VD9V	LOOP2T	LOOP2T INTF3T LOOP2S	
E2OUHX	A	ENTHALPY OF COOLANT EXITING IHX SECONDAR Y SIDE	J/KG	VD9V	LOOP2T IHX1T	LOOP2T IHX1T LOOP2S	
E2OUSH	A	ENTHALPY OF COOLANT EXITING SUPERHEATER SHELL SIDE	J/KG	VD9V	LOOP2T	INTF3T LOOP2S	
E2PNA	A	TEMPORARY ARRAY USED TO STORE INTERMEDIA TE COOLANT ENTHALPY AT ADVANCE TIME	J/KG	VD9V	PIPE2T LOOP2T END2T	PIPE2T LOOP2T END2T	
E2PUMP	A	ENTHALPY RISE ACROSS INTERMEDIATE PUMP	J/KG	VD9V	WRIT2T END2T PUMP2T	LOOP2S PUMP2T	
E3CONV	S	RELATIVE CONVERGENCE CRITERION FOR STEAM GENERATOR ENTHALPY CALCULATION	-	DATI3V	HX3S TUBE3T HXND3S	CALC3R	S-1002
E3DSGN	S	DESIGN TURBINE INLET ENTHALPY	J/KG	IHX3SV	LIST8R FEED3S	READ8R	O-1
E3FILL	A	FEEDWATER ENTHALPY FOR EACH STEAM GENERA TOR	J/KG	VD9V	STMP3S PRNT9S STGN3S	FEED3S STMP3S STGN3S	
E3FWMN	S	MINIMUM FEEDWATER ENTHALPY	J/KG	DATP3V	INFS3T FEED3T	CALC3R	S-401
E3INSL	A	INLET WATER SIDE ENTHALPY OF EACH FLOW S EGMENT FOR EACH SODIUM LOOP	J/KG	DATI3V	WFLO3S INIT3S	STMP3S	
E3OT	A	WATER SIDE OUTLET ENTHALPY OF HEAT EXCHA NGER	J/KG	DATI3V	HX3S	INIT3R CALC3R	S-301

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
E3OUTC	S	CALCULATED TURBINE INLET ENTHALPY	J/KG	IHX3SV	STGN3S PBAL9S PRNT9S	STGN3S	
E3TURB	S	DESIRED TURBINE INLET ENTHALPY	J/KG	DATI3V	PBAL9S CALC8R FEED3S LIST8R STGN3S HX3S VRFY8R	PBAL9S CALC8R READ8R	O-2
E3VOL	A	SPECIFIC ENTHALPY IN EACH ACCUMULATOR	J/KG	VD9V	INFS3T ACCM3T STMP3S STGN3T PRNT3T STGN3S	STGN3T VOL3S STGN3S	
E3WSSG	A	WATER SIDE ENTHALPY IN EACH NODE OF EACH FLOW SEGMENT	J/KG	VD9V	PRNT3T IKFS3T PRNT9S PIPE3T HX3T PUMP3T INFS3T STGN3T INIT3S STGN3S ACCM3T VOL3S PRNT3S WFLO3S TUBE3T	STGN3T INIT3S STGN3S VOL3S PUMP3S HX3S PIPE3S	
E3WSTB	A	ENTHALPY OF STEAM IN EACH NODE OF THE TU RBINE FLOW SEGMENT	J/KG	VD9V	STGN3T INIT3S PRNT3S VOL3S ACCM3T STGN3S PRNT9S IKFS3T PRNT3T PIPE3T	STGN3T INIT3S VOL3S PIPE3S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
E6AVER	S	FLOW WEIGHTED AVERAGE CORE EXIT SODIUM E NTHALPY	J/KG	DAT36V	UPLN6T INIT6T CORE6T	UPLN6S CORE6T	
E6BPAS	S	AVERAGE ENTHALPY IN LOWER REGION OF BYPA SS CHANNEL	J/KG	DAT36V	UPLN6S CORE6T	UPLN6S CORE6T	
E6BPLI	S	SODIUM ENTHALPY AT INLET TO LOWER BYPASS REGION	J/KG	DATI6V	LPLN6T CORE6T UPLN6S	CORE6T UPLN6S	
E6BPUE	S	SODIUM ENTHALPY AT EXIT OF UPPER BYPASS REGION	J/KG	DATI6V	UPLN6T	INIT6T CORE6T	
E6BPUI	S	SODIUM ENTHALPY AT INLET TO UPPER BYPASS REGION	J/KG	DATI6V	UPLN6S CORE6T UPLN6T	UPLN6S CORE6T	
E6INLT	S	VESSEL SODIUM INLET ENTHALPY AT STEADY S TATE	J/KG	DAT36V	UPLN6S COOL6S INIT6T	UPLN6S COOL6S	
E6LPN	S	ENTHALPY OF SODIUM IN VESSEL LOWER PLENU M	J/KG	DATT6V	LPLN6T	LPLN6T INIT6T	
E6LPV	A	VESSEL SODIUM OUTLET ENTHALPY TO EACH LO OP	J/KG	VD9V		COOL6T	
E6NAA	S	ENTHALPY OF SODIUM IN UPPER MIXING ZONE OF UPPER OUTLET PLENUM	J/K2	DAIN6V	UPLN6T	INIT6T UPLN6T	
E6NAB	S	ENTHALPY OF SODIUM IN LOWER MIXING ZONE OF UPPER OUTLET PLENUM	J/K2	DAIN6V	UPLN6T	INIT6T UPLN6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
E6NODE	A	SODIUM ENTHALPY AT EACH AXIAL NODAL INTE RFACE IN EACH CHANNEL	J/KG	VD9V	LPLN6T COOL6S CORE6S CORE6T PRNT6T UPLN6S	CORE6S CORE6T LPLN6S	
E6OUTL	S	VESSEL SODIUM OUTLET ENTHALPY	J/KG	DAT16V	UPLN6S COOL6S INIT6T	UPLN6S	
F1BETA	A	PRIMARY BYPASS FRACTION THROUGH EACH IHX	-	VD9V	HYDR1T HYDR1S CALC1R IHX1T LIST1R IHX1S	CALC1R READ1R	N-1002
F1CVAL	A	CHECK VALVE CHARACTERISTIC COEFFICIENTS	M4	DATA1V	CVAL1T CVAL1S LIST1R	READ1R	N-111
F1EMXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR LOOP THERMAL CALCULATIONS	-	TLUP1V	VRFY9T LIST9T	READ9T	T-9002
F1EPST	A	RELATIVE ACCURACY CRITERION FOR TRANSIEN T COOLANT HYDRAULICS VARIABLES	-	VD9V	INTG1T	INIT1T PRNT9T	
F1EPS	S	ROUGHNESS OF PRIMARY LOOP PIPING	M	DATA1V	PIPW1T LIST1R PIPE1S	READ1R	N-105
F1GVP	A	PUMP G.V. VOLUME TO LEVEL COEF. (I = 1, 3)	-	GVSL1V	LIST9T INIT1T	READ9T	T-1003
F1GVR	A	R.V. G.V. VOLUME TO LEVEL COEF. (I = 1, 3)	-	GVSL1V	LIST9T INIT1T	READ9T	T-1003
F1GVX	A	IHX G.V. VOLUME TO LEVEL COEF. (I = 1, 3)	-	GVSL1V	LIST9T INIT1T	READ9T	T-1003

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F1GV	A	GUARD VESSEL VOLUME TO-LEVEL COFFICIENT	-	VD9V	GVSL1T	INIT1T	
F1HED	A	PRIMARY PUMP HEAD COFFICIENTS	-	A1TCV	HEAD1T	BLKDAT	
F1ICDA	S	RELATIVE INTERFACE CONDITION ACCEPTANCE LIMIT FOR LOOP HYDRAULIC CALCULATIONS	-	TLUP1V	LIST9T	READ9T	T-9003
F1INR	S	LOSS COEFFICIENT FOR IHX PRIMARY INLET (REVERSE FLOW)	-	A1TCV	HYDR1T	CALC1R	
F1IN	S	PRIMARY INLET LOSS COEFFICIENT FOR IHX	-	DATX1V	LIST1R HYDR1T HYDR1S	READ1R	N-101
F1LOSS	A	LOSS COEFFICIENT FOR EACH PIPE IN EACH P RIMARY LOOP	-	VD9V	RSET1T PIPW1T VRFY9T LIST1R VRFY1R RITE1S INIT1T HYDR1T LOOP1S HYDR1S PIPE1S	RSET1T READ1R LOOP1S HYDR1S	N-1101
F1LSBK	A	LOSS COEFFICIENT AT PRIMARY BREAK	-	VD9V	INIT1T VRFY9T RSET1T LIST9T	READ9T INIT1T	T-1003
F1LUMP	A	NUMBER OF ACTUAL LOOOPS IN EACH SIMULATE D LOOP	-	VD9V	STOR1T VESL1T DRIV9T COOL6T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F1MAXD	S	MAXIMUM RELATIVE DEVIATION OF ANY LOOP T HERMAL VARIABLE DURING THE CURRENT TIMES TEP	-	TLUP1V	IHX1T PIPE1T PIPE2T DRIV9T	IHX1T PIPE1T PIPE2T DRIV9T	
F1MAXN	S	NAME OF LOOP THERMAL ARRAY CURRENTLY RES TRICTING SIDELT	-	TLUP1V	DRIV9T	PIPE2T PIPE1T IHX1T	
F1MXDW	S	MAXIMUM RELATIVE DEVIATION OF ANY LOOP H YDRAULIC VARIABLE DURING CURRENT TIMESTE P	-	INTG9V		INIT9T	
F1OUTR	S	PRIMARY OUTLET LOSS COEFFICIENT FOR IHX (REVERSE FLOW)	-	A1TCV	HYDR1T	CALC1R	
F1OUT	S	PRIMARY OUTLET LOSS COEFFICIENT FOR IHX	-	DATX1V	CALC1R HYDR1S LIST1R HYDR1T	READ1R	N-101
F1POD	S	PITCH-TO-DIAMETER RATIO FOR IHX TUBE BUN DLE	-	DATX1V	LIST1R ANUS1U CALC1R	READ1R	N-100
F1PUMP	A	COEFFICIENTS IN POLYNOMIAL EQUATION FOR PRIMARY PUMP HEAD	-	DATA1V	LIST1R PUMP1S CALC1R	READ1R	N-110
F1TFRI	A	PUMP FRICTIONAL TORQUE COEFFICIENTS	-	A1TCV	TORK1T	BLKDAT	
F1THIK	A	COEFFICIENTS OF FUNCTION FOR OVERALL HEA T TRANSFER	-	VD9V	PIPE1T	PRET1T	
F1TORK	A	PRIMARY PUMP TORQUE COEFFICIENTS	-	A1TCV	TORK1T	BLKDAT	
F1UNCG	A	TIME RATE OF CHANGE OF V1GV	M3/S	VD9V	EQIV1T	GVSL1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F1UNCL	A	TIME RATE OF CHANGE OF ZIRHO	KG/(M2*S)	VD9V	EQIV1T	RES1T	
F1UNCP	A	TIME RATE OF CHANGE OF PRIMARY PUMP SPEE D	RPM/S	VD9V	PUMP1T EQIV1T	PUMP1T	
F1UNC1	A	TIME RATE OF CHANGE OF W1ONE	KG/S2	VD9V	FUNC1T EQIV1T	FUNC1T	
F1UNC2	A	TIME RATE OF CHANGE OF W1TWO	KG/S2	VD9V	EQIV1T FUNC1T	FUNC1T	
F1UNC3	A	TIME RATE OF CHANGE OF W1THRE	KG/S2	VD9V	FUNC1T EQIV1T	FUNC1T	
F1WMXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR LOOP HYDRAULIC CALCULATIONS	-	TFLO1V	LIST9T VRFY9T VJ1T	READ9T	T-9002
F2CONT	S	LOSS COEFFICIENT FOR CONTRACTION FROM IN LET PLENUM TO TUBES IN IHX	-	DAT12V	HYDR1T LIST1R HYDR1S	READ1R	N-101
F2EPS	S	ROUGHNESS OF INTERMEDIATE LOOP PIPING PIPING	M	DATA2V	LIST1R PIPE2S PIPW2T	READ1R	N-105
F2EV	A	LOSS COEFFICIENT FOR SHELL SIDE OF EACH EVAPORATOR	-	VD9V	LOOP2S EVAP2T EVAP2S VRFY1R RITE2S LIST1R	LOOP2S READ1R EVAP2S	N-1003
F2EXPN	S	LOSS COEFFICIENT FOR EXPANSION FROM TUBE S TO OUTLET REGION IN IHX	-	DAT12V	LIST1R HYDR1T HYDR1S	READ1R	N-101
F2HED	A	INTERMEDIATE PUMP HEAD COEFFICIENT	-	A2TCV	HEAD2T	BLKDAT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F2IHXR	S	INLET LOSS COEFFICIENT TO IHX SECONDARY SIDE (REVERSE FLOW)	-	A2TCV	HYDR1T	CALC1R	
F2INEV	S	INLET LOSS COEFFICIENT TO EVAPORATOR SHELL SIDE	-	DATE2V	EVAP2T RITE2S LIST1R EVAP2S	READ1R	N-120
F2INHX	S	INLET LOSS COEFFICIENT TO IHX SECONDARY SIDE	-	DAT12V	CALC1R HYDR1T HYDR1S LIST1R	READ1R	N-101
F2INSH	S	INLET LOSS COEFFICIENT TO SUPERHEATER SHELL SIDE	-	DATS2V	RITE2S SPHT2T LIST1R SPHT2S	READ1R	N-121
F2LOSS	A	LOSS COEFFICIENT FOR EACH PIPE IN EACH INTERMEDIATE LOOP	-	VD9V	LOOP2S PIPE2S RITE2S RSET2T INIT1T LIST1R VRFY9T PIPW2T	LOOP2S RSET2T READ1R	N-1201
F2LOSX	A	LOSS COEFFICIENT FOR SECONDARY SIDE OF EACH IHX	-	VD9V	LIST1R HYDP1S HYDR1T LOOP1S VRFY1R	READ1R HYDR1S LOOP1S	N-1003
F2LSBK	A	LOSS COEFFICIENT AT SECONDARY BREAK	-	VD9V	INIT1T VRFY9T RSET2T LIST9T	READ9T INIT1T	T-1201
F2OHXR	S	OUTLET LOSS COEFFICIENT OF IHX SECONDARY SIDE (REVERSE FLOW)	-	A2TCV	HYDR1T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F2OUEV	S	OUTLET LOSS COEFFICIENT FOR EVAPORATOR S HELL SIDE	-	DATE2V	LIST1R EVAP2S EVAP2T RITE2S	READ1R	N-120
F2OUHX	S	OUTLET LOSS COEFFICIENT FROM IHX SECONDA RY SIDE	-	DAT12V	LIST1R CALC1R HYDR1S HYDR1T	READ1R	N-101
F2OUSH	S	OUTLET LOSS COEFFICIENT FOR SUPERHEATER SHELL SIDE	-	DATS2V	SPHT2T RITE2S LIST1R SPHT2S	READ1R	N-121
F2PREV	A	ARRAY TO STORE CERTAIN PREVIOUSLY CONVER GED STEADY STATE RESULTS FOR A SUBSEQUEN T RESTART		PREV2V	CALC8R	PBAL9S	
F2PUMP	A	COEFFICIENTS IN POLYNOMIAL EQUATION FOR PUMP HEAD	-	DATA2V	PUMP2S	CALC1R	
F2SH	A	LOSS COEFFICIENT FOR SHELL SIDE OF EACH SUPERHEATER	-	VD9V	RITE2S SPHT2T LOOP2S VRFY1R LIST1R SPHT2S	LOOP2S READ1R SPHT2S	N-1003
F2TFRI	A	PUMP FRICTIONAL TORQUE COEFFICIENT	-	A2TCV	TORK2T	BLKDAT	
F2THIK	A	FUNCTION FOR OVERALL HEAT TRANSFER COEFF ICIENTS	-	VD9V	PIPE2T	PRET1T	
F2TORK	A	TORQUE COEFFICIENTS	-	A2TCV	TORK2T	BLKDAT	
F2UNCL	A	TIME RATE OF CHANGE OF PUMP SPEED	RPM/S	VD9V	EQIV2T	RES2T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F2UNCP	A	TIME RATE OF CHANGE OF Z2RHO	KG/(K2*S)	VD9V	PUMP2T EQIV2T	PUMP2T	
F2UNCT	A	TIME RATE OF CHANGE OF Z2RTNK	KG/(M2*S)	VD9V	EQIV2T	TANK2T	
F2UNC1	A	TIME RATE OF CHANGE OF W2ONE	KG/S2	VD9V	FUNC2T EQIV2T	FUNC2T	
F2UNC2	A	TIME RATE OF CHANGE OF W2TWO	KG/S2	VD9V	FUNC2T EQIV2T	FUNC2T	
F2UNC3	A	TIME RATE OF CHANGE OF W2THRE	KG/S2	VD9V	FUNC2T EQIV2T	FUNC2T	
F3AQ	A	AREA CORRECTION FACTOR FOR HEAT EXCHANGE RS	-	DATG3V	HX3T HX3S PRNT9S TUBE3T	HX3S CALC3R INIT3R	S-301
F3DEWP	S	MAXIMUM FRACTIONAL CHANGE IN ENTHALPY DU RING PREVIOUS TIME STEP	-	DATT3V	TMSG3T	INIT3T TMSG3T	
F3DEWS	S	MAXIMUM FRACTIONAL CHANGE IN ENTHALPY DU RING TIME STEP	-	DATT3V	TMSG3T PRNT3T	INIT3T STGN3T	
F3DPSP	S	MAXIMUM FRACTIONAL CHANGE IN PRESSURE DU RING PREVIOUS TIME STEP	-	DATT3V	TMSG3T	TMSG3T INIT3T	
F3DPS	S	MAXIMUM FRACTIONAL CHANGE IN PRESSURE DU RING TIME STEP	-	DATT3V	PRNT3T TMSG3T	INIT3T STGN3T	
F3DWWP	S	MAXIMUM FRACTIONAL CHANGE IN FLOW RATE D URING PREVIOUS TIME STEP	-	DATT3V	TMSG3T	INIT3T TMSG3T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F3DWWS	S	MAXIMUM FRACTIONAL CHANGE IN FLOW RATE D URING TIME STEP	-	DATT3V	PRNT3T TMSG3T	INIT3T STGN3T	
F3EMXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR STEAM GENERATOR ENTHALPY CALCULATIONS	-	DATT3V	STGN3T INIT3T LIST9T	READ9T	T-9002
F3ENFW	A	COEFFICIENTS OF POLYNOMIAL FIT OF FEEDWA TER ENTHALPY AS A FUNCTION OF NORMALIZED FEEDWATER FLOW	-	DATP3V	ACCM3T INFS3T FEED3T FEED3S STMP3S	INIT3R CALC3R	S-401
F3ICDA	S	RELATIVE INTERFACE CONDITION ACCEPTANCE LIMIT FOR STEAM GENERATOR CALCULATIONS	-	DATT3V	LIST9T	READ9T	T-9003
F3INLV	A	RELATIVE HEIGHT OF K-TH EXIT NOZZLE	-	DATG3V	INFS3T STMP3S	CALC3R INIT3R	S-101
F3IPMP	A	TWO-PHASE MULTIPLIER FOR INLET PLENUM LO SS COEFFICIENT FOR EACH STEAM GENERATOR HEAT EXCHANGER	-	DATG3V	HX3S HX3T	CALC3R INIT3R	S-301
F3JUNC	A	JUNCTION PARAMETER AT EXIT OF PIPE	-	VD9V	PIPE3S PIPE3T WFLO3S	INIT3R CALC3R	S-1
F3LQLV	A	RELATIVE LIQUID LEVEL IN ACCUMULATOR	-	DATI3V	PRNT3S PRNT9S STMP3S VOL3S	CALC3R	S-101
F3OPMP	A	TWO-PHASE MULTIPLIER FOR OUTLET PLENUM L OSS COEFFICIENT FOR HEAT EXCHANGER	-	DATG3V	HX3S HX3T	CALC3R INIT3R	S-301
F3PMXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR STEAM GENERATOR PRESSURE CALCULATIONS	-	DATT3V	INIT3T LIST9T STGN3T	READ9T	T-9002

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F3PSFW	A	COEFFICIENT OF POLYNOMIAL FIT OF FEEDWATER PRESSURE AS A FUNCTION OF NORMALIZED FEEDWATER FLOW	-	DATP3V	STMP3S PRNT9S FEED3T PSFW3T	CALC3R INIT3R	S-401
F3PWIP	A	INLET PLENUM PRESSURE LOSS COEFFICIENT FOR HEAT EXCHANGER	-	DATG3V	HX3S HX3T PRNT3S	HX3S CALC3R INIT3R	S-301
F3PWMP	A	TWO PHASE MULTIPLIER FOR LOSS COEFFICIENT OF FITTING AT EXIT OF PIPE	-	VD9V	PIPE3T PIPE3S	CALC3R INIT3R	S-1
F3PWOP	A	OUTLET PLENUM LOSS COEFFICIENT FOR HEAT EXCHANGER	-	DATG3V	PRNT3S HX3T HX3S	INIT3R CALC3R HX3S	S-301
F3PW	A	PRESSURE LOSS COEFFICIENT FOR FITTING AT EXIT OF PIPE	-	VD9V	PRNT3S PIPE3T PIPE3S	INIT3R CALC3R PIPE3S	S-1
F3QLCV	S	RELATIVE CONVERGENCE CRITERION FOR STEAM GENERATOR WATER QUALITY CALCULATION	-	DATI3V	HX3S	CALC3R	S-1002
F3QUAL	A	WATER SIDE OUTLET QUALITY OF HEAT EXCHANGER	-	DATI3V	HX3S	CALC3R INIT3R	S-301
F3TBPD	A	PITCH TO OUTER DIAMETER RATIO FOR TUBE BUNDLE IN HEAT EXCHANGER	-	DATG3V	HX3S TUBE3T CALC1R HX3T	INIT3R CALC3R	S-301
F3WMXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR STEAM GENERATOR FLOW CALCULATIONS	-	DATT3V	INIT3T STGN3T LIST9T	READ9T	T-9002
F3ZW	S	COEFFICIENT OF PUMP HEAD VARIATION WITH FLOW	-	DATP3V	PUMP3T PUMP3S	CALC3R	S-201

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F3ZY	A	SURFACE ROUGHNESS TO DIAMETER RATIO FOR PIPES AND HEAT EXCHANGER TUBES	-	VD9V	TUBE3T HX3S PIPE3S PIPE3T HX3T	CALC3R INIT3R	S-1
F5AWGT	A	MESH WEIGHTED FUEL AXIAL EXPANSION REACT .COEF. FOR CHANNEL K	R/KG	VD9V	GROW5T LIST9T	READ9T	T-5501
F5BDOP	A	MESH WEIGHTED DOPPLER REACT.COEF. WITH S ODIUM PRESENT FOR CHANNEL K	R	VD9V	DOPP5T LIST9T	READ9T	T-5201
F5BETA	A	FRACTION OF I-TH EFFECTIVE DELAYED NEUTR ON GROUP	-	DATD5V	LIST9T PRMT5T INIT5T	READ9T	T-5003
F5BETT	S	SUMMATION OF F5BETA(I)	-	DATD5V	PRMT5T INIT5T	INIT5T	
F5CREF	S	RELATIVE CONVERGENCE CRITERION FOR STEAD Y STATE FUEL CALCULATIONS	-	DAT25V	CALC7R	BLKDAT	
F5CRIT	A	CONVERGENCE CRITERION FOR EACH SLICE TYP E (SET EQUAL TO F5CREF)	-	VD9V	FUEL5S	CALC7R	
F5DAFC	A	FRACTIONAL COLUMNAR GRAIN DENSITY OF ACT IVE FUEL FOR EACH ROD TYPE	-	VD9V	LIST7R REPT9R TYPE5R CALC7R	READ7R	V-101
F5DAFE	A	FRACTIONAL EQUIAXED GRAIN DENSITY OF ACT IVE FUEL FOR EACH ROD TYPE	-	VD9V	CALC7R TYPE5R REPT9R LIST7R	READ7R	V-101
F5DAFU	A	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF ACTIVE FUEL FOR EACH ROD TYPE	-	VD9V	LIST7R REPT9R CALC7R TYPE5R	READ7R	V-101

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F5DLBC	A	FRACTIONAL COLUMNAR GRAIN DENSITY OF LOW ER BLANKET FOR EACH ROD TYPE	-	VD9V	LIST7R REPT9R CALC7R TYPE5R	READ7R	V-101
F5DLBE	A	FRACTIONAL EQUIAXED GRAIN DENSITY OF LOW ER BLANKET FOR EACH ROD TYPE	-	VD9V	CALC7R REPT9R TYPE5R LIST7R	READ7R	V-101
F5DLBU	A	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF LOWER BLANKET FOR EACH ROD TYPE	-	VD9V	TYPE5R LIST7R CALC7R REPT9R	READ7R	V-101
F5DSLC	A	ARRAY FOR STORAGE OF FRACTIONAL DENSITIE S ON A SLICE TYPE BASIS	-	VD9V	CALC7R GAMA5S GAMA5T	REPT9R	
F5DUBC	A	FRACTIONAL COLUMNAR GRAIN DENSITY OF UPP ER BLANKET FOR EACH ROD TYPE	-	VD9V	REPT9R TYPE5R LIST7R CALC7R	READ7R	V-101
F5DUBE	A	FRACTIONAL EQUXIAXED GRAIN DENSITY OF UP PER BLANKET FOR EACH ROD TYPE	-	VD9V	LIST7R CALC7R TYPE5R REPT9R	READ7R	V-101
F5DUBU	A	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF UPPER BLANKET FOR EACH ROD TYPE	-	VD9V	CALC7R LIST7R REPT9R TYPE5R	READ7R	V-101
F5GAS	A	MOLE FRACTION OF EACH FISSION GAS IN EAC H CHANNEL	-	VD9V	GAMA5T VRFY7R LIST7R GAMA5S	READ7R	V-501
F5GDOP	A	MESH WEIGHTED DOPPLER REACT.COEF. W/O SO DIUM PRESENT FOR CHANNEL K	R	VD9V	DOPP5T LIST9T	READ9T	T-5301

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F5MAXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR FUEL CALCULATIONS	-	TFUL5V	LIST9T DRIV9T FUEL5T INIT9T	READ9T	T-9002
F5MAXD	S	MAXIMUM RELATIVE CHANGE OF ANY FUEL VARI ABLE DURING CURRENT TIMESTEP	-	TFUL5V	MAXD5T DRIV9T	MAXD5T DRIV9T	
F5MINA	S	SET EQUAL TO F5MAXA/2	-	TFUL5V	DRIV9T	INIT9T	
F5NORM	A	FUEL POWER NORMALIZATION FACTOR FOR EACH CHANNEL	-	VD9V	COEF5T TEMP5S	CALC7R	
F5PAX	A	AXIAL POWER FRACTION FOR EACH NODE IN EA CH CHANNEL	-	VD9V	CALC7R LIST7R FRAD5S FRAD5T	READ7R CALC7R	V-201
F5PBPD	A	FRACTIONAL TRANSIENT DECAY POWER IN BYPA SS (PAIRED WITH S5PBPD)	-	VD9V	POW6T LIST9T	READ9T	T-5006
F5PCDT	A	TIME RATE OF CHANGE OF F5PREC	1/S	DATD5V		INIT5T PRMT5T	
F5PDCY	A	FRACTIONAL POWER IN EACH CHANNEL DUE TO DECAY HEATING	-	VD9V	POW6T	VRFY9T	
F5PD	A	FRACTIONAL TRANSIENT DECAY POWER IN CHAN NEL K (PAIRED WITH S5PD)	-	VD9V	POW6T LIST9T	READ9T	T-5101
F5PFIS	A	FRACTIONAL POWER IN EACH CHANNEL DUE TO FISSION HEATING	-	VD9V	LIST9T VRFY9T POW6T	READ9T	T-5002
F5PMPL	S	VALUE OF F5PRMT AT PREVIOUS TIMESTEP	-	DATD5V	PRMT5T MAXD5T	POW5T INIT5T FUEL5T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F5PRAD	A	FUEL POWER FRACTION IN EACH RADIAL FUEL NODE IN EACH CHANNEL(NO AXIAL DEPENDENCE)	-	VD9V	FRAD5S FRAD5T LIST7R CALC7R	READ7R CALC7R	V-301
F5PRMT	S	NORMALIZED REACTOR FISSION POWER	-	TFUL5V	PRMT5T POW6T MAXD5T MOVE9T FUEL5T INIT5T POW5T APPL5T	PRMT5T FUEL5T INIT5T	
F5PTOT	A	FRACTION OF TOTAL POWER IN EACH FUEL CHA NNEL (SET EQUAL TO F6TPOW)	W	VD9V	FRAD5T FRAD5S PRNT5T	CALC7R	
F5PWR1	A	FRACTION OF POWER GENERATED IN EACH CHAN NEL DEPOSITED DIRECTLY INTO THE COOLANT	-	VD9V	VRFY7R LIST7R CORE6T	READ7R	V-401
F5PWR5	A	FRACTION OF POWER GENERATED IN EACH CHAN NEL DEPOSITED DIRECTLY INTO THE FUEL	-	VD9V	VRFY7R FRAD5S FRAD5T LIST7R	READ7R	V-401
F5PWR6	A	FRACTION OF POWER GENERATED IN EACH CHAN NEL DEPOSITED DIRECTLY IN THE CLADDING	-	VD9V	FRAD5S LIST7R FRAD5T VRFY7R	READ7R	V-401
F5PWR7	A	FRACTION OF POWER GENERATED IN EACH CHAN NEL DEPOSITED DIRECTLY INTO THE STRUCTUR E	-	VD9V	FRAD5T FRAD5S	VRFY7R	
F5VWGT	A	MESH WEIGHTED SODIUM VOID REACT.COEF. FO R CHANNEL K	R/KG	VD9V	VOID5T LIST9T	READ9T	T-5401
F5WEIT	A	WEIGHTING FACTOR WHEN MAKING CORRECTIONS DURING FUEL TEMPERATURE ITERATIONS	-	VD9V	TEMP5S	CALC7R	
F6CNVG	S	RELATIVE CONVERGENCE CRITERION FOR CERTA IN INPUT DATA	-	BNDS7R		BLKDTR	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F6CONV	S	RELATIVE CONVERGENCE CRITERION FOR CHANN EL FLOW FRACTION OPTION	-	DAT26V	OPTN6S LIST7R	READ7R BLKDAT	V-23
F6FLBP	S	FRACTION OF TOTAL CORE FLOW IN BYPASS CH ANNEL	-	DAT26V	INIT6T OPTN6S UPLN6S PRNT6T COOL6T CORE6T	OPTN6S VRFY7R FLOW6T	
F6FLOW	A	FRACTION OF TOTAL CORE FLOW IN EACH CHAN NEL	-	VD9V	INIT6T VRFY7R LIST7R PRNT5S OPTN6S PRNT6T COOL6T CORE6S	FLOW6T OPTN6S	V-4
F6FRC1	S	FRICTION FACTOR CORRELATION COEF. FOR SO DIUM FLOWING IN VESSEL	-	DATF6V	LIST7R FRIC6C	READ7R BLKDAT	V-30
F6FRC2	S	FRICTION FACTOR CORRELATION COEF. FOR SO DIUM FLOWING IN VESSEL	-	DATF6V	LIST7R FRIC6C	READ7R BLKDAT	V-30
F6FRC3	S	FRICTION FACTOR CORRELATION COEF. FOR SO DIUM FLOWING IN VESSEL	-	DATF6V	FRIC6C	BLKDAT	
F6FRC4	S	FRICTION FACTOR CORRELATION COEF. FOR SO DIUM FLOWING IN VESSEL	-	DATF6V	FRIC6C	BLKDAT	
F6FRIC	A	FRICTION FACTOR FOR EACH AXIAL NODE IN E ACH CHANNEL	-	VD9V	PRNT6T COEF6T COOL6S CORE6S	COEF6T CORE6S	
F6FRNO	S	LOCAL FROUDE NUMBER USED IN UPPER PLENUM JET PENETRATION CALCULATIONS	-	DATT6V		UPLN6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F6ICDA	S	RELATIVE INTERFACE CONDITION ACCEPTANE L IMIT FOR IN-VESSEL COOLANT CALCULATIONS	-	TCUL6V	LIST9T	READ9T	T-9003
F6INBP	S	FLOW LOSS COEFFICIENT AT BYPASS INLET	-	DAT26V	LIST7R UPLN6S FLOW6T	READ7R	V-29
F6LEAK	S	FRACTION OF FLOW LEAKING DIRECTLY INTO U PPER PLENUM FROM LOWER BYPASS REGION	-	DAIN6V	CORE6T LIST7R INIT6T UPLN6S	READ7R	V-28
F6LSA4	A	TOTAL LOSS COEFFICIENT AT TOP OF EACH CH ANNEL	-	VD9V	OPTN6S COEF6T COOL6S LIST7R	UPLN6S	V-23
F6LSA	A	LOSS COEF. FOR AREA EXPANSION IN EACH CH ANNEL, AREA CONTRACTION IN EACH CHANNEL AND ORIFICE OF EACH CHANNEL	-	VD9V	COEF6T LIST7R CORE6S		V-10
F6LSBP	S	BYPASS FLOW LOSS COEF.	-	DAT16V	COOL6S FLOW6T UPLN6S LIST7R	READ7R UPLN6S	V-23
F6MAXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR IN-VESSEL COOLANT CALCULATIONS	-	TCUL6V	LIST9T FLOW6T INIT9T COOL6T	READ9T	T-9002
F6MAXD	S	MAXIMUM RELATIVE DEVIATION OF ANY IN-VES SEL COOLANT PARAMETER DURING CURRENT TIM ESTEP	-	TCUL6V	DRIV9T COOL6T	DRIV9T COOL6T	
F6MINA	S	SET EQUAL TO F6MAXA/2	-	TCUL6V	COOL6T	INIT9T	
F6NAME	S	NAME OF IN-VESSEL COOLANT PARAMETER CURR ENTLY RESTRICTING S6DELT	-	TCUL6V	DRIV9T	COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F6NPWA	A	NORMALIZED AXIAL POWER DISTRIBUTION FOR EACH NODE OF EACH CHANNEL	-	VD9V	CORE6T CORE6S CALC7R	CALC7R	
F6NUC1	S	CORRELATION CONSTANT FOR NUSSELT NUMBER	-	DATN6V	LIST7R FNUS6C	READ7R BLKDAT	V-30
F6NUC2	S	CORRELATION CONSTANT FOR NUSSELT NUMBER	-	DATN6V	FNUS6C LIST7R	BLKDAT READ7R	V-30
F6NUC3	S	CORRELATION CONSTANT FOR NUSSELT NUMBER	-	DATN6V	FNUS6C LIST7R	BLKDAT READ7R	V-30
F6NUC4	S	CORRELATION CONSTANT FOR NUSSELT NUMBER	-	DATN6V	LIST7R FNUS6C	BLKDAT READ7R	V-30
F6PD	A	PITCH TO DIAMETER RATIO FOR EACH ROD TYP E	-	VD9V	LIST7R COEF6T PROP6T CORE6S	READ7R	V-101
F6PTOT	A	TOTAL NORMALIZED POWER FRACTION IN EACH CHANNEL FROM FISSION AND DECAY HEATING	-	VD9V	STEM5T COEF5T CORE6T	POW6T	
F6PWD	A	PITCH TO DIAMETER RATIO FOR WIRE WRAP OF EACH ROD TYPE	-	VD9V	COEF6T LIST7R CORE6S	READ7R	V-101
F6REBP	A	REYNOLDS NUMBER IN BYPASS REGIONS	-	FIX6T	PRNT6T	FLOW6T	
F6RENO	A	AVERAGE REYNOLDS NUMBER IN EACH CHANNEL	-	VD9V	PRNT6T	COEF6T	
F6TPBP	S	FRACTION OF TOTAL POWER DEPOSITED IN BYP ASS CHANNEL	-	DAT36V	VRFY7R CORE6T UPLN6S	VRFY7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
F6TPOW	A	FRACTION OF TOTAL POWER DEPOSITED IN EAC H CHANNEL	-	VD9V	VRFY7R CORE6T PRNT5S CORE6S LIST7R OPTN6S CALC7R	VRFY7R	V-3
F6WSTP	S	MAXIMUM FLOW FRACTION CHANGE ALLOWED PER FLOW FRACTION OPTION ITERATION	-	DAT26V	OPTN6S LIST7R	BLKDAT READ7R	V-23
F9MAXA	S	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR LOOP THERMAL AND HYDRAULIC CALCULATIONS	-	TLUP1V	INIT9T DRIV9T	VRFY9T	
F9MINA	S	SET EQUAL TO F9MAXA/2	-	TLUP1V	DRIV9T	INIT9T	
F9PWRZ	S	FRACTION OF REFERENCE POWER AT T=0	-	DATA8V	LIST8R CALC8R PRNT9S	READ8R	O-1
G6I	A	MASS FLOW RATE PER UNIT AREA OF EACH COO LANT CHANNEL	KG/(S*M2)	VD9V	UPLN6S CORE6T CORE6S OPTN6S	CORE6S OPTN6S	
H1FLP	S	FOULING RESISTANCE ON OUTER(PRIMARY) SUR FACE OF TUBES	(M2-K)/W	DATX1V	LIST1R IHX1T IHX1S	READ1R	N-100
H1FLS	S	FOULING RESISTANCE ON INNER(SECONDARY) S URFACE OF TUBES	(M2-K)/W	DATX1V	IHX1S LIST1R IHX1T	READ1R	N-100
H3FOUL	A	WATER SIDE FOULING HEAT TRANSFER COEFFIC IENT FOR HEAT EXCHANGER	W/(M2*K)	DATG3V	HX3T HX3S TUBE3T	CALC3R INIT3R	S-301
H5NOGP	A	EAT TRANSFER COEF. FOR FUEL-CLAD CONTACT FOR EACH CHANNEL	W/(K*M2)	VD9V	GAMA5S GAMA5T LIST7R		V-20

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
H6ABP	S	OVERALL HEAT TRANSFER COEFICIENT BETWEN UPPER BYPASS REGION SODIUM AND LINER	W/K	DAT26V	CORE6T UPLN6S LIST7R UPLN6T	READ7R	V-29
H6GAS	S	HEAT TRANSFER COEF. FOR COVER GAS IN UPP ER PLENUM	W/(K*M2)	DAT26V	INIT6T LIST7R UPLN6S	READ7R	V-28
H6INF	S	HEAT TRANSFER COEF. AT INTERFACE OF TWO SODIUM ZONES IN UPPER PLENUM	W/(K*M2)	DAIN6V	LIST7R INIT6T	READ7R	V-28
H6LNA	S	HEAT TRANSFER COEFICIENT BETWEEN SODIUM AND METAL IN UPPER PLENUM	W/(K*M2)	DAT26V	UPLN6S INIT6T LIST7R	READ7R	V-28
H6LPUA	S	HEAT TRANSFER COEFFICIENT IN LOWER PLENU M	W/(K*M2)	DAIN6V	LPLN6T LIST7R	READ7R	V-24
H6NODE	A	HEAT TRANSFER COEF. FOR EACH AXIAL NODE OF EACH CHANNEL	W/(K*M2)	VD9V	TFUN5T PRNT6T PRE5S COOL6S	PROP6T CORE6S	
I1FAIL	S	MODE OF PRIMARY CHECK VALVE 0-WORKING; 1-FAILED	-	A1TCI	LIST1R CVALIT	READ1R	N-111
I1TYPE	S	TYPE OF PRIMARY CHECK VALVE	-	A1TCI	LIST1R	READ1R	N-111
I3DNB	A	CONTROL FLAG FOR DNB CALCULATION IN HEAT EXCHANGER	-	DATI3I	HX3S	INIT3R CALC3R	S-301
I3EISL	A	CONTROL FLAG FOR CALCULATION OF ENTHALPY OF FLOW THRU EACH EXIT NOZZLE	-	DATG3I	INFS3T STMP3S	INIT3R CALC3R	S-101
I3MDWS	A	INDEX OF HEAT TRANSFER CORRELATION ON WA TER SIDE OF EACH HEAT EXCHANGER	-	VD9V	PRNT3S PRNT3T	HX3S TUBE3T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
I3PRNT	S	CONTROL FLAG FOR STEAM GENERATOR PRINT O PTIONS	-	IHX3SI	LIST8R PRNT3S PBAL9S	READ8R	
I3SBIN	A	POINTER FOR FIRST NODE IN EACH FLOW SEGM ENT OF EACH STEAM GENERATOR	-	VD9V	IKFS3T ACCM3T STGN3T CALC3R FEED3T INFS3T	CALC3R	
I3SBOT	A	POINTER FOR LAST NODE IN EACH FLOW SEGME NT OF EACH STEAM GENERATOR	-	VD9V	CALC3R FEED3T STGN3T ACCM3T	CALC3R	
I5EG	A	INDEX OF INNER MOST EQUIAXED GRAIN GROWT H RADIAL NODE OF EACH AXIAL SLICE OF EAC H CHANNEL	-	VD9V	PRE5T	PUT5S	
I5MAXT	S	INDEX NUMBER OF T5FUEL ELEMENT CURRENTLY RESTRICTING S5DELT	-	TFUL5I	DRIV9T	MAXD5T	
I5UN	A	INDEX OF INNER MOST UNSTRUCTED RADIAL NO DE OF EACH AXIAL SLICE OF EACHCHANNEL	-	VD9V	PRE5T PRNT5S PRNT5T	PUT5S	
J1BREK	A	PRIMARY LOOP PIPE NUMBER CONTAINING BREA K	-	VD9V	GVSL1T WRIT1T RSET1T EQIV1T VRFY9T LIST9T BREK1T FUNC1T VESL1T PRES1T PLOS1T STOR1T INIT1T DEFN1T XI1T DRIV9T	READ9T	T-1003

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
J2BREK	A	INTERMEDIATE LOOP PIPE NUMBER CONTAINING BREAK	-	VD9V	INIT1T LIST9T PLOS2T WRIT2T EQIV2T RSET2T DEFN2T RITE1T BREK2T PRES2T FUNC2T VRFY9T	READ9T	T-1201
J5TYP	A	INDEX DENOTING TYPE OF EACH AXIAL SLICE OF EACH CHANNEL	-	VD9V	FUEL5S TYPE5R PRE5T PRE5S GROW5T	TYPE5R	
L1CLEG	S	CONTROL FLAG INDICATING IF PRIMARY PUMP IS IN COLD LEG 0-NO 1-YES	-	DATA8I	PBAL9S	CALC8R	
L1CV	A	PIPE NUMBER PRECEDING CHECK VALVE IN EACH PRIMARY LOOP	-	VD9V	WRIT1T LIST1R VRFY1R CALC1R PRES1S RSET1T PLOS1T RITE1S CVAL1S CVAL1T	CALC1R RSET1T READ1R	N-1001
L1ECAL	S	FLAG TO CALL LOOP THERMAL CALCULATION 0-NO; 1-YES	-	TLUP1I	LIST9T	READ9T	T-9004
L1EPRT	S	CONTROL FLAG FOR PRIMARY AND SECONDARY LOOP DETAILED PRINT 0-NO, 1-YES	-	DATL1I	MAIN9S PRNT9T READ8R INIT1T LIST8R LIST9T LOOP1S	READ9T READ8R	0-5

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC
L1ERR	S	ERROR FLAG	-	DATL1I	IHX1S PUMP1S	IHX1S LOOP1S PUMP1S	
L1FDIR	S	IHX FLOW INDICATOR 1 FOR PARALLEL FLOW IN IHX; -1 FOR COUNTER FLOW	-	DATL1I	IHX1T VRFY1R RITE1T IHX1S HYDR1T HYDR1S LIST1R	READ1R	N-101
L1FLOR	S	INDEX COUNTER USED IN PRIMARY LOOP TO VE SSEL INTERFACE CALCULATIONS	-	TFLO1I	COOL6T	STOR1T COOL6T	
L1FLOT	S	INDEX COUNTER USED IN PRIMARY LOOP TO VE SSEL INTERFACE CALCULATIONS	-	TFLO1I	DRIV9T STOR1T	DRIV9T STOR1T	
L1GV	A	GUARD VESSEL OPTION FLAG 0 NO GUARD VE SSEL 1-RV OUT, 2-RV IN, 3-P IN, 4-P OUT, 5-IHX IN, 6-IHX OUT	-	VD9V	GVSL1T INIT1T LIST9T	READ9T	T-1003
L1IHX	A	PIPE NUMBER OF IHX IN EACH PRIMARY LOOP	-	VD9V	IHX1T PRET1T PRNT1T IHX1S LIST1R HYDR1S RITE1T PRNT9S RSET1T LOOP1T XI1T RITE1S CALC8R CALC1R END1T PDFG1T END1S VRFY1R LOOP1S WRIT1T HYDR1T	READ1R RSET1T CALC1R	N-1001

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L1KP	S	INPUT OPTION INDICTOR 0 IF P1PDHX GIVEN, 1 IF F1LOSS(J1HX,1) GIVEN	-	DATL1I	VRFY1R HYDR1S LIST1R	READ1R	N-101
L1KS	S	INPUT OPTION INDICTOR 0 IF P2PDHX GIVEN, 1 IF F2LOSX(1) GIVEN	-	DATL1I	LIST1R VRFY1R HYDR1S	READ1R	N-101
L1MAXD	S	INDEX NUMBER WITHIN F1MAXN ARRAY OF ELEMENT CURRENTLY RESTRICTING SIDELT	-	TLUP1I	DRIV9T	PIPE1T PIPE2T IHX1T	
L1NODE	A	OFFSET INDICATORS WITHIN CERTAIN PRIMARY LOOP ARRAYS	-	VD9V	LOOP1S READ1R CALC1R INIT1T LIST1R	READ1R	
L1PIPE	A	OFFSET INDICATORS WITHIN CERTAIN PRIMARY LOOP ARRAYS	-	VD9V	CALC1R VRFY9T READ1R	READ1R	
L1PONY	S	CONTROL FLAG FOR PRIMARY PONY MOTOR 0-OFF; 1- ON	-	DATA1I	LIST9T PUMP1T	READ9T	T-1001
L1PORS		IHX COMPUTATION INDEX DIRECTING TO PRIMARY OR SECONDARY SIDE	-	A1TCI	HYDR1T IHX1T	LOOP2T PDFG2T LOOP1T PDFG1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L1PUMP	A	PIPE NUMBER PRECEDING PUMP IN EACH PRIMA RY LOOP	-	VD9V	LOOP1S INIT1T BREK1T VESL1T PRES1T RSET1T WRIT1T RES1S PRNT9S PLOS1T FUNC1T VRFY1R CALC8R XI1T CALC1R END1S DEFN1T PUMP1S RITE1S END1T LIST1R RES1T PRES1S	RSET1T READ1R CALC1R	N-1001
L1SEPR	S	FLAG TO PRINT LOOP THERMAL CPU TIMING DA TA 0-NO; 1-YES	-	TLUP11	LIST9T DRIV9T	READ9T	T-9006
L1SEXT	S	FLAG INDICATING IF S1LOOP=S9MSTR	-	TLUP11	DRIV9T	INIT9T DRIV9T PRNT9T	
L1STEP	S	NUMBER OF TIMESTEPS TAKEN BY LOOP THERMA L MODULES	-	TLUP11	DRIV9T PRNT9T	DRIV9T INIT9T	
L1STRC	S	PRIMARY LOOP STRUCTURAL MATERIAL ID	-	DATL11	IHX1S LIST1R IHX1T PRET1T VRFY1R PIPE2T PIPE1T	READ1R PRET1T	N-100

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L1SWPR	S	FLAG TO PRINT LOOP HYDRAULIC CPU TIMING DATA 0-NO; 1-YES	-	TFLO1I	LIST9T DRIV9T	READ9T	T-9006
L1WCAL	S	FLAG TO CALL LOOP HYDRAULIC CALCULATION 0-NO; 1-YES	-	TFLO1I	LIST9T	READ9T	T-9004
L1WPRT	S	FLAG TO PRINT LOOP HYDRAULIC TRANSIENT D ATA 0-NO; 1-YES	-	INTG9I	PRNT9T	READ9T	T-9005
L1WSTP	S	NUMBER OF TIMESTEPS TAKEN BY LOOP HYDRAU LICS MODULES	-	INTG9I	PRNT9T INTG1T	DRIV9T INIT9T	
L2ERR	S	ERROR FLAG	-	DATL2I	PUMP2S	PUMP2S LOOP2S	
L2EV	A	PIPE NUMBER PRECEDING EVAPORATOR IN EACH INTERMEDIATE LOOP	-	VD9V	LIST1R PRNT9S PRES2S CALC1R EVAP2S WGHT2T END2S LOOP2S RITE2S LOOP2T END2T RSET2T VRFY1R EVAP2T PRNT1T WRIT2T	CALC1R RSET2T READ1R	N-1001
L2KEV	S	INPUT OPTION INDICTOR 0 IF P2PDEV(1) G IVEN; 1 IF F2EV(1) GIVEN	-	DATL2I	EVAP2S VRFY1R RITE2S LIST1R	READ1R	N-120

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L2KSH	S	INPUT OPTION INDICTOR 0 IF P2PDSH(1) G IVEN; 1 IF F2SH(1) GIVEN	-	DATL2I	LIST1R RITE2S VRFY1R SPHT2S	READ1R	N-121
L2NODE	A	OFFSET INDICATORS WITHIN CERTAIN INTERME DIATE LOOP ARRAYS	-	VD9V	INIT1T LOOP2S READ1R LIST1R CALC1R	READ1R	
L2PIPE	A	OFFSET INDICATORS WITHIN CERTAIN INTERME DIATE LOOP ARRAYS	-	VD9V	READ1R CALC1R VRFY9T	READ1R	
L2PONY	S	CONTROL FLAG FOR SECONDARY PONY MOTOR 0-OFF; 1- ON	-	DATA2I	LIST9T PUMP2T	READ9T	T-1002
L2PREV	S	FLAG, INITIAL GUESS FROM PREVIOUS CASE 0-NO; 1-YES	-	PREV2I	LIST8R CALC8R	READ8R	O-3
L2PRNT	S	SET EQUAL TO L1PRNT	-	DATL2I	LOOP2S	READ8R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L2PUMP	A	PIPE NUMBER PRECEDING PUMP IN EACH INTER MEDIATE LOOP	-	VD9V	PRES2T RSET2T PRES2S RES2S LIST1R RITE1T RITE2S PRNT9S VRFY1R LOOP2S DEFN2T BREK2T CALC1R INIT2T END2T END2S RES2T PUMP2S FUNC2T PLOS2T	RSET2T CALC1R READ1R	N-1001
L2SH	A	PIPE NUMBER PRECEDING SUPERHEATER IN EAC H INTERMEDIATE LOOP	-	VD9V	END2S LOOP2S PRES2S SPHT2T WRIT2T PRNT1T END2T WGHT2T PRNT9S RITE2S CALC1R RSET2T LIST1R LOOP2T SPHT2S VRFY1R	CALC1R RSET2T READ1R	N-1001

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L2TANK	A	PIPE NUMBER PRECEDING EXPANSION TANK IN EACH INTERMEDIATE LOOP	-	VD9V	RITE2S PLOS2T RSET2T LIST1R BREK2T TANK2T DEFN2T RITE1T PRES2S FUNC2T WRIT2T CALC1R TANK2S VRFY1R INIT2T	RSET2T CALC1R READ1R	N-1001
L3CALL	S	FLAG TO CALL SG CALCULATION 0-NO; 1-Y ES	-	DATT3I	DRIV9T LIST9T	READ9T	T-9004
L3CONV	S	CONTROL FLAG INDICATING CONVERGENCE OF S TEAM GENERATOR CALCULATIONS	-	PREV2I	MAIN9S PBAL9S	STGN3S PBAL9S	
L3DMEN	S	CONTROL FLAG USED IN INPUT PROCESSOR TO INDICATE WHETHER THE STEAM GENERATOR DIM ENSIONS HAVE BEEN SET	-	BNDS3R	READ3R	BLKDTR READ3R	
L3DNB	A	NODE IN WHICH DNB OCCURS IN EACH SG SODI UM LOOP	-	VD9V	HX3T PRNT3S PRNT3T STGN3S TUBE3T	HX3S STGN3S TUBE3T	
L3FILL	S	LOCATION OF FILL JUNCTION IN STEAM GENER ATOR LOOP	-	DATG3I	WFLO3S PIPE3T CALC3R PIPE3S STMP3S	VRFY3R	
L3FRST	S	MODULE NUMBER TO WHICH THE FIRST MODULE IN THE STEAM GENERATOR LOOP IS CONNECTED	-	DATG3I	STMP3S CALC3R	VRFY3R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L3HXI	A	NODE NUMBER IN CERTAIN SG VD ARRAYS DENO TING START POINT OF EACH HEAT EXCHANGER	-	DATS3I	PRNT3T PRNT9S TUBE3T	CALC3R	
L3HXO	A	NODE NUMBER IN CERTAIN SG VD ARRAYS DENO TING END POINT OF EACH HEAT EXCHANGER	-	DATS3I	PRNT9S PRNT3T	CALC3R	
L3HX	A	MODULE NUMBER OF EACH STEAM GENERATOR HE AT EXCHANGER	-	DATG3I	HX3T CALC3R EVAP2S SPHT2S WFLO3S LOOP2S EVAP2T TUBE3T PRNT3T PIPE3S SPHT2T STGN3S PIPE3T INTF3T FSEG3T PRNT3S CALC1R STGN3T PRNT9S	VRFY3R	
L3ORD	A	ARRAY USED IN SG INPUT PROCESSOR TO CORR ECTLY ORDER THE USER SUPPLIED INPUT	-	VD9V	VRFY3R CALC3R	VRFY3R	
L3PRNT	S	FLAG TO PRINT SG DATA 0-NO; 1-YES	-	DATT3I	STGN3T PRNT9T LIST9T	READ9T	T-9005
L3PUMI	S	NODE NUMBER IN SG VD ARRAYS DENOTING PUM P INLET	-	DATS3I	PRNT9S	CALC3R	
L3PUMO	S	NODE NUMBER IN SG VD ARRAYS DENOTING PUM P OUTLET	-	DATS3I	PRNT9S	CALC3R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L3PUMP	S	MODULE NUMBER OF STEAM GENERATOR PUMP	-	DATG3I	PIPE3T STGN3S WFLO3S PIPE3S	VRFY3R	
L3SBLP	A	MODULE NUMBER OF FIRST MODULE IN EACH FLOW SEGMENT OF BOTH SG AND TURBSINE LOOPS	-	DATG3I	WFLO3S STMP3S PIPE3S PRNT3S CALC3R PIPE3T INIT3S	VRFY3R	
L3SPRT	S	FLAG TO PRINT SG CPU TIMING DATA 0-NO, 1-YES	-	DATT3I	LIST9T DRIV9T	READ9T	T-9006
L3STDM	S	NODE NUMBER IN CERTAIN SG VD ARRAYS DENOTING STEAM DRUM LOCATION	-	DATS3I	PRNT9S	CALC3R	
L3STEP	S	NUMBER OF TIME STEPS TAKEN BY STEAM GENERATOR MODULE	-	DATT3I	PRNT9T STGN3T DRIV9T	STGN3T INIT9T	
L3TYPE	A	TYPE DESIGNATION OF EACH MODULE IN BOTH SG AND TURB FLOW SEGMENTS; 1=PIPE, 2=HX, 3=PUMP, 4=VOL	-	VD9V	WFLO3S PRNT3S FSEG3T CALC3R PIPE3S PIPE3T	CALC3R INIT3R	
L3VOL	A	MODULE NUMBER OF EACH ACCUMULATOR IN BOTH SG AND TURB LOOPS	-	DATG3I	CALC3R STGN3S PRNT3S STMP3S	VRFY3R	
L5AFMT	A	INDEX OF ACTIVE FUEL MATERIAL FOR EACH ROD TYPE	-	VD9V	TYPE5R VRFY7R LIST7R REPT9R	READ7R	V-101
L5CALL	S	FLAG TO CALL FUEL CALCULATION 0-NO, 1-YES	-	TFUL5I	LIST9T DRIV9T	READ9T	T-9004

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L5CLMT	A	INDEX OF CLADDING MATERIAL FOR EACH ROD TYPE	-	VD9V	REPT9R LIST7R VRFY7R CALC7R TYPE5R	READ7R	V-101
L5GAS	A	INDEX OF EACH FISSION GAS TYPE IN EACH C HANNEL	-	VD9V	CALC7R LIST7R VRFY7R	READ7R	V-501
L5IPDY	A	COUNTERS USED IN DECAY HEAT CALCULATIONS	-	VD9V	POW6T	POW6T INIT6T	
L5LBMT	A	INDEX OF LOWER BLANKET MATERIAL FOR EACH ROD TYPE	-	VD9V	TYPE5R VRFY7R REPT9R LIST7R	READ7R	V-101
L5MESH	S	INDICATOR FOR FUEL RADIAL MESH; 0-EQ UI-RADIUS, 1-EQUI-AREA	-	DAT25I	PUT5T XPAN5S GROW5T PUT5S XPAN5T PREX5S LIST7R DOPP5T	READ7R	V-25
L5POPT	S	TRANSIENT POWER FLAG; 0-PROMT JUMP APP OX., 1-EXACT	-	DATD5I	LIST9T PRMT5T	READ9T	T-5001
L5PRNT	S	CONTROL FLAG FOR DETAILED IN-VESSEL TEMP . DISTRIBUTION PRINT	-	DAT25I	FUEL5S LIST8R PRNT9T LIST9T	READ8R READ9T	0-5
L5REST	S	RESTRUCTURING CONTROL FLAG	-	DAT25I		CALC7R	
L5SEXT	S	FLAG TO INDICATE IF S5FUEL=S9MSTR	-	TFUL5I	DRIV9T	DRIV9T INIT9T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L5SPRT	S	FLAG TO PRINT FUEL CPU TIMING DATA 0-NO, 1-YES	-	TFUL5I	LIST9T DRIV9T	READ9T	T-9006
L5STEP	S	NUMBER OF TIMESTEPS TAKEN BY FUEL HEAT CONDUCTION MODULE	-	TFUL5I	PRNT9T DRIV9T	DRIV9T INIT9T	
L5STMT	A	INDEX OF STRUCTURAL MATERIAL FOR EACH ROD TYPE	-	VD9V	REPT9R VRFY7R LIST7R TYPE5R	READ7R	V-101
L5THLF	S	POINTER TO MID POINT IN T5FUEL ARRAY	-	TFUL5I	PROP6T MAXD5T	INIT5T	
L5UBMT	A	INDEX OF UPPER BLANKET MATERIAL FOR EACH ROD TYPE	-	VD9V	TYPE5R REPT9R LIST7R VRFY7R	READ7R	V-101
L6ATYP	A	INTEGER VALUE INDICATING THE ROD TYPE OF EACH CHANNEL	-	VD9V	COOL6S CORE6T LPLN6T LIST7R TYPE5R INIT6T VRFY7R CORE6S OPTN6S PROP6T READ7R COEF6T PRNT6T COOL6T UPLN6S CALC7R		V-2
L6BOIL	A	FLAG TO INDICATE IF BOILING HAS OCCURED IN A CHANNEL 0-NO 1-YES	-	VD9V		INIT6T	
L6CALL	S	FLAG TO CALL IN-VESSEL COOLANT CALC. 0-NO, 1-YES	-	TCUL6I	DRIV9T LIST9T	READ9T	T-9004

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L6CGAS	S	CONTROL FLAG FOR COVER GAS PRESSURE OPTI ON; 1-CONSTANT MASS, 2-CONSTANT FEED/B LEED RATE	-	DAIN6I	UPLN6T LIST9T	READ9T	T-6002
L6CLAD	A	MATERIAL PROPERTY ID OF CLADDING IN EACH CHANNEL	-	VD9V	PROP6T INIT6T	CALC7R INIT6T	
L6FGAS	A	FLAG TO INDICATE IF FISSION GAS HAS BEE N RELEASED IN A CHANNEL; 0-NO, 1-YES	-	VD9V		INIT6T LEAK5T	
L6FLOW	S	INDICATOR FOR FLOW REDISTRIBUTION; 0-NO FLOW REDISTRIBUTION, 1-FLOW RESTRIBUTIO N	-	DAIN6I	LIST9T FLOW6T COOL6T	READ9T	T-6001
L6MAXD	S	INDEX NUMBER WITHIN THE F6NAME ARRAY OF ELEMENTS CURRENTLY RESTRICTING S6DELT	-	TCUL6I	DRIV9T	COOL6T	
L6MIX	S	INDICATOR FOR MIXING TYPE; 1-ONE ZONE M IXING, 2-TWO ZONE MIXING	-	DAIN6I	LIST9T UPLN6T	READ9T	T-6001
L6PRNT	S	CONTROL FLAG FOR IN-VESSEL FLUID DYNAMIC S DETAILED PRINT; 0-NO, 1-YES	-	DATA6I	LIST9T PRNT9T COOL6S LIST8R	READ8R READ9T	0-5
L6PROP	S	CONTROL FLAG TO INDICATE WHETHER FUEL TE MPERATURE EXTRAPOLATIONS SHOULD BE USED; 0-NO, 1-YES	-	TCUL6I	PROP6T	PROP6T DRIV9T	
L6SCHG	S	CONTROL FLAG INDICATING IF S6DELT HAS JU ST BEEN CHANGED FOE REASONS OTHER THAN D EVIATION CRITERION; 0-NO, 1-YES	-	TCUL6I	COOL6T	COOL6T DRIV9T	
L6SEXT		FLAG TO INDICATE IF S6COOL=S5FUEL; 0-NO 1-YES	-	TCUL6I	DRIV9T	DRIV9T INIT9T	
L6SPRT	S	FLAG TO PRINT IN-VESSEL CPU TIMING DATA 0-NO, 1-YES	-	TCUL6I	LIST9T DRIV9T	READ9T	T-9006

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
L6STEP	S	NUMBER OF TIMESTEPS TAKEN BY IN-VESSEL C OOLANT DYNAMICS MODULE	-	TCUL6I	PRNT9T DRIV9T PROP6T	INIT9T DRIV9T	
L6WOPT	S	INDICATOR FOR FLOW FRACTION OPTION 0 FRA CTIONS KNOWN 1 FRACTIONS UNKNOWN	-	DATA6I	CORE6S COOL6S UPLN6S OPTN6S LIST7R	BLKDAT READ7R	V-23
L9DMPI	S	FLAG TO PRINT COMMON BLOCK DATA AFTER IN ITIALIZATION 0-NO, 1-YES	-	INTG9I	INIT9T LIST9T	READ9T	T-9008
L9DMPL	S	FLAG TO PRINT COMMON BLOCK DATA AFTER TR ANSIENT 0-NO, 1-YES	-	INTG9I	LIST9T MAIN9T	READ9T	T-9008
L9DMPZ	S	FLAG TO PRINT COMMON BLOCK DATA BEFORE I NITIALIZATION 0-NO, 1-YES	-	INTG9I	INIT9T LIST9T	READ9T	T-9008
L9MWRD	S	CONTROL FLAG INDICATING COMPUTER MAINFRA ME TYPE 1-SIX OR MORE CHARACTERS PER WORD; 2-FOUR CHARACTERS PER WORD	-	DATA9	MAIN9R READ9T PPNT9R GPNT9R	MAIN9R BLKDAT	
L9OPT	S	CONTROL FLAG INDICATING WHICH STEADY STA TE INITIALIZATION OPTION HAS BEEN SELECT ED	-	DATA8I	PBAL9S CALC8R	CALC8R	
L9TBLD	S	FLAG TO PRINT CONTAINER ARRAY TABLE INFO RMATION 0-NO, 1-YES	-	INTG9I	LIST9T INIT9T	READ9T	T-9008
M1LOOP	S	MAXIMUM NUMBER OF PRIMARY LOOPS SIMULATE	-	DATM1I		CALC1R BLKDAT	
M1ORD	S	MAXIMUM ORDER(+1) OF PRIMARY PUMP POLYNO MIAL	-	DATM1I	VRFY1R READ1R	BLKDAT	
M2LOOP	S	MAXIMUM NUMBER OF INTERMEDIATE LOOPS SIM ULATED	-	DATM2I		BLKDAT CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
M3TYPE	A	ID NUMBER OF HEAT TRANSFER TUBE MATERIAL	-	DATG3I	HX3T HX3S TUBE3T	INIT3R CALC3R	S-301
M5RNOD	S	MAXIMUM NUMBER OF RADIAL NODES SPECIFIED FOR ANY CORE AXIAL SLICE (USED FOR SCRA TCH ARRAYS)	-	DAT15I	INIT5T FUEL5S	FUEL5S	
M9AUSI	S	MAXIMUM NUMBER OF PAIRED POINTS ALLOWED FOR VARIOUS INPUT FUNCTIONS (SET AT 25)	-	DATC9I	POW6T CALC7R LIST9T READ9T INIT6T CALC3R INIT5T	BLKDAT	
N1ACTV	A	NUMBER OF ACTIVE(UNPLUGGED) TUBES IN IHX OF EACH LOOP	-	VD9V	PRET1T CALC1R VRFY1R LIST1R IHX1S	READ1R CALC1R VRFY1R	N-1002
N1BREK	S	TOTAL NUMBER OF BREAKS IN PRIMARY SYSTEM	-	A1TCI	PRNT1T RSET1T WRIT2T WRIT1T	READ1R	
N1EQ	S	NUMBER OF O.D.E.'S TO BE INTEGRATED FOR PRIMARY LOOP HYDRAULICS	-	A1TCI	UPLN6T EQIV2T CALC1R EQIV1T	READ1R	
N1FEQT	S	N1EQ + N2EQ	-	A1TCI	CALC1R INIT1T INTG1T PRNT9T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N1LOOP	S	NUMBER OF PRIMARY LOOPS SIMULATED	-	DATM11	LIST9T FSEG3T VRFY9T CALC3R IKFS3T STGN3T INTF3T PLOP3T PRNT3T HX3T READ9T CALC1R INIT1T READ1R PRET1T RSET1T GVSL1T WRIT1T INIT3T XI1T INFS3T INIT6T EQIV1T LOOP1T COOL6T LPLN6T FLOW1T DEFN1T STOR1T LOOP2S INIT3R ACCM3T PLOS1T BREK1T CALC7R FEED3T CVAL1T FUNC1T CALC8R PDFG1T LIST1R PRNT9S RES1T PBAL9S VESL1T STGN3S PUMP1T PRES1T VRFY8R STMP3S DRIV9T VOL3S PRNT1T LOOP1S TUBE3T VRFY1R	READ1R	N-1

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N1NBRK	A	NUMBER OF NODES IN BROKEN PRIMARY PIPE	-	VD9V	INIT1T LIST9T VRFY9T PUMP1T RSET1T HEAD1T	INIT1T READ9T	T-1003
N1NODE	A	NUMBER OF NODES IN EACH PIPE OF EACH PRIMARY LOOP	-	VD9V	END1S LIST1R PRNT9S RES1T IHX1S HYDR1S IHX1T LOOP1S PRNT1T PRET1T BREK1T READ1R INIT1T GVSL1T PIPE1S RES1S RSET1T LOOP1T PUMP1S HYDR1T PIPW1T VRFY9T PIPE1T CVAL1T END1T RITE1S CALC1R CVAL1S	READ1R RSET1T	N-1

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N1PIPE	A	NUMBER OF PIPES IN EACH PRIMARY LOOP	-	VD9V	LOOP1S IHX1T PIPE1S HYDR1S END1S CALC1R PRNT1T GVSL1T PUMP1S PRES1S CVAL1S RITE1S WRIT1T DEFN1T LOOP2T VRFY1R RITE1T PRET1T PIPE1T LOOP1T PDFG2T BREK1T INIT1T PLOS1T CVAL1T HYDR1T PIPW1T PDFG1T END1T LIST1R RES1T PRES1T FUNC1T READ1R RSET1T XI1T RES1S PRNT9S	READ1R RSET1T	N-1
N1PUMP	S	NUMBER OF COEFFICIENTS IN POLYNOMIAL FOR PRIMARY PUMP HEAD	-	DATA11	PUMP1S CALC1R LIST1R VRFY1R	READ1R	N-110

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N1TUBE	S	NUMBER OF TUBES IN IHX	-	DATX1I	CALC1R VRFY1R LIST1R	READ1R	N-100
N2BREK	S	TOTAL NUMBER OF BREAKS IN INTERMEDIATE S YSTEM	-	A2TCI	WRIT2T RSET2T INIT2T PRNT1T	READ1R	
N2EQ	S	NUMBER OF O.D.E.'S TO BE INTEGRATED FOR INTERMEDIATE LOOP HYDRAULICS	-	A2TCI	CALC1R	READ1R	
N2EV	S	NUMBER OF EVAPORATORS PER SUPERHEATER	-	DATE2I	SPHT2T WGHT2T END2S SPHT2S RITE2S	CALC1R	
N2LOOP	S	NUMBER OF INTERMEDIATE LOOPS SIMULATED (=N1LOOP)	-	A2TCI	FLOW2T PLOS2T EVAP2T PRES2T RITE1T PDFG2T RES2T BREK2T PUMP2T SPHT2T FUNC2T TANK2T WRIT2T EQIV2T INIT2T RSET2T DEFN2T	READ1R	
N2NBRK	A	NUMBER OF NODES IN BROKEN SECONDARY PIPE	-	VD9V	RSET2T LIST9T VRFY9T INIT1T	INIT1T READ9T	T-1201

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N2PIPE	A	NUMBER OF PIPES IN EACH INTERMEDIATE LOO P	-	VD9V	READ1R PLOS2T PRNT9S PRES2T END2T BREK2T CALC1R SPHT2S PRET1T PIPE2S IHX1T EVAP2T SPHT2T END2S PDFG2T LOOP2S RSET2T PIPE2T RES2T LOOP1T INIT2T FUNC2T VRFY1R PIPW2T HYDR1T EVAP2S WRIT2T RITE2S TANK2T LOOP2T RES2S DEFN2T PRES2S LIST1R TANK2S PRNT1T PUMP2S RITE1T	READ1R RSET2T	N-1
N2PUMP	S	NUMBER OF COEFFICIENTS IN POLYNOMIAL FOR INTERMEDIATE PUMP HEAD	-	DATA2I	PUMP2S RITE2S	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N2NODE	A	NUMBER OF NODES IN EACH PIPE OF EACH INTERMEDIATE LOOP	-	VD9V	RITE2S LOOP2T PUMP2S LIST1R PIPW2T TANK2T INIT2T TANK2S SPHT2S PIPE2T RES2T PRNT1T RSET2T SPHT2T END2S PIPE2S EVAP2T READ1R VRFY9T RES2S END2T PRET1T BREK2T CALC1R INIT1T LOOP2S EVAP2S PRNT9S	RSET2T READ1R	N-1

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N2SH	S	NUMBER OF SUPERHEATERS PER INTERMEDIATE LOOP	-	DATS2I	WGHT2T RITE2S END2S CALC1R	CALC1R	
N2TPTS	S	NUMBER OF TEMPERATURE DATA POINTS FOR LO OP - SG INTERFACE EXTRAPOLATIONS	-	BCTEMP	STMP3T INTF3T	INTF3T	
N2WPTS	S	NUMBER OF FLOW RATE DATA POINTS FOR LOOP - SG INTERFACE INTERPOLATIONS	-	BCWFLO	INTF3T STGN3T PRNT3T ENAVG TMSG3T	INTF3T	
N3FMLP	A	MODULE NUMBER OF FIRST MODULE OF EACH FL OW SEGMENT OF EACH STEAM GENERATOR	-	VD9V	IKFS3T STGN3T	CALC3R	
N3FWLC	A	INDEX NUMBER OF FLOW SEGMENT CONTAINING FLOW SENSOR FOR FEEDWATER FLOW CONTROL	-	VD9V	FEED3T	CALC3R	
N3FWNC	A	INDEX NUMBER OF NODE WHERE FEEDWATER FLO W CONTROL SENSOR IS LOCATED	-	VD9V	FEED3T	CALC3R	
N3HDNB	A	MODULE NUMBER OF HX WHERE DNB OCCURS	-	VD9V	STGN3S HX3T TUBE3T PRNT3S PRNT3T	HX3S STGN3S CALC3R TUBE3T	
N3HMOD	A	NUMBER OF PHYSICAL UNITS REPRESENTED BY EACH HEAT EXCHANGER	-	DATG3I	SFLO3S CALC1R TUBE3T	INIT3R CALC3R	S-301
N3HXI	S	NUMBER OF HX-S TO BE INITIALIZED ON INPU T	-	DATR3I	VRFY3R CALC3R READ3R LIST3R	READ3R	S-1001

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N3HXR	S	NUMBER OF HX-S WHOSE GEOMETRIC DATA WILL BE READ ON INPUT	-	DATR3I	READ3R CALC3R NKEY3R VRFY3R LIST3R	READ3R	S-1001
N3HX	S	NUMBER OF SG HX-S SIMULATED	-	DATG3I	FSEG3T PIPE3S STGN3S VRFY3R PRNT3T CALC3R INTF3T STGN3T HX3S SFLO3S PRNT3S STMP3T INIT3R PIPE3T WFLO3S	VRFY3R	
N3ITER	S	MAX NUMBER OF ALLOWED ITERATIONS FOR ANY ITERATIVE CALCULATION	-	DATI3I	HX3S STGN3T FEED3S INIT3T	CALC3R	S-1002
N3KEY	A	ARRAY CONTAINING INFORMATION RELATING TO ORDER OF INTERCONNECTION OF MODULES	-	VD9V	VRFY3R CALC3R	NKEY3R	
N3LMLP	A	MODULE NUMBER OF LAST MODULE OF EACH FLO W SEGMENT OF EACH STEAM GENERATOR	-	VD9V	STGN3T IKFS3T	CALC3R	
N3LVIN	A	MODULE NUMBER OF ACCUMULATOR AT INLET OF EACH FLOW SEGMENT	-	VD9V	STGN3T INFS3T FEED3T ACCM3T PLOP3T	CALC3R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N3LVOT	A	MODULE NUMBER OF ACCUMULATOR AT OUTLET O F EACH FLOW SEGMENT	-	VD9V	FEED3T INFS3T ACCM3T STGN3T PLOP3T	CALC3R	
N3MOD	A	NUMBER OF MODULES IN EACH FLOW SEGMENT	-	DATG3I	VRFY3R PIPE3S WFLO3S CALC3R STGN3S STMP3S IKFS3T INIT3R PRNT3S	VRFY3R	
N3NODE	A	NUMBER OF CONTROL VOLUMES IN EACH MODULE	-	VD9V	CALC1R EVAP2T TUBE3T SPHT2T PIPE3T PRNT3S PIPE3S HX3T INTF3T LOOP2S HX3S PRNT9S CALC3R EVAP2S SPHT2S PRNT3T	INIT3R CALC3R	S-1
N3PIPI	S	NUMBER OF PIPES TO BE INITIALIZED ON INP UT	-	DATR3I	LIST3R VRFY3R READ3R CALC3R	READ3R	S-1001
N3PIPR	S	NUMBER OF PIPES WHOSE GEOMETRIC DATA IS TO BE READ ON INPUT	-	DATR3I	LIST3R NKEY3R CALC3R VRFY3R READ3R	READ3R	S-1001

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N3PMPI	S	PUMP INITIALIZATION CONTROL FLAG	-	DATR3I	LIST3R READ3R CALC3R VRFY3R	READ3R	S-100†
N3PTRB	S	NUMBER OF ENTRIES IN TABLE OF TURBINE IN LET PRESSURES VS. TIME	-	DATT3I	LIST9T READ9T FEED3T	READ9T	
N3SBLP	A	NUMBER OF FLOW SEGMENTS IN SG LOOP THEN TURB LOOP	-	DATG3I	ACCM3T CALC3R INIT3S INFS3T PIPE3S STMP3S PRNT3S VRFY3R TUBE3T STGN3S STGN3T FSEG3T PLOP3T PRNT3T INIT3T FEED3T IKFS3T WFLO3S	VRFY3R	
N3STGN	A	NUMBER OF PHYSICAL SG LOOPS TO BE REPRES ENTED BY EACH SIMULATED SG LOOP (SUMMAT ION MUST EQUAL N9LOOP)	-	VD9V	VRFY1R LIST1R ACCM3T CALC1R	READ1R	N-2
N3TUBE	A	NUMBER OF TUBES IN EACH HEAT EXCHANGER	-	DATG3I	CALC1R SFLO3S HX3S WFLO3S TUBE3T CALC3R HX3T	INIT3R CALC3R	
N3UMT	S	TOTAL NUMBER OF MODULES PER SG + TURB FL OW SEGMENTS	-	DATR3I	NKEY3R VRFY3R	NKEY3R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N3VISB	A	SEQUENCE NUMBER OF FLOW SEGMENT DISCHARG ING INTO ACCUMULATOR	-	VD9V	ACCM3T	CALC3R	
N3VLIN	A	NUMBER OF FLOWS INTO ACCUMULATOR ACCUMUL ATOR	-	VD9V	CALC3R ACCM3T	CALC3R	
N3VLOT	A	NUMBER OF EXIT NOZZLES	-	VD9V	ACCM3T CALC3R	CALC3R	S-101
N3VOLR	S	NUMBER OF ACCUMULATORS WHOSE GEOMETRIC D ATA ARE TO BE READ OINPUT (SAME NUMBER M UST BE INITIALIZED)	-	DATR3I	NKEY3R VRFY3R LIST3R READ3R CALC3R	READ3R	S-1001
N3VOL	A	NUMBER OF ACCUMULATORS IN BOTH SG AND TU RB LOOPS	-	DATG3I	STMP3S INIT3T ACCM3T STGN3S PRNT3S PRNT3T VOL3S CALC3R VRFY3R	VRFY3R	
N3VOSB	A	ID OF MODULE ATTACHED TO EACH EXIT NOZZL E	-	VD9V	ACCM3T	CALC3R	S-101
N5AFUL	A	NUMBER OF AXIAL NODES IN ACTIVE FUEL REG ION OF EACH ROD TYPE	-	VD9V	TYPE5R CALC7R	TYPE5R	V-101
N5ASEC	A	NUMBER OF AXIAL NODES OF EACH ROD TYPE	-	VD9V	VRFY7R TYPE5R READ7R CALC7R LIST7R	VRFY7R	V-1

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N5CHAN	S	NUMBER OF CHANNELS BEING SIMULATED	-	DAT15I	LIST9T CALC7R PRNT5T PRNT5S READ9T GROW5T INIT5T INIT6T VOID5T DOPP5T FUEL5S FUEL5T	CALC7R	
N5DNGP	S	NUMBER OF DELAYED NEUTRON GROUPS (MAXIM UM OF 6)	-	DATD5I	POW5T INIT5T VRFY9T LIST9T PRMT5T	READ9T	T-5001
N5GAS	A	NUMBER OF FISSION GASES PRESENT IN EACH CHANNEL	-	VD9V	LIST7R GAMA5T CALC7R GAMA5S VRFY7R READ7R	READ7R	
N5ITER	A	MAXIMUM NUMBER OF ITERATIONS ALLOWED DUR ING STEADY STATE TEMP. CALCULATION FOR E ACH SLICE TYPE	-	VD9V	FUEL5S	CALC7R	
N5JK	A	T5FUEL ARRAY SUBCRIPT FOR EACH AXIAL SLI CE IN EACH CHANNEL	-	VD9V	PRNT5S PRNT5T PROP6T PUT5T MAXD5T PUT5S INIT5T PRE5T LEAK5T	FUEL5S	
N5LBLK	A	NUMBER OF AXIAL NODES IN LOWER BLANKET O F EACH ROD TYPE	-	VD9V	CALC7R TYPE5R	TYPE5R	V-101

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N5LFGP	A	NUMBER OF AXIAL NODES IN LOWER GAS PLENU M OF EACH ROD TYPE	-	VD9V	FUEL5S FUEL5T PROP6T	CALC7R	
N5NFR	A	NUMBER OF RADIAL FUEL NODES IN AN AXIAL SLICE OF EACH CHANNEL	-	VD9V	PRE5T FUEL5T CALC7R PRNT5T LIST7R DOPP5T READ7R GROW5T VRFY7R PRE5S PRNT5S FUEL5S		V-1
N5RODS	A	NUMBER OF RODS ASSOCIATED WITH EACH CHAN NEL	-	VD9V	FRAD5T GROW5T FRAD5S DOPP5T	CALC7R	
N5SLIC	A	TOTAL NUMBER OF NODES AXIAL IN EACH CHAN NEL	-	VD9V	DOPP5T FUEL5T PRNT5S GROW5T INIT5T INIT6T READ9T FUEL5S PROP6T PRNT5T VOID5T	CALC7R	
N5UBLK	A	NUMBER OF NODES AXIAL IN UPPER BLANKET R EGION OF EACH ROD TYPE	-	VD9V	CALC7R TYPE5R	TYPE5R	V-101
N5UFGP	A	NUMBER OF NODES IN AXIAL FISSION GAS PL ENUM OF EACH ROD TYPE	-	VD9V	FUEL5T FUEL5S PROP6T	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N6AFUL	A	NUMBER OF AXIAL NODES IN ACTIVE FUEL REGION OF EACH ROD TYPE	-	VD9V	LIST7R TYPE5R READ7R VRFY7R CALC7R CORE6S	READ7R	V-101
N6ASEC	A	TOTAL NUMBER OF AXIAL NODES FOR EACH ROD TYPE	-	VD9V	LPLN6T COOL6S UPLN6S CORE6T CALC7R VRFY7R COEF6T CORE6S INIT6T PROP6T OPTN6S PRNT6T COOL6T	VRFY7R READ7R	
N6CHAN	S	NUMBER OF CHANNELS BEING SIMULATED	-	DATA6I	COOL6T POW6T TYPE5R VRFY7R CORE6S PRNT6T INIT1T LPLN6T READ7R UPLN6S COEF6T FLOW6T CALC7R CORE6T COOL6S PROP6T OPTN6S LIST7R INIT6T	READ7R	V-1
N6CHI	S	RUNNING INDEX ON CHANNEL BEING CACULATED	-	DAT36I	OPTN6S CORE6S	OPTN6S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N6FLMX	S	MAXIMUM ITERATIONS FOR FLOW FRACTION OPT ION CALCULATION	-	DATA6I	LIST7R OPTN6S	READ7R BLKDAT	V-23
N6LBLK	A	NUMBER OF AXIAL NODES IN LOWER BLANKET R EGION OF EACH ROD TYPE	-	VD9V	TYPE5R VRFY7R CORE6S READ7R LIST7R CALC7R	READ7R	V-101
N6LFGP	A	NUMBER OF AXIAL NODES IN LOWER FISSION G AS PLENUM REGION OF EACH ROD TYPE	-	VD9V	TYPE5R CORE6S VRFY7R LIST7R CALC7R READ7R	READ7R	V-101
N6PMAX	S	MAXIMUM ITERATION FOR PRESSURE CALULATIO N	-	DATA6I	OPTN6S LIST7R	BLKDAT READ7R	V-23
N6RODS	A	NUMBER OF RODS ASSOCIATED WITH EACH CHAN NEL	-	VD9V	CALC7R LIST7R VOID5T COEF6T PROP6T CORE6S INIT6T OPTN6S		V-5
N6UBLK	A	NUMBER OF AXIAL NODES IN UPPER BLANKET R EGION OF EACH ROD TYPE	-	VD9V	CORE6S VRFY7R READ7R CALC7R TYPE5R LIST7R	READ7R	V-101
N6UFGP	A	NUMBER OF AXIAL NODES IN UPPER FISSION G AS PLENUM REGION OF EA CH ROD TYP E	-	VD9V	LIST7R READ7R CALC7R CORE6S TYPE5R VRFY7R	READ7R TYPE5R	V-101

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
N9DSGN	S	NUMBER OF PHYSICAL LOOPS PRESENT IN PLAN T	-	DATA8I	FEED3S LIST8R	READ8R	0-1
N9LOOP	S	NUMBER OF OPERATING LOOPS PRESENT IN PLA NT	-	DATA8I	WFLO3S PBAL9S VRFY1R VRFY8R LIST8R FEED3S	READ8R	0-1
P1BIN	A	UPSTREAM BREAK PRESSURE	N/M2	VD9V	PRES1T WRIT1T BREK1T	BREK1T	
P1BOUT	A	DOWNSTREAM BREAK PRESSURE	N/M2	VD9V	PRES1T VESL1T WRIT1T	BREK1T	
P1DENM	S	CONSTANT IN PUMP SPEED EQUATION	KG/M2	RV	PUMP1T	INIT1T	
P1EXTR	A	PRESSURE OUTSIDE BREAK	N/M2	VD9V	WRIT1T BREK1T	GVSL1T	
P1GASI	S	INITIAL COVER GAS PRESSURE IN ALL PRIMAR Y LOOPS	N/M2	BNDS8R	LIST8R CALC8R	READ8R	0-4
P1GAS	A	COVER GAS PRESSURE IN EACH PRIMARY PUMP TANK	N/M2	VD9V	RES1T CALC8R RES1S WRIT1T RITE1S INIT1T	RES1T CALC8R	
P1INLT	S	PRESSURE AT PRIMARY LOOP INLET	N/M2	DATB1V	UPLN6T LOOP1S PINT1S	UPLN6T INIT1T PINT1S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P1INP	A	PUMP INLET PRESSURE	N/M2	VD9V	INITIT PUMPIT WRITIT PRESIT	RESIT INITIT	
P1IN	A	INLET PRESURE TO EACH PIPE IN EACH PRIMA RY LOOP	N/M2	VD9V	WRITIT RITEIS FUNCIT RSETIT PRESIS INITIT PRNT9S LOOPIS	PRESIT RSETIT PRESIS LOOPIS	
P1LOS1	A	PRESSURE LOSS ACROSS LOOP SECTION BETWEE N PUMP AND TANK (OR BREAK)	N/M2	VD9V	FUNCIT BREKIT	PLOSIT	
P1LOS2	A	PRESSURE LOSS IN LOOP SECTION AFTER PUMP AND BEFORE TANK (OR BREAK)	N/M2	VD9V	BREKIT FUNCIT VESLIT	PLOSIT	
P1LOS3	A	PRESSURE LOSS IN LOOP SECTION AFTER BREA K	N/M2	VD9V	VESLIT FUNCIT	PLOSIT	
P1OUTL	S	PRIMARY LOOP OUTLET PRESSURE	N/M2	RV	STORIT DRIV9T	VESLIT INITIT	
P1OUTP	A	PUMP OUTLET PRESSURE	N/M2	VD9V	PRESIT WRITIT BREKIT VESLIT	PUMPIT INITIT	
P1OUT	A	OUTLET PRESSURE FROM EACH PIPE OF EACH P RIMARY LOOP	N/M2	VD9V	PRESIS RESIS RITEIS INITIT LOOPIS RSETIT FUNCIT WRITIT PRNT9S	PRESIS PRESIT LOOPIS RSETIT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P1PCV	S	BACKPRESSURE FOR CHECK VALVE TO CLOSE	N/M2	A1TCV	LIST1R	READ1R	N-111
P1PDCV	A	PRESSURE DROP OVER CHECK VALUE IN EACH P RIMARY LOOP	N/M2	VD9V	LOOP1S PUMP1S PRES1S PLOS1T WRIT1T	LOOP1S CVAL1T CVAL1S	
P1PDFG	A	TOTAL PRESSURE LOSS IN PRIMARY PIPE OR I HX	N/M2	VD9V	PLOS1T WRIT1T	HYDR1T PIPW1T	
P1PDHX	A	PRESSURE DROP OVER IHX PRIMARY SIDE	N/M2	VD9V	HYDR1S VRFY1R LIST1R LOOP1S	READ1R HYDR1S LOOP1S	N-1002
P1PDRV	S	PRESSURE DROP OVER REACTOR VESSEL	N/M2	DATB1V	PUMP1S	PINT1S	
P1RISE	A	PRESSURE RISE ACROSS PUMP	N/M2	VD9V	WRIT1T PUMP1T	WRIT1T PUMP1T	
P1	S	PRESSURE AT REACTOR VESSEL OUTLET NOZZLE	N/M2	RV	PRES1T BREK1T	UPLN6T	
P2BIN	A	UPSTREAM BREAK PRESSURE	N/M2	VD9V	BREK2T WRIT2T PRES2T	BREK2T	
P2BOUT	A	DOWNSTREAM BREAK PRESSURE	N/M2	VD9V	PRES2T WRIT2T	BREK2T	
P2DENM	S	2*C9PI*Q2NRTA/60	KG/M2	RV	PUMP2T	INIT1T	
P2GASI	S	INITIAL COVER GAS PRESSURE IN ALL INTERM EDIATE LOOPS	N/M2	BNDS8R	CALC8R LIST8R	READ8R	0-4

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P2GAS	A	COVER GAS PRESSURE IN EACH INTERMEDIATE LOOP	N/M2	VD9V	RITE2S WRIT2T RES2T RES2S LOOP2S TANK2S INIT2T	CALC8R RES2T LOOP2S	
P2INP	A	PUMP INLET PRESSURE	N/M2	VD9V	PUMP2T PRES2T WRIT2T INIT2T	RES2T INIT2T	
P2IN	A	INLET PRESSURE TO EACH PIPE IN EACH INTE RMEDIATE LOOP	N/M2	VD9V	FUNC2T RSET2T PRNT9S RITE2S PRES2S LOOP2S BREK2T	RSET2T TANK2T PRES2S PRES2T LOOP2S	
P2LOS1	A	PRESSURE LOSS ACROSS LOOP SECTION BETWEE N TANK AND PUMP (OR BREAK)	N/M2	VD9V	BREK2T FUNC2T	PLOS2T	
P2LOS2	A	PRESSURE LOSS IN LOOP SECTION AFTER PUMP AND BEFORE TANK (OR BREAK)	N/M2	VD9V	FUNC2T BREK2T	PLOS2T	
P2LOS3	A	PRESSURE LOSS IN LOOP SECTION AFTER BREA K	N/M2	VD9V	FUNC2T	PLOS2T	
P2OUTP	A	INTERMEDIATE PUMP OUTLET PRESSURE	N/M2	VD9V	WRIT2T BREK2T PRES2T	INIT2T PUMP2T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P2OUT	A	OUTLET PRESSURE FROM EACH PIPE OF EACH I NTERMEDIATE LOOP	N/M2	VD9V	PRES2S RES2S RSET2T LOOP2S TANK2T FUNC2T RITE2S PRNT9S WRIT2T	PRES2T PRES2S RSET2T TANK2S LOOP2S TANK2T	
P2PDEV	A	PRESSURE DROP OVER EACH EVAPORATOR SHELL SIDE	N/M2	VD9V	EVAP2S LOOP2S LIST1R RITE2S WRIT2T PLOS2T PUMP2S PRES2S VRFY1R	EVAP2S LOOP2S EVAP2T READ1R	N-1003
P2PDFG	A	TOTAL PRESSURE LOSS IN INTERMEDIATE PIPE	N/M2	VD9V	PLOS2T WRIT2T	PIPW2T	
P2PDHX	A	PRESSURE DROP OVER SECONDARY SIDE OF IHX	N/M2	VD9V	PRES2S PLOS2T LIST1R PUMP2S HYDR1S LOOP1S VRFY1R	HYDR1T HYDR1S LOOP1S READ1R	N-1003
P2PDSH	A	PRESSURE DROP OVER SUPERHEATER SHELL SID E	N/M2	VD9V	PLOS2T PRES2S RITE2S LIST1R VRFY1R SPHT2S WRIT2T LOOP2S PUMP2S	SPHT2T READ1R SPHT2S LOOP2S	N-1003
P2RISE	A	PRESSURE RISE ACROSS PUMP	N/M2	VD9V	WRIT2T PUMP2T	WRIT2T PUMP2T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P3CONV	S	RELATIVE CONVERGENCE CRITERION FOR SG PR ESSURE CALCULATIONS	-	DATI3V		CALC3R	S-1002
P3DPIP	A	INLET PLENUM PRESSURE DROP IN HEAT EXCHA NGER	N/M2	DATI3V	HX3S	INIT3R CALC3R	S-301
P3DPOP	A	OUTLET PLENUM PRESSURE DROP IN HEAT EXCH ANGER	N/M2	DATI3V	HX3S	CALC3R INIT3R	S-301
P3DSGN	S	DESIGN PRESSURE AT TURBINE INLET	N/M2	DATA8V	LIST8R CALC8R	READ8R	0-1
P3INSL	A	WATER SIDE INLET PRESSURE OF EACH FLOW S EGMENT	N/M2	DATI3V	WFLO3S INIT3S	STMP3S	
P3OT	A	OUTLET PRESSURE OF MODULE	N/M2	VD9V	PUMP3S PIPE3S HX3S	STMP3S CALC3R INIT3R	S-1
P3PTRB	A	TURBINE INLET PRESSURE (PAIRED WITH S3P TRB(I))	N/M2	VD9V	FEED3T LIST9T	READ9T	1-3001
P3SBLP	A	REFERENCE PRESSURE FOR FLOW SEGMENT	N/M2	DATI3V	INIT3S WFLO3S	STMP3S	
P3TOTC	S	CALCULATED POWER TRANSFERRED PER SG (COM PARED TO P3TOT)	W	IHX3SV	STGN3S PBAL9S	STGN3S	
P3TOT	S	DESIRED POWER TRANSFERRED PER SG (=F9PWR Z*P9DSGN/N1LOOP)	W	IHX3SV	STGN3S FEED3S PBAL9S	CALC8R	
P3TURB	S	TURBINE INLET PRESSURE	N/M2	DATI3V	PRNT9S STMP3S	CALC8R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P3VOLI	A	PRESSURE IN EACH ACCUMULATOR OF BOTH STE AM GENERATOR AND TURBINE LOOPS	N/M2	DATI3V	VOL3S STMP3S	CALC3R INIT3R	
P3VOL	A	PRESSURE IN EACH ACCUMULATOR	N/M2	VD9V	STGN3S ACCM3T PLOP3T STGN3T INFS3T PRNT3T	STGN3S VOL3S STGN3T	S-101
P3WSSG	A	WATER SIDE PRESSURE IN EACH NODE OF EACH FLOW SEGMENT	N/M2	VD9V	PRNT9S STGN3S PRNT3S INIT3S	PUMP3S VOL3S HX3S STGN3S INIT3S PIPE3S	
P3WSTB	A	WATER SIDE PRESSURE IN EACH NODE OF TURB INE FLOW SEGMENT	N/M2	VD9V	INIT3S PRNT3S PRNT9S	PIPE3S INIT3S VOL3S	
P5FGAS	A	FISSION GAS PRESSURE FOR EACH CHANNEL	N/M2	VD9V	VRFY7R FUEL5S LEAK5T LIST7R	FUEL5T FUEL5S	V-21
P5TOT	S	TOTAL POWER IN FUEL	W	DAT25V	PBAL9S FRAD5S FRAD5T INIT5T	PBAL9S	
P5Z	S	INITIAL VALUE OF P5TOT	W	TFUL5V		INIT5T	
P6BCOR	S	PRESSURE AT BOTTOM OF CORE	N/M2	DAT16V	CORE6S PRNT6T UPLN6S	LPLN6T LPLN6S	
P6BPE	S	PRESSURE AT BYPASS CHANNEL EXIT	N/M2	DAT26V	OPTN6S	UPLN6S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P6CGAS	S	COVER GAS PRESSURE AT UPPER PLENUM	N/M2	DAT26V	OPTN6S UPLN6T PINT1S INIT6T FLOW6T PRNT6T UPLN6S MOVE9T	UPLN6T CALC8R	
P6CGFB	S	COVER GAS PRESSURE CHANGE REQUIRED TO AC TUATE FEED/BLEED VALVE	N/M2	DAIN6V	LIST9T	READ9T	T-6002
P6CGLB	S	INITIAL COVER GAS PRESSURE MINUS P6CGFB	N/M2	DAIN6V	UPLN6T		
P6CGUB	S	INITIAL COVER GAS PRESSURE PLUS P6CGFB	N/M2	DAIN6V	UPLN6T		
P6DSGN	S	DESIGN CORE PRESSURE DROP	N/M2	DAT26V	LIST7R OPTN6S CALC7R	READ7R	V-23
P6GSTY	S	STEADY STATE COVER GAS PRESSURE (USED IN CONSTANT MASS OPTION)	N/M2	DVOG6V		INIT6T	
P6INLT	S	VESSEL INLET PRESSURE	N/M2	DAT26V	OPTN6S INIT6T COOL6S LPLN6S MOVE9T INIT1T PRNT9S	OPTN6S COOL6S	
P6INVL	S	PARAMETER USED IN INTERPOLATION FOR VESS EL PRESSURE	N/M2	TFLO1V	COOL6T	COOL6T STOR1T	
P6INVN	S	PARAMETER USED IN INTERPOLATION FOR VESS EL PRESSURE	N/M2	TFLO1V	COOL6T	STOR1T COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P6INVR	S	PARAMETER USED IN INTERPOLATION FOR VESS EL PRESSURE	N/M2	TFLO1V	COOL6T	COOL6T	
P6INV	A	CURRENT VALUE OF VESSEL INLET PRESSURE	N/M2	TFLO1V	COOL6T DRIV9T STOR1T	DRIV9T STOR1T	
P6NODE	A	PRESSURE IN EACH AXIAL COOLANT NODAL INT ERFACE IN EACH CHANNEL	N/M2	VD9V	COOL6S OPTN6S CORE6T PRNT6T UPLN6S PUT5T VOID5T LEAK5T CORE6S	CORE6T LPLN6S CORE6S	
P6OUTL	S	VESSEL OUTLET PRESSURE	N/M2	DAT16V	PRNT9S UPLN6S PRNT6T OPTN6S UPLN6T MOVE9T COOL6S CORE6T INIT1T FLOW6T	PINT1S UPLN6S OPTN6S UPLN6T	
P6STEP	S	MAXIMUM PRESSURE CHANGE ALLOWED PER ITER ATION	N/M2	DAT26V	LIST7R OPTN6S	BLKDAT READ7R	V-23
P6TCOR	S	PRESSURE AT TOP OF CORE	N/M2	DAT16V	OPTN6S UPLN6S	OPTN6S UPLN6S	
P6TERM	S	USED TO INTERFACE IN-VESSEL PRESSURE DRO P INFORMATION WITH LOOP HYDRAULICS CALCU LATIONS	N/M2	RV	INIT6T VESL1T FLOW6T	INIT6T FLOW6T	
P6TPOW	S	TOTAL POWER TRANSFERRED INTO COOLANT	W	DAT26V	CORE6S CORE6T PBAL9S UPLN6S	PBAL9S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
P6VIN	S	CURRENT VALUE OF VESSEL INLET PRESSURE I NTERPOLATED FROM LOOP HYDRAULICS DATA	N/M2	DATT6V	CORE6T LPLN6T FLOW6T	COOL6T INIT6T	
P7DROP	S	REACTOR VESSEL PRESSURE DROP	N/M2	DATA8V	PINT1S COOL6S	CALC7R COOL6S	O-5
P9ATM	S	ATMOSPHERIC PRESSURE	N/M2	DATC9V	GVSL1T	BLKDAT	
P9DSGN	S	DESIGN REACTOR POWER	W	IHX3SV	FEED3S CALC8R LIST8R	READ8R	O-1
Q1FLOR	S	RATED VOLUMETRIC FLOW RATE OF PRIMARY PU MP	M3/S	A1TCV	LIST1R HEAD1T WRIT1T PUMP1S TORK1T	READ1R	N-112
Q1LOSS	A	HEAT RATE LOST BY PRIMARY COOLANT IN IHX	W	VD9V	LOOP1S PBAL9S IHX1S	LOOP1S IHX1S	
Q1NRTA	S	PRIMARY PUMP INERTIA	KG-M2	A1TCV	LIST9T INIT1T	READ9T	T-1001
Q2FLOR	S	RATED VOLUMETRIC FLOW RATE OF INTERMEDIA TE PUMP	M3/S	A2TCV	LIST1R PUMP2S HEAD2T TORK2T	READ1R	N-122
Q2GAIN	A	HEAT RATE GAIN BY SECONDARY COOLANT IN I HX	W	VD9V	IHX1S LOOP1S	IHX1S LOOP1S	
Q2NRTA	S	SECONDARY PUMP INERTIA	KG-M2	A2TCV	INIT1T LIST9T	READ9T	T-1002

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Q3DTG1	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		VD9V	NKEY3R CALC3R VRFY3R READ3R LIST3R	READ3R	
Q3DTG2	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	LIST3R NKEY3R CALC3R VRFY3R	READ3R	
Q3DTG3	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	CALC3R VRFY3R NKEY3R LIST3R	READ3R	
Q3DTG4	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	CALC3R LIST3R VRFY3R NKEY3R	READ3R	S-101
Q3DTG5	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	VRFY3R LIST3R CALC3R NKEY3R	READ3R	
Q3DTI0	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	CALC3R LIST3R	READ3R	
Q3DTI1	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		VD9V	LIST3R VRFY3R READ3R CALC3R	READ3R	
Q3DTI2	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	VRFY3R LIST3R CALC3R	READ3R	
Q3DTI3	A	TEMPORARY ARRAY USED IN SG INPUT PROSESS OR		DATR3V	VRFY3R CALC3R LIST3R	READ3R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Q3DTI4	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	VRFY3R CALC3R LIST3R	READ3R	S-101
Q3DTP3	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	CALC3R LIST3R VRFY3R	READ3R	
Q3DTP5	A	TEMPORARY ARRAY USED IN SG INPUT PROCESS OR		DATR3V	VRFY3R LIST3R CALC3R	READ3R	S-401
Q3NA	A	SURFACE HEAT FLUX ON SODIUM SIDE OF HEAT EXCHANGER	W/M2	VD9V	STGN3S TUBE3T	STGN3S HX3S TUBE3T	
Q3WS	A	SURFACE HEAT FLUX ON WATER SIDE OF HEAT EXCHANGER	W/M2	VD9V	STGN3S PRNT3T TUBE3T HX3T	STGN3S HX3S TUBE3T	
Q6CGCP	S	SPECIFIC HEAT CAPACITY OF COVER GAS	J/(KG*K)	DAIN6V	UPLN6T	INIT6T	
Q6CGFB	S	IN-VESSEL COVER GAS FEED/BLEED RATE (L6 CGAS=2)	KG/S	DAIN6V	LIST9T UPLN6T	READ9T	T-6002
R1PLEN	A	THE ANGLE OF FLOW IN IHX PRIMARY PLENA (I = 1, 2)	D	DATX1V	HYDR1S HYDR1T CALC1R LIST1R	CALC1R READ1R	N-103
R1SBRK	A	ANGLE OF NODES IN BROKEN PIPE	D	VD9V	RSET1T	INIT1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
R1SIN	A	THE ANGLE OF PRIMARY FLOW AT EACH NODE I N EACH PIPE OF EACH LOOP	D	VD9V	INITIT RSET1T PIPW1T HYDR1S HYDR1T PIPE1S LIST1R CALC1R	RSET1T READ1R CALC1R	N-1101
R2DOWN	S	THE ANGLE OF FLOW IN THE IHX CENTRAL DOW NCOMER	D	DAT12V	HYDR1S LIST1R CALC1R HYDR1T	CALC1R READ1R	N-104
R2EV	A	THE ANGLE OF FLOW IN THE EVAPORATOR SHEL L SIDE	D	VD9V	EVAP2T EVAP2S	CALC1R	N-120
R2INEV	S	THE ANGLE OF FLOW AT INLET PLENUM OF EVA PORATOR SHELL SIDE	D	DATE2V	EVAP2T LIST1R EVAP2S CALC1R	READ1R CALC1R	N-120
R2INSH	S	THE ANGLE OF FLOW AT INLET PLENUM OF SUP ERHEATER SHELL SIDE	D	DATS2V	SPHT2T CALC1R LIST1R SPHT2S	READ1R CALC1R	N-121
R2OUEV	S	THE ANGLE OF FLOW AT THE OUTLET PLENUM O F EVAPORATOR SHELL SIDE	D	DATE2V	EVAP2T LIST1R CALC1R EVAP2S	READ1R CALC1R	N-120
R2OUSH	S	THE ANGLE OF FLOW AT OUTLET PLENUM OF SU PERHEATER SHELL SIDE	D	DATS2V	LIST1R CALC1R SPHT2T SPHT2S	CALC1R READ1R	N-121
R2PLEN	A	THE ANGLE OF FLOW IN IHX SECONDARY PLENA (I = 1, 2)	D	DAT12V	HYDR1T CALC1R LIST1R HYDR1S	CALC1R READ1R	N-103
R2SBRK	A	ANGLE OF NODES IN BROKEN PIPE	D	VD9V	RSET2T	INITIT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
R2SH	A	THE ANGLE OF FLOW IN SUPERHEATER SHELL S IDE	D	VD9V	SPHT2T SPHT2S	CALC1R	N-121
R2SIN	A	THE ANGLE OF INTERMEDIATE FLOW AT EACH N ODE OF EACH PIPE OF EACH LOOP	D	VD9V	PIPW2T CALC1R RSET2T PIPE2S LIST1R INIT1T	CALC1R RSET2T READ1R	N-1201
R3PUMP	A	SPEED RATIO OF SG PUMP IN EACH SODIUM LO OP	-	VD9V	STGN3S PUMP3S PRNT9S	STGN3S PUMP3S PUMP3T	
R5CL	A	ARRAY USED TO STORE PREVIOUS VALUES OF F 5PREC	-	DATD5V	PRMT5T	INIT5T POW5T	
R5DOPP	S	DOPPLER FEEDBACK REACTIVITY	R	DATD5V	MOVE9T REAC5T DOPP5T	INIT5T DOPP5T	
R5GROW	S	AXIAL EXPANSION FEEDBACK REACTIVITY	R	DATD5V	REAC5T MOVE9T	INIT5T GROW5T	
R5PLNM	A	RESISTIVITY OF FISSION GAS PLENUM MATERI AL	M2*K/W	VD9V	PROP6T STEM5T	PROP6T	
R5RHLL	S	VALUE OF TOTAL REACTIVITY AT TIMESTEP K-2	R	DATD5V	PRMT5T	POW5T INIT5T	
R5RHOL	S	VALUE OF TOTAL REACTIVITY AT TIMESTEP K-1	R	DATD5V	PRMT5T REAC5T POW5T	INIT5T POW5T	
R5RHO	S	CURRENT VALUE OF TOTAL REACTIVITY	R	DATD5V	POW5T PRMT5T	INIT5T REAC5T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
R5SROD	A	SCRAM ROD REACTIVITY INSERTION (PAIRED WITH S5SROD)	R	VD9V	INIT5T APPL5T LIST9T	INIT5T READ9T	T-5005
R5STR	A	RESISTIVITY OF IN-VESSEL ROD STRUCTURE M ATERIAL	M2*K/W	VD9V	STEM5T PROP6T	FUEL5S FUEL5T	
R5VOID	S	SODIUM VOID FEEDBACK REACTIVITY	R	DATD5V	REAC5T MOVE9T VOID5T	INIT5T VOID5T	
S1BREK	A	TIME OF PRIMARY PIPE BREAK	S	VD9V	BREKIT VRFY9T LIST9T	READ9T	T-1003
S1DELA	S	ALLOWED VALUE OF S1DELT	S	TLUP1V	PRNT9T DRIV9T INTG1T	INIT9T DRIV9T	
S1DELP	S	PREVIOUS VALUE OF S1DELT	S	TLUP1V		DRIV9T INIT9T	
S1DELT	S	LOOP THERMAL TIME STEP	S	TLUP1V	INIT9T DRIV9T PRNT9T IHX1T MOVE9T PIPE1T	INIT9T DRIV9T	
S1DELW	S	LOOP HYDRAULIC TIMESTEP	S	TFLO1V	PRNT9T INTF3T INIT1T MOVE9T DRIV9T	INIT9T DRIV1T	
S1DLWL	S	USED IN IN-VESSEL INTERFACE CALCULATIONS	S	TFLO1V	COOL6T	COOL6T STOR1T	
S1DLWP	S	PREVIOUS VALUE OF S1DELW	S	TFLO1V	DRIV1T	DRIV1T INIT1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S1FLOL	S	USED IN IN-VESSEL INTERFACE CALCULATIONS	S	TFLO1V	COOL6T STOR1T	COOL6T INIT9T STOR1T	
S1FLOR	S	USED IN IN-VESSEL INTERFACE CALCULATIONS	S	TFLO1V	STOR1T COOL6T	INIT9T STOR1T COOL6T	
S1FLOT	A	ARRAY USED TO STORE IN-VESSEL INTERFACE DATA	S	TFLO1V	DRIV9T COOL6T STOR1T	DRIV9T STOR1T	
S1FLOW	S	CURRENT LOOP HYDRAULICS TIME	S	TFLO1V	STOR1T DRIV9T INIT9T INTF3T BREK2T PUMP2T BREK1T PUMP1T PRNT9T	DRIV1T INIT9T	
S1LOOP	S	CURRENT LOOP THERMAL TIME	S	TLUP1V	PRNT1T DRIV9T WRIT1T	DRIV9T INIT9T	
S1POFF	A	PUMP MAIN MOTOR SHUTOFF TIME IN EACH PRI MARY LOOP	S	VD9V	PUMP1T VRFY9T LIST9T	READ9T	T-9007
S2BREK	A	TIME OF SECONDARY PIPE BREAK	S	VD9V	VRFY9T LIST9T BREK2T	READ9T	T-1201
S2DELT	S	SAME AS S1DELT	S	TLUP1V	IHX1T PIPE2T	DRIV9T	
S2FLOT	A	ARRAY TO STORE STEAM GENERATOR FLOW INTE RFACE DATA	S	BCWFLO	STGN3T ENAVG TMSG3T	INTF3T	
S2LOOP	S	SAME AS S1LOOP	S	TLUP1V	WRIT2T	DRIV9T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S2POFF	A	PUMP MAIN MOTOR SHUTOFF TIME IN EACH SEC ONDARY LOOP	S	VD9V	VRFY9T LIST9T PUMP2T	READ9T	T-9007
S2TEMP	A	ARRAY USED TO STORE STEAM GENERATOR INTE RFACE DATA	S	BCTEMP	STMP3T INTF3T	INTF3T	
S3DELP	S	PREDICTED TIME STEP FOR STEAM GENERATOR CALCULATIONS	S	DATT3V	TMSG3T	TMSG3T INIT3T	
S3DELT	S	CURRENT TIME STEP FOR STEAM GENERATOR CA LCULATIONS	S	DATT3V	DRIV9T PRNT9T MOVE9T TMSG3T	INIT3T TMSG3T	
S3DMN		MINIMUM TIME STEP FOR STEAM GENERATOR CA LCULATIONS	S	DATT3V	TMSG3T	INIT3T	
S3DMX	S	MAXIMUM TIME STEP FOR STEAM GENERATOR CA LCULATIONS	S	DATT3V	TMSG3T	INIT3T	
S3DTPV	S	PREVIOUS STEAM GENERATOR TIME STEP	S	DATT3V		TMSG3T INIT3T	
S3PCST	S	PUMP COASTDOWN TIME CONSTANT	S	DATP3V		CALC3R INIT3R	
S3POFF	A	TIME AT WHICH PUMP IN EACH STEAM GENERAT OR IS SHUT OFF	S	VD9V	PUMP3T VRFY9T LIST9T	READ9T	T-9007
S3PTRB	A	TIME (PAIRED WITH P3TRB)	S	VD9V	FEED3T LIST9T	READ9T	T-3001
S3STGN	S	CURRENT TIME IN STEAM GENERATOR	K	DATT3V	DRIV9T PRNT3T STGN3T	STGN3T INTF3T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S5DELA	S	ALLOWED VALUE OF S5DELT	S	TFUL5V	PRNT9T DRIV9T COOL6T	PRNT9T DRIV9T INIT9T	
S5DELP	S	PREVIOUS VALUE OF S5DELT	S	TFUL5V	PROP6T DOPP5T VOID5T GROW5T TFUN5T	DRIV9T	
S5DELT	S	CURRENT TIMESTEP FOR FUEL CALCULATIONS	S	TFUL5V	STEM5T COEF5T TFUN5T DRIV9T PRMT5T VOID5T PRNT9T MOVE9T DOPP5T GROW5T	INIT9T DRIV9T PRNT9T	
S5FUEL	S	CURRENT TIME FOR FUEL CALCULATIONS	S	TFUL5V	PRNT6T APPL5T COOL6T LEAK5T PROP6T DRIV9T	INIT9T DRIV9T	
S5PAST	S	PREVIOUS VALUE OF S5FUEL	S	TFUL5V	PROP6T POW6T	INIT9T DRIV9T	
S5PBPD	A	TRANSIENT POSTSCRAM TIME FOR DECAY POWER IN BYPASS (PAIREDWITH F5PBPD)	S	VD9V	POW6T LIST9T	READ9T	T-5006
S5PD	A	TRANSIENT POSTSCRAM TIME FOR DECAY POWER IN CHANNEL (PAIRED WITH F5PD)	S	VD9V	POW6T LIST9T	READ9T	T-5101
S5SCRA	S	REACTOR SCRAM TIME	S	INTG9V	APPL5T PRNT9T LIST9T POW6T	READ9T	T-9007

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S5SROD	A	POSTSCRAM TIMES FOR SCRAM ROD INSERTION (PAIRED WITH R5SROD(I))	S	VD9V	APPL5T LIST9T	READ9T	T-5005
S6COOL	S	CURRENT TIME FOR IN-VESSEL COOLANT CALCU LATIONS	S	TCUL6V	COOL6T POW6T PRNT6T PROP6T CORE6T DRIV9T FLOW6T	DRIV9T INIT9T	
S6DELA	S	ALLOWED VALUE OF S6DELT	S	TCUL6V	PRNT9T DRIV9T COOL6T	PRNT9T DRIV9T COOL6T INIT9T	
S6DELP	S	PREVIOUS VALUE OF S6DELT	S	TCUL6V	PRNT6T	DRIV9T COOL6T INIT9T	
S6DELT	S	CURRENT TIMESTEP FOR IN-VESSEL COOLANT C ALCULATIONS	S	TCUL6V	LPLN6T DRIV9T MOVE9T CORE6T INIT9T FLOW6T PRNT9T COOL6T	DRIV9T INIT9T PRNT9T COOL6T	
S9CPU	S	TOTAL CPU TIME USED	S	DATA9	PAGE9U		
S9DELZ	S	INITIAL VALUE OF S9DELT AT START OF TRAN SIENT	S	INTG9V	INIT9T PRNT9T	INIT9T	
S9INOW	S	CURRENT VALUE OF PRINT INTERVAL	S	INTG9V	DRIV9T INTG1T PRNT9T	PRNT9T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S9LAST	S	PROBLEM SIMULATION TIME	S	INTG9V	PRNT9T LIST9T DRIV9T INIT1T	READ9T	T-9001
S9MAXA	S	MAXIMUM TIMESTEP ALLOWED	S	INTG9V	INIT6T DRIV9T INIT3T LIST9T INIT1T	READ9T	T-9001
S9MINA	S	MINIMUM TIMESTEP ALLOWED	S	INTG9V	PRNT9T COOL6T VRFY9T INIT9T DRIV9T LIST9T INIT3T	READ9T	T-9001
S9MIN2	S	SET EQUAL TO S9MINA/2	S	INTG9V	DRIV9T PRNT9T INTG1T DRIV1T COOL6T	INIT9T	
S9MSTR	S	CURRENT MASTER CLOCK TIME	S	INTG9V	PRNT9T MOVE9T INIT9T TMSG3T DRIV9T FLOW6T INTF3T DRIV1T COOL6T	INIT9T DRIV9T	
S9PAST	S	PREVIOUS VALUE OF S9MSTR	S	TFLO1V	DRIV1T	DRIV9T	
S9PINT	A	PRINT INTERVAL	S	INTG9V	LIST9T PRNT9T INIT9T	READ9T	T-9001

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
S9PRNT	S	NEXT VALUE OF S9MSTR AT WHICH RESULTS AR E PRINTED/STORED	S	INTG9V	PRNT9T STGN3T DRIV9T	PRNT9T INIT9T	
S9SINT	S	TIME INTERVAL AT WHICH A TRANSIENT RESTA RT WILL BE CREATED	S	INTG9V	DRIV9T LIST9T	READ9T	
T1BYP	A	TEMPERATURE OF PRIMARY BYPASS FLOW ENTER ING OUTLET REGION OF IHX	K	VD9V	PRET1T LOOP1S IHX1T IHX1S PRNT1T	PRET1T LOOP1S IHX1T IHX1S	
T1CONV	S	CONVERGENCE CRITERION FOR TEMPERATURES I N IHX	K	DATA1V	IHX1S LIST1R	READ1R	N-105
T1DOWN	A	COOLANT TEMPERATURE IN DOWNCOMER	K	VD9V	PRET1T IHX1T	PRET1T IHX1T	
T1FRCR	S	RATED FRICTIONAL TORQUE OF PRIMARY PUMP	N-M	A1TCV		CALC1R	
T1FRIC	A	FRICTIONAL TORQUE OF PRIMARY PUMP	N-M	VD9V	WRIT1T	PUMP1T	
T1HYD	A	HYDRAULIC TORQUE OF PRIMARY PUMP	N-M	VD9V	WRIT1T	PUMP1T	
T1INHX	A	TEMPERATURE OF COOLANT ENTERING IHX PRIM ARY SIDE	K	VD9V	PRNT1T IHX1T PRET1T HYDR1T PBAL9S LOOP1S PRNT9S IHX1S	IHX1T END1S PBAL9S LOOP1S END1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T1INLT	S	TEMPERATURE OF COOLANT AT INLET OF PRIMARY LOOP	K	DATB1V	LOOP1S LOOP1T PRNT1T	PRET1T COOL6T LOOP1T PINT1S	
T1INP	A	COOLANT TEMPERATURE AT PRIMARY PUMP INLET	K	VD9V	INIT1T RES1T	INIT1T RES1T	
T1IN	A	COOLANT TEMPERATURE AT IHX PRIMARY INLET AT PREVIOUS TIME	K	VD9V	IHX1T	IHX1T PRET1T	
T1NAS	A	TEMPERATURE OF COOLANT AT EACH NODE OF SECONARY SIDE OF IHX	K	VD9V	HYDR1T LOOP1S RITE1S IHX1S IHX1T HYDR1S PRNT1T	LOOP1S IHX1S IHX1T	
T1NA	A	PRIMARY COOLANT TEMPERATURE AT EACH NODE IN EACH PIPE OF EACH LOOP	K	VD9V	IHX1S CVAL1T LOOP1S BREK1T IHX1T PRNT1T PIPE1S PIPW1T HYDR1S END1S GVSL1T HYDR1T PIPE1T PRET1T INIT1T RSET1T PRNT9S PUMP1S RES1S CVAL1S RITE1S RES1T LOOP1T	IHX1S LOOP1S IHX1T PIPE1S END1S PIPE1T RSET1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T1ORKR	S	RATED HYDRAULIC TORQUE OF PRIMARY PUMP	N-M	A1TCV	CALC1R TORK1T LIST1R	READ1R	N-112
T1OUHX	A	TEMPERATURE OF COOLANT EXITING IHX PRIMA RY SIDE	K	VD9V	PRET1T HYDR1T LOOP1S PBAL9S END1S PRNT9S PRNT1T IHX1T	LOOP1S END1T IHX1T IHX1S	
T1OUTL	A	COOLANT TEMPERATURE AT OUTLET OF PRIMARY LOOP	K	VD9V	LPLN6T PRNT1T	LOOP1T PRET1T	
T1OUTP	A	COOLANT TEMPERATURE AT OUTLET OF PRIMARY PUMP	K	VD9V		INIT1T	
T1OUT	A	COOLANT TEMPERATURE AT IHX PRIMARY OUTLE T AT PREVIOUS TIME	K	VD9V	IHX1T	PRET1T IHX1T	
T1PIN	S	COOLANT TEMPERATURE AT IHX INLET AT ADVA NCED TIME	K	SCRH1V	IHX1T	IHX1T	
T1PMPI	S	INITIAL VALUE OF T1PUMP	K	BNDS8R	CALC8R LIST8R	READ8R	O-4
T1PNAS	A	TEMPORARY ARRAY TO STORE ADVANCED TIME T EMPERATURES IN IHX SECONDARY SIDE	K	VD9V	IHX1T	IHX1T	
T1PNA	A	COOLANT TEMPERATURE AT ADVANCED TIME	K	VD9V	IHX1T	IHX1T	
T1POUT	S	COOLANT TEMPERATURE AT IHX PRIMARY OUTLE T AT ADVANCED TIME	K	SCRH1V	IHX1T	IHX1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T1PSH	A	TEMPORARY ARRAY TO STORE IHX SHELL TEMPE RATURE AT ADVANCED TIME	K	VD9V	IHX1T	IHX1T	
T1PTUB	A	TEMPORARY ARRAY TO STORE IHX TUBE TEMPER ATURE AT ADVANCED TIME	K	VD9V	IHX1T	IHX1T	
T1PUMP	A	TEMPERATURE RISE ACROSS PRIMARY PUMP	K	VD9V	PBAL9S END1S	CALC8R	
T1PWAL	A	PIPE WALL TEMPERATURE AT ADVANCED TIME	K	VD9V	PIPE1T	PIPE1T	
T1SHEL	A	IHX SHELL TEMPERATURE AT PREVIOUS TIME	K	VD9V	PRET1T IHX1T	PRET1T IHX1T	
T1TUBE	A	TUBE WALL TEMPERATURE IN EACH WALL NODE OF IHX	K	VD9V	LOOP1S IHX1T RITE1S	LOOP1S IHX1T IHX1S	
T1WALL	A	PIPE WALL TEMPERATURE AT PREVIOUS TIME	K	VD9V	PIPE1T	PRET1T PIPE1T	
T2FRCR	S	RATED FRICTION TORQUE FOR INTERMEDIATE P UMP	N-M	A2TCV		CALC1R	
T2FRIC	A	FRICTIONAL TORQUE OF INTERMEDIATE PUMP	N-M	VD9V	WRIT2T	PUMP2T	
T2HYD	A	HYDRAULIC TORQUE OF INTERMEDIATE PUMP	N-M	VD9V	WRIT2T	PUMP2T	
T2IHXI	S	GUESS OF IHX SECONDARY SODIUM INLET TEMP . (IF KNOWN)	K	DATA8V	PBAL9S LIST8R CALC8R	PBAL9S READ8R CALC8R	0-3
T2IHXO	S	GUESS OF IHX SECONDARY SODIUM OUTLET TEM P. (IF KNOWN)	K	DATA8V	LIST8R	READ8R	0-3

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T2IHX	S	INTERMEDIATE LOOP STEAM GENERATOR OUTLET TEMPERATURE (USED IN STEADY STATE)	K	IHX3SV	STMP3S PBAL9S	PBAL9S CALC8R	
T2INEV	A	TEMPERATURE OF COOLANT ENTERING EVAPORAT OR SHELL SIDE	K	VD9V	EVAP2S EVAP2T RITE2S INTF3T LOOP2S	EVAP2S EVAP2T LOOP2S LOOP2T	
T2INHX	A	TEMPERATURE OF COOLANT ENTERING IHX SECO NDARY SIDE	K	VD9V	HYDR1S PRNT9S IHX1T PRNT1T LOOP1S PRET1T LOOP2S HYDR1T PBAL9S	IHX1S END2T IHX1T LOOP1S	
T2INP	A	COOLANT TEMPERATURE AT SECONDARY PUMP IN LET	K	VD9V	INIT2T RES2T	INIT2T RES2T	
T2INSH	A	TEMPERATURE OF COOLANT ENTERING SUPERHEA TER SHELL SIDE	K	VD9V	LOOP2S PRNT1T RITE2S SPHT2T SPHT2S INTF3T	LOOP2S LOOP2T SPHT2T SPHT2S	
T2IN	A	SECONDARY IHX INLET TEMPERATURE	K	VD9V	IHX1T	IHX1T PRET1T	
T2MXCG	S	MAXIMUM ALLOWED CHANGE IN T2INHX PER ITE RATION	K	PREV2V	PBAL9S LIST8R	READ8R	0-3

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T2NA	A	INTERMEDIATE COOLANT TEMPERATURE	K	VD9V	LOOP2S INIT2T BREK2T SPHT2T RITE2S TANK2T PIPW2T PRET1T RSET2T EVAP2T PRNT9S EVAP2S PUMP2S TANK2S RES2S SPHT2S PIPE2S END2S PIPE2T PRNT1T RES2T	LOOP2S RSET2T PIPE2S END2S PIPE2T	
T2ORKR	S	RATED HYDRAULIC TORQUE OF INTERMEDIATE P UMP	N-M	A2TCV	TORK2T CALC1R	READ1R	N-122
T2OUEV	A	TEMPERATURE OF COOLANT EXITING EVAPORATO R SHELL SIDE	K	VD9V	PRNT1T EVAP2T INTF3T EVAP2S LOOP2S RITE2S END2S	EVAP2T INTF3T EVAP2S LOOP2S	
T2OUHX	A	TEMPERATURE OF COOLANT EXITING IHX SECON DARY SIDE	K	VD9V	PRNT9S LOOP1S IHX1T PRET1T PBAL9S IHX1S RITE1S HYDR1T LOOP2S PRNT1T	LOOP1S IHX1T PBAL9S LOOP2T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T2OUSH	A	TEMPERATURE OF COOLANT EXITING SUPERHEATER SHELL SIDE	K	VD9V	SPHT2S INTF3T SPHT2T RITE2S END2S LOOP2S	SPHT2S INTF3T SPHT2T LOOP2S	
T2OUTP	A	COOLANT TEMPERATURE AT OUTLET OF INTERMEDIATE PUMP	K	VD9V		INIT2T	
T2OUT	A	COOLANT TEMPERATURE AT IHX OUTLET SECONDARY SIDE PREVIOUS TIME	K	VD9V	IHX1T	IHX1T PRET1T	
T2PMPI	S	INITIAL VALVE OF T2PUMP	K	BNDS8R	CALC8R LIST8R	READ8R	0-4
T2PUMP	A	TEMPERATURE RISE ACROSS INTERMEDIATE PUMP	K	VD9V	PBAL9S RITE2S END2S CALC8R LOOP2S	CALC8R LOOP2S	
T2PWAL	A	PIPE WALL TEMPERATURE AT ADVANCED TIME	K	VD9V	PIPE2T	PIPE2T	
T2TEMP	A	ARRAY USED TO STORE STEAM GENERATOR INTERFACE DATA	K	VD9V	INTF3T STMP3T	INTF3T	
T2WALL	A	PIPE WALL TEMPERATURE	K	VD9V	PIPE2T	PIPE2T PRET1T	
T3CONV	S	RELATIVE CONVERGENCE CRITERION FOR TEMPERATURE ITERATIVE CALCULATIONS	-	DATI3V	TUBE3T HXND3S HX3S	CALC3R	S-1002
T3NAIN	A	SODIUM INLET TEMPERATURE OF HEAT EXCHANGER	K	DATI3V	HX3S	INIT3R CALC3R	S-301

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T3NAOT	A	SODIUM OUTLET TEMPERATURE OF HEAT EXCHAN GER	K	DATI3V		INIT3R CALC3R	S-301
T3NA	A	SODIUM TEMPERATURE IN EACH NODE OF EACH SG HX OF EACH SODIUM LOOP	K	VD9V	PRNT3T EVAP2S STMP3S EVAP2T TUBE3T PRNT9S PRNT3S HX3S SPHT2S STGN3S INTF3T PBAL9S SPHT2T	TUBE3T HX3S STGN3S	
T3TWDN	A	TUBE WALL TEMPERATURE FOR PORTION OF TUB E WALL ABOVE(DOWNSTREAM) OF DNB LOCATION	K	VD9V	PRNT3S STGN3S TUBE3T PRNT3T	HX3S STGN3S TUBE3T	
T3TW	A	TUBE WALL TEMPERATURE OF EACH NODE OF EA CH SG HX OF EACH SODIUM LOOP	K	VD9V	PRNT3S TUBE3T PRNT3T STGN3S	HX3S TUBE3T STGN3S	
T5CG	A	TEMP. THRESHOLD FOR COLUMNAR GRAIN GROWT H OF FUEL FOR EACH SLICE TYPE	K	VD9V	GRO5S	CALC7R	
T5CMLT	A	MELTING TEMP. OF CLADDING MATERIAL FOR E ACH SLICE TYPE	K	VD9V	ALFA5S ALFA5T	CALC7R	
T5DPAV	A	VOLUME-AVERAGED FUEL TEMPERATURE IN EACH AXIAL SLICE	K	VD9V	DOPP5T TSAV5S GROW5T	TSAV5T TSAV5S	
T5DREF	A	PREVIOUS VALUES OF T5DPAV	K	VD9V	DOPP5T GROW5T	TSAV5S GROW5T	
T5EG	A	TEMP. THRESHOLD FOR EQUIAXED GRAIN GROWT H FOR FUEL OF EACH SLICE TYPE	K	VD9V	GRO5S	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T5FMLT	A	MELTING TEMP. OF FUEL OF EACH SLICE TYPE	K	VD9V	FUEL5S	CALC7R	
T5FUEL	A	ARRAY OF FUEL, CLADDING AND STRUCTURE TE MPERATURES	K	VD9V	PRE5T PROP6T PRNT5S LEAK5T MAXD5T PRNT5T	PUT5T PUT5S	
T5REF	S	TEMP. AT WHICH THE ROD DIMENSIONS ARE RE FERENCED	K	DAT25V	STEM5S STEM5T XPAN5S XPAN5T FUEL5S LIST7R	READ7R	V-25
T6AVER	S	FLOW WEIGHTED AVERAGE ACTIVE CORE COOLAN T OUTLET TEMPERATURE	K	DATT6V	PRNT6T UPLN6T MOVE9T	INIT6T CORE6T	
T6BPAS	S	AVARAGE COOLANT TEMPERATURE IN LOWER REG ION OF BYPASS CHANNEL	K	DAT36V	INIT6T FLOW6T COOL6T PRNT6T COOL6S CORE6T UPLN6S	CORE6T UPLN6S	
T6BPE	S	COOLANT EXIT TEMPERATURE FROM UPPER REGI ON OF BYPASS	K	DAT16V	MOVE9T		
T6BPK	S	PREVIOUS VALUE OF T6BPAS	K	DATT6V	COOL6T	INIT6T COOL6T	
T6BPLI	S	SODIUM TEMPERATURE AT INLET TO LOWER BYP ASS REGION	K	DAT16V		UPLN6S CORE6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T6BPM	S	MEAN COOLANT TEMPERATURE IN UPPER REGION OF BYPASS	K	DAT16V	CORE6T FLOW6T UPLN6S UPLN6T PRNT6T COOL6S	CORE6T UPLN6S	
T6BPUE	S	SODIUM TEMPERATURE AT EXIT OF UPPER BYPA SS REGION	K	DAT16V	UPLN6S FLOW6T CORE6T COOL6S INIT6T	UPLN6S CORE6T	
T6BPUI	S	SODIUM TEMPERARURE AT INLET TO UPPER BYP ASS REGION	K	DAT16V	UPLN6S CORE6T FLOW6T	UPLN6S CORE6T	
T6CGAS	S	COVER GAS TEMPERATURE	K	DAT16V	UPLN6S MOVE9T PRNT6T UPLN6T COOL6S INIT6T EQIVIT	UPLN6S EQIVIT	
T6GSTY	S	STEADY STATE COVER GAS TEMPERATURE (USED IN CONSTANT MASS OPTION)	K	DVOG6V		INIT6T	
T6INLT	S	VESSEL COOLANT INLET TEMPERATURE AT STEA DY STATE	K	DAT26V	PRETIT MOVE9T VRFY8R PRNT6T CORE6S COOL6S CALC8R PRNT9S PBAL9S UPLN6S LPLN6S INIT6T LIST8R	READ8R CALC8R PBAL9S	0-2
T6LK	S	PREVIOUS VALUE OF T6LPN	K	DATT6V	COOL6T	INIT6T COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T6LMK	S	PREVIOUS VALUE OF T6LMT	K	DATT6V		COOL6T INIT6T	
T6LMT	S	TEMPERATURE OF METAL IN LOWER INLET PLEN UM	K	DATT6V	PRNT6T COOL6T LPLN6T	LPLN6T INIT6T	
T6LPN	S	TEMPERATURE OF SODIUM IN LOWER INLET PLE NUM	K	DATT6V	MOVE9T COOL6T PRNT6T LPLN6T CORE6T FLOW6T COEF6T	LPLN6T INIT6T	
T6MXCG	S	MAXIMUM ALLOWED CHANGE IN PRIMARY LOOP C ORNER TEMPERATURES PER ITERATION	K	PREV2V	PBAL9S LIST8R	READ8R	0-3
T6M1	S	TEMPERATURE AT UPPER INTERNAL STRUCTURE	K	DAT16V	MOVE9T PRNT6T EQIV1T UPLN6S UPLN6T INIT6T COOL6S	EQIV1T UPLN6S	
T6M2	S	TEMPERATURE OF THERMAL LINER	K	DAT16V	UPLN6T UPLN6S INIT6T MOVE9T CORE6T COOL6S PRNT6T EQIV1T	UPLN6S EQIV1T	
T6M3	S	TEMPERATURE OF VESSEL HEAD	K	DAT16V	INIT6T COOL6S MOVE9T UPLN6T PRNT6T	EQIV1T UPLN6S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T6NAA	S	TEMPERATURE OF SODIUM IN UPPER MIXING ZONE OF UPPER OUTLET PLENUM	K	DATT6V	MOVE9T UPLN6T EQIVIT PRNT6T	INIT6T EQIVIT	
T6NAB	S	TEMPERATURE OF SODIUM IN LOWER MIXING ZONE OF UPPER OUTLET PLENUM	K	DATT6V	COOL6T UPLN6T EQIVIT PRNT6T MOVE9T	EQIVIT INIT6T	
T6NODE	A	COOLANT TEMPERATURE AT EACH AXIAL NODAL INTERFACE OF EACH CHANNEL	K	VD9V	CORE6T DOPP5T UPLN6S VOID5T PRE5S TFUN5T PRNT5S PRNT5T COEF6T PROP6T INIT6T CORE6S COOL6T LPLN6S COOL6S INIT5T PRNT6T	CORE6T CORE6S LPLN6S	
T6NODK	A	PREVIOUS VALUES OF T6NODE	K	VD9V	VOID5T CORE6T DOPP5T COOL6T	INIT6T COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
T6OUTL	S	VESSEL SODIUM OUTLET TEMPERATURE	K	DAT26V	COOL6S COOL6T CALC8R OPTN6S PRNT6T MOVE9T LIST8R PRET1T PBAL9S PINT1S UPLN6S VRFY8R PRNT9S	CALC8R READ8R UPLN6T PBAL9S UPLN6S	O-2
T6SUPH	S	SUPER HEAT TEMPERATURE (CHANGE ABOVE SAT URATION TEMPERATURE WHERE BOILING OCCURS)	K	DAIN6V	CORE6T LIST9T	READ9T	T-6001
U1OMGA	A	OPERATING SPEED OF PRIMARY PUMP	RPM	VD9V	EQIV1T PUMP1T HEAD1T PRNT9S PRNT9T LOOP1S RITE1S WRIT1T	EQIV1T PUMP1T LOOP1S PUMP1S	
U1OMGR	S	RATED SPEED OF PRIMARY PUMP	RPM	DATA1V	VRFY9T LIST1R HEAD1T WRIT1T TORK1T PRNT9S PUMP1S	READ1R	N-112
U1PONY	S	PRIMARY PUMP MOTOR OPERATING SPEED	RPM	DATA1V	PUMP1T	VRFY9T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
U2OMGA	A	OPERATING SPEED OF INTERMEDIATE PUMP	RPM	VD9V	WRIT2T RITE2S LOOP2S EQIV2T PRNT9S PUMP2T PRNT9T	LOOP2S EQIV2T PUMP2S PUMP2T	
U2OMGR	S	RATED SPEED OF INTERMEDIATE PUMP	RPM	DATA2V	VRFY9T HEAD2T PUMP2S RITE2S TORK2T LIST1R PRNT9S	READ1R	N-122
U2PONY	S	INTERMEDIATE PUMP OPERATING SPEED	RPM	DATA2V	PUMP2T	VRFY9T	
V1BYP	S	VOLUME OF SODIUM IN IHX PRIMARY BYPASS	M3	A1TCV	IHX1T LIST1R	READ1R	N-100
V1GV	A	VOLUME OF SODIUM IN GUARD VESSEL	M3	VD9V	GVSL1T EQIV1T	INIT1T EQIV1T	
V1IHX	S	VOLUME OF SODIUM IN IHX PRIMARY HEAT EXC HANGE REGION	M3	A1TCV	LIST1R PRET1T	READ1R	N-100
V1MAX	S	MAXIMUM VOLUME THAT CAN BE FILLED IN G.V . IN ANY LOCATION	M3	GVSL1V	GVSL1T LIST9T	READ9T	T-1003
V1MBRK	A	DISCHARGE VELOCITY AT PREVIOUS TIME STEP	M/S	VD9V	BREK1T	BREK1T	
V1MINP	S	VOLUME AT LEVEL WITH LOWEST ELEVATION OF PIPE IN PUMP G.V.	M3	GVSL1V	INIT1T LIST9T	READ9T	T-1003

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
V1MINR	S	VOLUME AT LEVEL WITH LOWEST ELEVATION OF PIPE IN R.V. G.V.	M3	GVSL1V	INIT1T LIST9T	READ9T	T-1003
V1MINX	S	VOLUME AT LEVEL WITH LOWEST ELEVATION OF PIPE IN IHX G.V.	M3	GVSL1V	LIST9T INIT1T	READ9T	T-1003
V1MIN	A	VOLUME REQUIRED TO FILL TO LOWEST ELEVAT ION OF PIPE IN GUARD VESSEL	M3	VD9V	GVSL1T	INIT1T	
V1NA	S	COOLANT VOLUME BETWEEN TWO ADJACENT NODE S IN IHX PRIMARY SIDE	M3	SCRH1V	IHX1T	PRET1T	
V1OLNA	A	VOLUME OF PRIMARY COOLANT BETWEEN TWO AD JACENT NODES	M3	VD9V	PIPE1T	PRET1T	
V1PLEN	A	SODIUM VOLUME OF IHX PRIMARY PLENA (I = 1, 2)	M3	A1TCV	LIST1R IHX1T XI1T	READ1R	N-102
V2DOWN	S	VOLUME OF COOLANT IN IHX DOWNCOMER	M3	SCRH1V	IHX1T	PRET1T	
V2INEV	S	SODIUM VOLUME OF EVAPORATOR INLET PLENUM	M3	A2TCV	LIST1R RITE1T	READ1R	N-120
V2INSH	S	SODIUM VOLUME OF SUPERHEATER INLET PLENU M	M3	A2TCV	LIST1R RITE1T	READ1R	N-121
V2MBRK	A	DISCHARGE VELOCITY PREVIOUS TIME STEP	M/S	VD9V	BREK2T	BREK2T	
V2NA	S	COOLANT VOLUME BETWEEN TWO ADJACENT NODE S IN IHX SECONDARY SIDE	M3	SCRH1V	IHX1T	PRET1T	
V2OLNA	A	VOLUME OF INTERMEDIATE COOLANT BETWEEN T WO ADJACENT NODES	M3	VD9V	PIPE2T	PRET1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
V2OUEV	S	SODIUM VOLUME OF EVAPORATOR OUTLET PLENU M	M3	A2TCV	LIST1R RITE1T	READ1R	N-120
V2OUSH	S	SODIUM VOLUME OF SUPERHEATER OUTLET PLEN UM	M3	A2TCV	RITE1T LIST1R	READ1R	N-121
V2PLEN	A	SODIUM VOLUME OF IHX SECONDARY PLENA (I = 1, 2)	M3	A2TCV	LIST1R RITE1T IHX1T	READ1R	N-102
V3IP	A	VOLUME OF INLET PLENUM OF HEAT EXCHANGER	M3	DATG3V	HX3S HX3T	INIT3R CALC3R	S-301
V3OP	A	VOLUME OF OUTLET PLENUM OF HEAT EXCHANGE R	M3	DATG3V	HX3T HX3S	CALC3R INIT3R	S-301
V3VOL	A	VOLUME OF ACCUMULATOR	M3	DATG3V	ACCM3T	CALC3R	S-101
V6CGAS	S	VOLUME OF COVER GAS ABOVE SODIUM IN VESS EL UPPER PLENUM	M3	DATT6V	UPLN6T INIT6T	UPLN6T INIT6T	
V6LP	S	VOLUME OF LOWER PLENUM	M3	DAIN6V	LPLN6T LIST7R	READ7R	V-24
W1FLOL	A	ARRAY USED TO STORE PRIMARY LOOP HYDRAUL IC INTERFACE DATA	KG/S	TFLO1V	COOL6T	COOL6T STOR1T	
W1FLON	A	ARRAY USED TO STORE PRIMARY LOOP HYDRAUL IC INTERFACE DATA	KG/S	TFLO1V	COOL6T	STOR1T COOL6T	
W1FLOR	A	ARRAY USED TO STORE PRIMARY LOOP HYDRAUL IC INTERFACE DATA	KG/S	TFLO1V	COOL6T	COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W1FLOT	A	ARRAY USED TO STORE PRIMARY LOOP HYDRAUL IC INTERFACE DATA	KG/S	TFLO1V	DRIV9T STOR1T COOL6T	DRIV9T STOR1T	
W1INL	S	USED IN INTERPOLATION OF LOOP HYDRAULICS DATA AT THE VESSEL OUTLET INTERFACE	KG/S	TFLO1V	COOL6T	COOL6T STOR1T	
W1INN	S	USED IN INTERPOLATION OF LOOP HYDRAULICS DATA AT THE VESSEL OUTLET INTERFACE	KG/S	TFLO1V	COOL6T	STOR1T COOL6T	
W1INP	A	PRIMARY PUMP INLET FLOW RATE	KG/S	VD9V	RES1T	DEFN1T	
W1IN	A	USED IN INTERPOLATION OF LOOP HYDRAULICS DATA AT THE VESSEL OUTLET INTERFACE	KG/S	TFLO1V	COOL6T DRIV9T STOR1T	DRIV9T STOR1T	
W1LOOP	S	SODIUM FLOW RATE IN PRIMARY LOOP	KG/S	DATA8V	CALC8R PBAL9S VRFY8R LIST8R	DRIV9T CALC8R PBAL9S READ8R	0-2
W1ONE	A	FLOW RATE BEFORE PUMP AND PIPE BREAK	KG/S	VD9V	DEFN1T FUNC1T WRIT1T VESL1T STOR1T PRNT9T DRIV9T EQIV1T	INIT1T EQIV1T	
W1OUTP	A	FLOW RATE AT PUMP OUTLET	KG/S	VD9V	RES1T PUMP1T	DEFN1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W1PIPE	A	PRIMARY PIPE FLOW RATE	KG/S	VD9V	BREK1T	PIPE1T	
					PIPE1T	IHX1T	
					END1T	PRET1T	
					WRIT1T	DEFN1T	
					LOOP1T		
					HYDR1T		
					IHX1T		
					PIPW1T		
					CVAL1T		
					PRNT1T		
					PRET1T		
					GVSL1T		
					DEFN1T		
W1REF	A	REFERENCE MASS FLOW RATE IN PRIMARY LOOP	KG/S	VD9V	IHX1S	PBAL9S	
					CVAL1S	LOOP1S	
					PUMP1S		
					HYDR1S		
					INIT1T		
					PIPE1S		
					PRNT9S		
					RITE1S		
					CVAL1T		
					WRIT1T		
					LOOP1S		
W1THRE	A	FLOW RATE DOWNSTREAM OF PIPE BREAK	KG/S	VD9V	DRIV9T	EQIV1T	
					VESL1T	INIT1T	
					FUNC1T		
					WRIT1T		
					STOR1T		
					DEFN1T		
					EQIV1T		
W1TWO	A	FLOW RATE DOWNSTREAM OF PUMP	KG/S	VD9V	VESL1T	INIT1T	
					PUMP1T	EQIV1T	
					DEFN1T		
					DRIV9T		
					STOR1T		
					WRIT1T		
					PRNT9T		
					EQIV1T		
					FUNC1T		

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W2FLOT	A	ARRAY USED TO STORE INTERMEDIATE LOOP HY DRAULIC INTERFACE DATA	KG/S	VD9V	INTF3T PRNT3T ENAVG	INTF3T	
W2INP	A	INTERMEDIATE PUMP INLET FLOW RATE	KG/S	VD9V	RES2T	DEFN2T	
W2LOOP	S	GUESS OF SODIUM FLOW RATE IN INTERMEDIAT E LOOP (IF KNOWN)	KG/S	IHX3SV	PBAL9S SFLO3S	CALC8R PBAL9S READ8R	0-3
W2MXCG	S	MAXIMUM ALLOWED CHANGE IN W2LOOP PER ITE RATION	KG/S	PREV2V	LIST8R PBAL9S	READ8R	0-3
W2NOW	S	LOCAL MASS FLOW RATE IN INTERMEDIATE LOO P	KG/S	DATA2V	SPHT2S EVAP2S LOOP2S PIPE2S	END2S LOOP2S	
W2ONE	A	FLOW RATE AFTER SURGE TANK AND BEFORE PU MP	KG/S	VD9V	FUNC2T EQIV2T PRNT9T INTF3T DEFN2T	EQIV2T INIT2T	
W2OUTP	A	FLOW RATE AFTER PIPE OUTLET	KG/S	VD9V	RES2T PUMP2T	DEFN2T	
W2PIPE	A	INTERMEDIATE PIPE FLOW RATE	KG/S	VD9V	WRIT2T DEFN2T LOOP2T HYDR1T PRNT1T PIPE2T PRET1T END2T EVAP2T TANK2T IHX1T BREK2T PIPW2T SPHT2T	DEFN2T PIPE2T PRET1T IHX1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W2REF	A	REFERENCE MASS FLOW RATE AT INTERMEDIATE LOOP	KG/S	VD9V	RITE1S HYDR1S PRNT9S LOOP2S LOOP1S PUMP2S INIT2T END2S IHX1S	LOOP1S PBAL9S	
W2THRE	A	FLOW RATE DOWNSTREAM OF PIPE BREAK	KG/S	VD9V	DEFN2T EQIV2T FUNC2T	INIT2T EQIV2T	
W2TWO	A	FLOW RATE BETWEEN PUMP AND SURGE TANK	KG/S	VD9V	FUNC2T PUMP2T EQIV2T DEFN2T PRNT9T	INIT2T EQIV2T	
W3BAR	A	AVERAGE FLOW RATE IN EACH FLOW SEGMENT O F EACH STEAM GENERATOR AND TURBINE LOOP	KG/S	VD9V	FSEG3T HX3S PRNT3T STGN3S STGN3T PIPE3S PUMP3S TUBE3T	STGN3S STGN3T INIT3S	
W3CONV	S	RELATIVE CONVERGENCE CRITERION FOR SG IT ERATIVE FLOW CALCULATIONS	-	DATI3V	FEED3S	CALC3R	S-1002
W3FWRP	S	FEEDWATER FLOW RATE AT RATED POWER PER S G	KG/S	DATS3V	PSFW3T ACCM3T STMP3S PRNT9S INFS3T FEED3S FEED3T	FEED3S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W3FW	A	FEEDWATER FLOW RATE IN EACH SG	KG/S	VD9V	FEED3T ACCM3T PRNT3T INFS3T STMP3S STGN3S PRNT9S FEED3S WFLO3S	STGN3T STGN3S FEED3S	
W3NA	A	SODIUM FLOW RATE IN EACH SG HX (PER SODI UM LOOP)	KG/S	VD9V	HX3S STGN3S	INIT3R STGN3S SFLO3S	
W3REF	S	REFERENCE PUMP FLOW RATE	KG/S	DATP3V	PUMP3S PBAL9S WFLO3S PUMP3T	CALC3R	S-201
W3SBLP	A	WATER SIDE FLOW RATE IN EACH FLOW SEGMEN T OF BOTH SG AND TURB LOOPS OF EACH SODI UM LOOP	KG/S	DATI3V	PRNT9S STMP3S WFLO3S	WFLO3S	
W3TBRP	S	STEAM FLOW RATE INTO TURBINE AT RATED PO WER	KG/S	DATS3V	FEED3S	FEED3S	
W3TB	S	STEAM FLOW RATE TO TURBINE (PER SG)	KG/S	DATS3V	FEED3S	FEED3S	
W3WSSG	A	FLOW RATE IN EACH NODE IN EACH STEAM GEN ERATOR FLOW SEGMENT	KG/S	VD9V	PRNT3T INFS3T PUMP3T TUBE3T PIPE3T STGN3S IKFS3T FEED3T HX3T	PUMP3S STGN3T INIT3S VOL3S STGN3S PIPE3S HX3S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W3WSTB	A	FLOW RATE IN EACH NODE IN TURBINE FLOW S EGMENT	KG/S	VD9V	PIPE3T IKFS3T PRNT3T	PIPE3S PIPE3T INIT3S VOL3S STGN3T	
W3WS	A	WATER SIDE FLOW RATE IN EACH MODULE OF B OTH SG AND TURB FLOW SEGMENTS OF EACH SO DIUM LOOP	KG/S	VD9V	PUMP3S PIPE3S WFLO3S STGN3S HX3S	WFLO3S	
W6BPAS	S	MASS FLOW RATE IN BYPASS CHANNEL	KG/S	DAT16V	UPLN6T FLOW6T PRNT6T UPLN6S MOVE9T INIT6T LPLN6T COOL6T CORE6T COOL6S	FLOW6T UPLN6S COOL6T	
W6BPK	S	PREVIOUS VALVE OF W6BPAS	KG/S	DATT6V	COOL6T	INIT6T COOL6T	
W6CHAN	A	MASS FLOW RATE IN EACH CHANNEL	KG/S	VD9V	PROP6T COOL6S COOL6T CORE6T LPLN6T UPLN6S OPTN6S PRNT6T COEF6T FLOW6T CORE6S INIT6T	COOL6T OPTN6S FLOW6T CORE6S	
W6CHK	A	PREVIOUS VALUES OF W6CHAN	KG/S	VD9V	COOL6T	INIT6T COOL6T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
W6CT	S	MASS FLOW THROUGH CORE	KG/S	DAT36V	UPLN6T UPLN6S	COOL6T UPLN6T UPLN6S	
W6DSGN	S	DESIGN CORE FLOW RATE	KG/S	DAT26V	LIST7R OPTN6S	READ7R	V-23
W6TOT	S	TOTAL IN-VESSEL COOLANT MASS FLOW RATE	KG/S	DAT26V	INIT6T UPLN6T PBAL9S OPTN6S CORE6S UPLN6S COOL6T FLOW6T	VESL1T PBAL9S COOL6T	
W6VIN	A	VESSEL INLET FLOW RATE FROM EACH LOOP	KG/S	VD9V	LPLN6T COOL6T	INIT6T COOL6T	
W6VOUT	S	VESSEL OUTLET FLOW RATE TO EACH LOOP	KG/S	DAIN6V	UPLN6T	COOL6T VESL1T	
X1BREK	A	LENGTH OF PRIMARY PIPE UPSTREAM OF BREAK	M	VD9V	VRFY9T RSET1T WRIT1T LIST9T	READ9T	T-1003
X1ONE	A	FLUID INERTIA IN LOOP SECTION UPSTREAM O F PUMP AND PIPE BREAK	1/M	VD9V	XI1T FUNC1T	XI1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
X1PIPE	A	LENGTH OF EACH PIPE IN EACH PRIMARY LOOP	M	VD9V	HYDR1S PIPE1S HYDR1T CALC1R RSET1T RITE1T LIST1R PRET1T RITE1S XI1T IHX1S VRFY9T PIPW1T	READ1R CALC1R RSET1T	N-1101
X1PLEN	A	LENGTH OF IHX PRIMARY PLENA (I = 1, 2)	M	DATX1V	HYDR1T LIST1R XI1T HYDR1S	READ1R	N-102
X1THRE	A	FLUID INERTIA IN LOOP SECTION BETWEEN BR EAK AND REACTOR VESSEL (OR PUMP)	1/M	VD9V	FUNC1T VESL1T XI1T	XI1T	
X1TWO	A	FLUID INERTIA IN LOOP SECTION BETWEEN PU MP AND REACTOR VESSEL INLET (OR PIPE BRE AK)	1/M	VD9V	VESL1T XI1T FUNC1T	XI1T	
X2BREK	A	LENGTH OF PRIMARY PIPE UPSTREAM OF BREAK	M	VD9V	VRFY9T RSET2T WRIT2T LIST9T	READ9T	T-1201
X2DOWN	S	LENGTH OF IHX CENTRAL DOWNCOMER REGION	M	DAT12V	RITE1T HYDR1S PRET1T LIST1R HYDR1T	READ1R	N-104
X2EV	S	ACTIVE LENGTH OF EVAPORATOR SHELL SIDE	M	DATE2V	RITE2S EVAP2T EVAP2S RITE1T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
X2INEV	S	LENGTH OF INLET PLENUM ON EVAPORATOR SHE LL SIDE	M	DATE2V	LISTIR RITE1T EVAP2T RITE2S EVAP2S	READIR	N-120
X2INSH	S	LENGTH OF INLET PLENUM ON SUPERHEATER SH ELL SIDE	M	DATS2V	RITE2S LISTIR SPHT2T RITE1T SPHT2S	READIR	N-121
X2ONE	A	FLUID INERTIA IN LOOP SECTION BETWEEN SU RGE TANK AND PUMP (OR PIPE BREAK)	1/M	VD9V	RITE1T FUNC2T	RITE1T	
X2OUEV	S	LENGTH OF OUTLET PLENUM ON EVAPORATOR SH ELL SIDE	M	DATE2V	EVAP2S RITE2S LISTIR EVAP2T RITE1T	READIR	N-120
X2OUSH	S	LENGTH OF OUTLET PLENUM ON SUPERHEATER S HELL SIDE	M	DATS2V	RITE1T SPHT2T LISTIR RITE2S SPHT2S	READIR	N-121
X2PIPE	A	LENGTH OF EACH PIPE IN EACH PRIMARY LOOP	M	VD9V	CALCIR RITE1T RITE2S RSET2T VRFY9T PRET1T LISTIR PIPW2T PIPE2S	CALCIR RSET2T READIR	N-1201
X2PLEN	A	LENGTH OF IHX INTERMEDIATE PLENA (I = 1 , 2)	M	DAT12V	RITE1T LISTIR HYDR1S	READIR	N-102

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
X2SH	S	ACTIVE LENGTH OF SUPERHEATER SHELL SIDE	M	DATS2V	SPHT2S SPHT2T RITE1T RITE2S	CALC1R	
X2THRE	A	FLUID INERTIA IN LOOP SECTION DOWNSTREAM OF BREAK	1/M	VD9V	FUNC2T RITE1T	RITE1T	
X2TWO	A	FLUID INERTIA IN LOOP SECTION BETWEEN PU MP AND SURGE TANK	1/M	VD9V	RITE1T FUNC2T	RITE1T	
X3FSSG	A	ARRAY CONTAINING DISTANCE FROM INLET OF FLOW SEGMENT TO DOWNSTREAM END OF EACH C ONTROL VOL. IN EACH FLOW SEGMENT OF SG	M	VD9V	PUMP3S PIPE3S HX3S STGN3S	VOL3S PUMP3S PIPE3S INIT3S HX3S STGN3S	
X3FSTB	A	ARRAY CONTAINING DISTANCE FROM INLET OF FLOW SEGMAENT TO DOWNSTREAM END OF EACH CONTROL VOLUME IN TURBINE FLOW SEGMENT	M	VD9V	PIPE3S	PIPE3S VOL3S INIT3S	
X3INER	A	AVERAGE(LENGTH/AREA) OF EACH FLOW SEGMEN T OF EACH STEAM GENERATOR AND TURBINE LO OP	-	VD9V	FSEG3T HX3S STGN3T PIPE3S	HX3S INIT3S PIPE3S	
X3IP	A	FLOW PATH LENGTH IN INLET PLENUM OF HEAT EXCHANGER	M	DATG3V	HX3T HX3S	CALC3R INIT3R	S-301
X3OP	A	FLOW PATH LENGTH IN OUTLET PLENUM OF HEA T EXCHANGER	M	DATG3V	HX3T HX3S	INIT3R CALC3R	S-301
X3PIPE	A	LENGTH OF PIPE OR HEAT EXCHANGER TUBE	M	VD9V	CALC1R HX3T HX3S TUBE3T PIPE3T PIPE3S	CALC3R INIT3R	S-301

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
X5CLIR	A	CLADDING INNER RADIUS OF EACH CHANNEL	M	VD9V	VRFY7R TYPE5R LIST7R REPT9R		V-13
X5CLOR	A	CLADDING OUTER RADIUS OF EACH CHANNEL	M	VD9V	TYPE5R REPT9R VRFY7R LIST7R		V-14
X5COR	A	CLADDING OUTER RADIUS FOR EACH SLICE OF EACH CHANNEL DURING TRANSIENT	M	VD9V	PROP6T STEM5T	PUT5S PUT5T	
X5FIR	A	FUEL INNER RADIUS OF EACH CHANNEL	M	VD9V	VRFY7R TYPE5R LIST7R REPT9R		V-11
X5FOR	A	FUEL OUTER RADIUS OF EACH CHANNEL	M	VD9V	TYPE5R REPT9R VRFY7R LIST7R		V-12
X5ICOR	A	INNER CLADDING RADIUS FOR EACH SLICE OF EACH CHANNEL DURING TRANSIENT	M	VD9V	PROP6T	PUT5S PUT5T	
X5LBIR	A	LOWER BLANKET INNER RADIUS OF EACH CHANN EL	M	VD9V	TYPE5R REPT9R LIST7R VRFY7R		V-15
X5LBOR	A	LOWER BLANKET OUTER RADIUS OF EACH CHANN EL	M	VD9V	VRFY7R REPT9R LIST7R TYPE5R		V-16
X5REF	A	DIMENSIONS OF FUEL INSIDE, FUEL OUTSIDE, CLAD INSIDE AND CLAD OUTSIDE RADIUS FOR EACH SLICE TYPE AT T5REF	M	VD9V	PREX5S GRO5S XPAN5S XPAN5T STEM5T FUEL5S STEM5S	REPT9R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
X5SS1	A	FUEL ROD RADIUS AT SPECIFIC RADIAL NODE LOCATIONS FOR EACH SLICE OF EACH CHANNEL	M	VD9V	XPAN5T DOPP5T GROW5T	PUT5S PUT5T	
X5UBIR	A	UPPER BLANKET INNER RADIUS FOR EACH CHAN NEL	M	VD9V	LIST7R TYPE5R REPT9R VRFY7R		V-17
X5UBOR	A	UPPER BLANKET OUTER RADIUS FOR EACH CHAN NEL	M	VD9V	TYPE5R VRFY7R LIST7R CHEX9R READ9R ERR9R CRDR9R LIST9R REPT9R INIT9R		V-18
X6INOZ	S	LENGTH OF INLET NOZZLE FOR CHANNEL ORIFI CE ZONE	M	DAT26V	LIST7R	READ7R	V-27
X6SUMB	S	INERTIA OF FLUID IN BYPASS CHANNEL	1/M	DAT26V	INIT6T FLOW6T	INIT6T FLOW6T	
X6SUMT	S	FLUID INERTIA TERM USED IN LOOP HYDRAULI CS INTERFACE CALCULATIONS	M	RV	INIT6T VESL1T FLOW6T	INIT6T FLOW6T	
X6SUM	A	INTERIA OF FLUID IN EACH CHANNEL	1/M	VD9V	INIT6T FLOW6T	INIT6T	
Y1DYDT	A	TIME RATE OF CHANGE OF Y1		VD9V	PRNT9T INTG1T	EQIV1T EQIV2T INTG1T INIT1T UPLN6T	
Y1LOOP	S	DIAMETER OF OUTLET NOZZLE	M	DAIN6V	INIT6T	CALC1R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Y1OLD	A	PREVIOUS VALUES OF Y1		VD9V	INTG1T	INTG1T	
Y1PIPE	A	INNER DIAMETER OF EACH PIPE IN EACH PRIM ARY LOOP	M	VD9V	IHX1T RSET1T LIST1R PIPE1T CALC1R PRET1T RITE1S HYDR1T PIPW1T PIPE1S IHX1S HYDR1S	RSET1T READ1R CALC1R	N-1101
Y1THIK	A	THICKNESS OF EACH PIPE WALL IN EACH PRIM ARY LOOP	M	VD9V	PRET1T CALC1R RSET1T LIST1R	READ1R CALC1R RSET1T	N-1101
Y1TUB1	S	INNER DIAMETER OF IHX TUBES	M	DATX1V	HYDR1S IHX1S HYDR1T IHX1T LIST1R CALC1R PRET1T	READ1R	N-100
Y1TUB2	S	OUTER DIAMETER OF IHX TUBES	M	DATX1V	LIST1R CALC1R PRET1T IHX1S	READ1R	N-100
Y1	A	ARRAY USED IN SUBROUTINE INTG1T FOR LOOP HYDRAULICS CALCULATIONS		VD9V	EQIV2T PRNT9T EQIV1T INTG1T INIT1T	EQIV2T EQIV1T INTG1T	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Y2DOWN	S	INNER DIAMETER OF IHX CENTRAL DOWNCOMER	M	DAT12V	PRET1T LIST1R HYDR1S HYDR1T CALC1R	READ1R	N-104
Y2EV	S	EQUIVALENT (HYDRAULIC) DIAMETER OF EVAPO RATOR SHELL SIDE	M	DATE2V	EVAP2S RITE2S EVAP2T	CALC1R	
Y2PIPE	A	INNER DIAMETER OF EACH PIPE IN EACH INTE RMEDIATE LOOP	M	VD9V	CALC1R PIPW2T RSET2T RITE2S PIPE2T PRET1T PIPE2S LIST1R	CALC1R RSET2T READ1R	N-1201
Y2SH	S	EQUIVALENT (HYDRAULIC) DIAMETER OF SUPER HEATER SHELL SIDE	M	DATS2V	SPHT2T SPHT2S RITE2S	CALC1R	
Y2THIK	A	THICKNESS OF EACH PIPE WALL IN EACH INTE RMEDIATE LOOP	M	VD9V	PRET1T CALC1R LIST1R	CALC1R READ1R	N-1201
Y3ID	A	INNER DIAMETER OF PIPE OR HEAT EXCHANGER TUBE	M	VD9V	HX3T TUBE3T PIPE3T HX3S PIPE3S	INIT3R CALC3R	S-301
Y3OD	A	OUTER DIAMETER OF HEAT EXHANGER TUBE	M	DATG3V	CALC1R HX3S TUBE3T HX3T	CALC3R HX3S INIT3R	S-301
Y6HYDR	A	HYDRAULIC DIAMETER OF EACH COOLANT CHANN EL	M	VD9V	PROP6T CORE6S COEF6T LIST7R		V-8

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Y6HYOZ	A	HYDRAULIC DIAMETER OF ORIFICE ZONE OF EA CH CHANNEL	M	VD9V	INIT6T CORE6S COEF6T LIST7R		V-9
Y6LRBP	S	HYDRAULIC DIAMETER OF LOWER BYPASS REGIO N CHANNEL	M	DAT26V	LIST7R UPLN6S FLOW6T	READ7R	V-29
Y6URBP	S	HYDRAULIC DIAMETER OF UPPER BYPASS REGIO N CHANNEL	M	DAT26V	UPLN6S FLOW6T LIST7R	READ7R	V-29
Z1BK	A	HEIGHT TO BREAK LOCATION, MEASURED FROM LOWEST ELEVATION OF PIPE IN GUARD VESSEL	M	VD9V	GVSL1T		
Z1HEAD	A	PRIMARY PUMP HEAD (IN METERS OF COOLANT)	M	VD9V	PUMP1S LOOP1S RITE1S PRNT9T INIT1T WRIT1T	PUMP1S LOOP1S PUMP1T	
Z1HEDR	S	RATED HEAD OF PRIMARY PUMP	M	DATA1V	LIST1R WRIT1T HEAD1T PUMP1S	READ1R	N-112
Z1LOOP	S	HEIGHT OF OUTLET NOZZLES ABOVE Z6TCOR	M	DAIN6V	UPLN6T FLOW6T INIT6T	CALC7R	
Z1MAXP	S	PUMP G.V. MAXIMUM LEVEL THAT CAN BE REAC HED BY COOLANT	M	GVSL1V	INIT1T LIST9T	READ9T	T-1003
Z1MAXR	S	R.V. G.V. MAXIMUM LEVEL THAT CAN BE REAC HED BY COOLANT	M	GVSL1V	LIST9T INIT1T	READ9T	T-1003
Z1MAXX	S	IHX G.V. MAXIMUM LEVEL THAT CAN REACHED BY COOLANT	M	GVSL1V	INIT1T LIST9T	READ9T	T-1003

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z1MAX	A	HEIGHT OF GUARD VESSEL MEASURED FROM LOW EST ELEVATION OF PIPE IN GUARD VESSEL	M	VD9V	GVSL1T	INIT1T	
Z1RES	A	HEIGHT OF COOLANT IN PRIMARY PUMP TANK	M	VD9V	PRNT9T RITE1S RES1T WRIT1T LOOP1S INIT1T RES1S	RES1T LOOP1S RES1S	
Z1RHO	A	COOLANT HEIGHT * DENSITY FOR RESERVOIR	KG/M2	VD9V	EQIV1T INTG1T FLOW1T RES1T	EQIV1T INIT1T	
Z1RR	S	COOLANT HEIGHT * DENSITY FOR REACTOR VES SEL UPPER PLENUM	KG/M2	RV		INIT1T	
Z1RTOT	S	HEIGHT OF PRIMARY PUMP TANK	M	DATA1V	LIST1R RES1T RES1S RITE1S	READ1R	N-112
Z2HEAD	A	INTERMEDIATE PUMP HEAD	M	VD9V	PUMP2S WRIT2T RITE2S PRNT9T INIT2T LOOP2S	PUMP2T PUMP2S LOOP2S	
Z2HEDR	S	RATED HEAD OF INTERMEDIATE PUMP	M	DATA2V	PUMP2S HEAD2T LIST1R RITE2S	READ1R	N-122
Z2RES	A	HEIGHT OF COOLANT IN INTERMEDIATE PUMP T ANK	M	VD9V	RITE2S PRNT9T RES2T INIT2T WRIT2T LOOP2S RES2S	RES2T LOOP2S RES2S	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z2RHO	A	COOLANT HEIGHT * DENSITY FOR RESEVOIR	KG/M2	VD9V	RES2T FLOW2T EQIV2T	INIT2T EQIV2T	
Z2RTNK	A	COOLANT HEIGHT * DENSITY FOR SURGE TANK	KG/M2	VD9V	FLOW2T TANK2T EQIV2T	INIT2T EQIV2T	
Z2RTOT	S	HEIGHT OF INTERMEDIATE PUMP TANK	M	DATA2V	RES2S RES2T RITE2S LIST1R	READ1R	N-122
Z2TANK	A	HEIGHT OF COOLANT IN SURGE (EXPANSION) T ANK	M	VD9V	INIT2T TANK2T TANK2S LOOP2S WRIT2T RITE2S	TANK2T CALC8R LOOP2S	
Z2TNKI	S	INITIAL VALUE OF Z2TANK	M	BNDS8R	LIST8R CALC8R	READ8R	O-4
Z2TTOT	S	HEIGHT OF SURGE TANK	M	DATA2V	TANK2S TANK2T RITE2S LIST1R	READ1R	N-122
Z3DNB	A	RELATIVE LOCATION IN NODE OF DNB IN EACH SG HX PER SODIUM LOOP	M	VD9V	HX3T PRNT3T STGN3S PRNT3S TUBE3T	HX3S STGN3S TUBE3T	
Z3FILL	S	ELEVATION OF FILL JUNCTION	M	DATG3V	PIPE3S PIPE3T	CALC3R	S-401
Z3FIT	A	EXIT ELEVATION OF FITTING AT EXIT OF PIP E	M	VD9V	HX3T PIPE3T HX3S PUMP3S PIPE3S	INIT3R CALC3R	S-1

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z3FSSG	A	ELEVATION OF DOWNSTREAM END OF EACH CONTROL VOLUME IN A FLOW SEGMENT RELATIVE TO INLET ELEVATION FOR SG FLOW SEGMENT	M	VD9V	STGN3S PUMP3S HX3S PIPE3S	STGN3S VOL3S PUMP3S HX3S PIPE3S INIT3S	
Z3FSTB	A	ELEVATION OF DOWNSTREAM END OF CONTROL VOLUME IN TURBINE FLOW SEGMENT RELATIVE TO INLET ELEVATION	M	VD9V	PIPE3S	INIT3S VOL3S PIPE3S	
Z3INSL	A	ELEVATION OF EACH EXIT NOZZLE	M	DATG3V	PIPE3S PIPE3T	CALC3R INIT3R	S-101
Z3IP	A	ELEVATION AT EXIT OF INLET PLENUM OF HEAT EXCHANGER	M	DATG3V	TUBE3T HX3T HX3S	INIT3R CALC3R	S-301
Z3OP	A	ELEVATION AT EXIT OF OUTLET PLENUM OF HEAT EXCHANGER	M	DATG3V	PIPE3T HX3T HX3S PIPE3S	CALC3R INIT3R	S-301
Z3PIPE	A	EXIT ELEVATION OF EACH MODULE	M	VD9V	PIPE3T HX3T TUBE3T PIPE3S HX3S	CALC3R INIT3R	S-1
Z3PMOT	S	ELEVATION AT PUMP OUTLET	M	DATG3V	PIPE3S PIPE3T PUMP3S	CALC3R	S-201
Z3PUMP	S	RATED HEAD OF PUMP	M	DATP3V	PUMP3S PUMP3T	CALC3R	S-201
Z5AFUL	A	AXIAL LENGTH OF ACTIVE FUEL REGION OF EACH CHANNEL	M	VD9V	COEF5T TEMP5S STEM5S STEM5T	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z5ELEV	A	RELATIVE ELEVATION OF EACH AXIAL SLICE O F EACH CHANNEL WITH REFERENCE TO BOTTOM OF CHANNEL	M	VD9V	CALC7R MAXD5T INIT9T VOID5T PRNT5S DOPP5T STEM5S INIT5T STEM5T REPT9R PRNT5T LEAK5T PRNT6T	CALC7R	
Z5LBLK	A	AXIAL LENGTH OF LOWER BLANKET OF EACH CH ANNEL	M	VD9V	COEF5T TEMP5S STEM5T STEM5S	CALC7R	
Z5LFGP	A	AXIAL LENGTH OF LOWER FISSION GAS PLENUM REGION OF EACH CHANNEL	M	VD9V	COEF5T INIT5T FUEL5S TEMP5S STEM5S FUEL5T GROW5T STEM5T DOPP5T VOID5T	CALC7R	
Z5REF	A	LENGTH OF EACH AXIAL SLICE IN EACH CHANN EL FOR AXIAL EXPANSION F EEDBACK EF FECT CALCULATIONS	M	VD9V	GROW5T POW5T PRMT5T REAC5T	INIT5T GROW5T	
Z5UBLK	A	AXIAL LENGTH OF UPPER BLANKET REGION OF EACH CHANNEL	M	VD9V	STEM5T COEF5T STEM5S TEMP5S	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z5UFGP	A	AXIAL LENGTH OF UPPER FISSION GAS PLENUM REGION OF EACH CHANNEL	M	VD9V	FUEL5S STEM5S GROW5T VOID5T DOPP5T INIT5T STEM5T TEMP5S COEF5T FUEL5T	CALC7R	
Z6AFUL	A	AXIAL LENGTH OF ACTIVE FUEL REGION OF EA CH ROD TYPE	M	VD9V	TYPE5R VRFY7R LIST7R CALC7R CORE6S	READ7R	V-101
Z6BCOR	S	ELEVATION OF BOTTOM OF CORE ABOVE Z6REF	M	DAT26V	UPLN6S COEF6T LIST7R LPLN6S INIT6T FLOW6T LPLN6T CORE6S	READ7R	V-27
Z6CHAN	A	TOTAL LENGTH OF EACH CHANNEL	M	VD9V	INIT6T CORE6T UPLN6S COEF6T	CALC7R	
Z6CHIM	S	LENGTH OF CHIMNEY	M	DAIN6V	LIST7R UPLN6T	READ7R	V-28
Z6DELT	A	LENGTH OF EACH FIXED MESH SLICE IN EACH CHANNEL	M	VD9V	PROP6T CALC7R CORE6T COEF6T	INIT6T CALC7R	
Z6ELEV	A	RELATIVE ELEVATION OF EACH AXIAL SLICE O F EACH CHANNEL WITH REFE RENCE TO B OTTOM OF CHANNEL	M	VD9V	INIT6T STOR9T CALC7R COOL6S	CALC7R	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z6GAS	S	HEIGHT OF COVER GAS REGION	M	DAIN6V	UPLN6T INIT6T	INIT6T	
Z6INOZ	S	ELEVATION OF VESSEL INLET NOZZLE ABOVE Z 6REF	M	DAT26V	LPLN6S LPLN6T INIT6T LIST7R FLOW6T	READ7R	V-27
Z6JET	S	PENETRATION HEIGHT INTO UPPER MIXING PLE NUM OF AVERAGE CORE EXIT FLOW	M	DAIN6V	MOVE9T UPLN6T PRNT6T	UPLN6T INIT6T	
Z6LBLK	A	AXIAL LENGTH OF LOWER BLANKET REGION OF EACH ROD TYPE	M	VD9V	CALC7R CORE6S VRFY7R TYPE5R LIST7R	READ7R	V-101
Z6LFGP	A	AXIAL LENGTH OF LOWER FISSION GAS PLENUM REGION OF EACH ROD TYPE	M	VD9V	CALC7R LIST7R TYPE5R CORE6S VRFY7R	READ7R	V-101
Z6LMAX	S	LENGTH OF FLOW PATH IN LOWER REGION OF B YPASS CHANNEL	M	DAT26V	FLOW6T INIT6T	INIT6T	
Z6LOWR	S	LENGTH OF FLOW PATH FROM Z6INOZ TO Z6BCO R	M	DAT26V	INIT6T	INIT6T	
Z6LRBP	S	HEIGHT OF SODIUM IN LOWER REGION OF BYPA SS CHANNEL	M	DAT26V	INIT6T CORE6T FLOW6T MOVE9T	INIT6T FLOW6T	
Z6NALV	S	HEIGHT OF SODIUM IN UPPER MIXING PLENUM ABOVE Z6TCOR	M	DAIN6V	PRNT6T UPLN6T INIT6T MOVE9T EQIVIT	INIT6T EQIVIT	

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z6ONOZ	S	ELEVATION OF VESSEL OUTLET NOZZLE ABOVE Z6REF	M	DAT26V	LIST7R CALC7R PINT1S OPTN6S UPLN6S	READ7R	V-27
Z6REF	S	REFERENCE ELEVATION OF REACTOR VESSEL	M	DAT26V	LIST7R	READ7R	V-27
Z6TCOR	S	ELEVATION OF TOP OF CORE ABOVE Z6REF	M	DAT26V	OPTN6S CORE6S UPLN6S LIST7R CALC7R INIT6T COEF6T	READ7R	V-27
Z6UBLK	A	AXIAL LENGTH OF UPPER BLANKET REGION OF EACH ROD TYPE	M	VD9V	CALC7R CORE6S VRFY7R TYPE5R LIST7R	READ7R	V-101
Z6UFGP	A	AXIAL LENGTH OF UPPER FISSION GAS PLENUM REGION OF EACH ROD TYPE	M	VD9V	TYPE5R CORE6S VRFY7R CALC7R LIST7R	READ7R	V-101
Z6UMAX	S	LENGTH OF FLOW PATH IN UPPER REGION OF B YPASS CHANNEL	M	DAT26V	UPLN6T INIT6T CORE6T FLOW6T	INIT6T	
Z6UPLN	S	RELATIVE HEIGHT OF SODIUM IN VESSEL UPPE R PLENUM TO Z6REF	M	DAT26V	UPLN6S LIST7R PINT1S INIT6T OPTN6S	READ7R	V-27
Z6UPTL	S	TOTAL HEIGHT OF TOP OF UPPER PLENUM ABOV E Z6REF	M	DAIN6V	LIST7R INIT6T	READ7R	V-28

FORTRAN NAME	TYPE	DEFINITION	UNITS	LABELLED COMMON	REFERENCED	DEFINED	INPUT REC.
Z6URBP	S	HEIGHT OF SODIUM IN UPPER REGION OF BYPASS CHANNEL	M	DAT26V	FLOW6T CORE6T MOVE9T INIT6T UPLN6T	FLOW6T INIT6T	
Z9MIN	S	ARBITRARILY SMALL LENGTH USED FOR CHECKING PURPOSES	M	DATC9V	GROW5T UPLN6T CORE6T FUEL5T UPLN6S CALC7R DOPP5T INIT5T VOID5T FLOW6T INIT6T FUEL5S	BLKDAT	

4. INPUT/OUTPUT DESCRIPTION

4.1 Description of Input

In the design of SSC, great emphasis has been placed on flexibility and adaptability so as to make its capabilities applicable to any loop-type LMFBR and a wide class of transients. This approach to modeling necessitates considerable interaction between the user and the code, especially during the initialization of the calculation. With this in mind, the SSC input modules have been constructed to make the user-code interaction as intelligent and, hopefully, as painless as possible.

Input is processed in SSC by three sections of code; a reader, a verifier and a secondary data manager. The reader is built around a Brookhaven National Laboratory version of the GENRD(7) free-format processor originally developed by the Los Alamos Scientific Laboratory. Data, once read, is checked, by the verification sub-module, for consistency within the data set and against the criteria detailed in the data dictionary (Section 3.0). An inconsistency at this point sets an error flag and causes the program to enter an informative message on the output file. The program is terminated at the end of this process if any error flag has been set. As a further check, all card images are entered on the output file as they are read by GENRD, along with the decoded values assigned to all variables.

Once the verification has been completed, the third section (the secondary data manager) proceeds to initialize certain internal parameters on the basis of processed input. The steady state calculations are then initiated.

The list of input required to run SSC consists of a series of free-format card image records (cards). These records contain control specifications and/or data in columns 1 through 72. The record format is 'free' in the sense that as long as the sequence of data points (for a given record) conforms to the ordering found in this section,field location, field length, and type conversions are determined solely by the way the record is "punched," not by an externally specified format.

Two types of information are permitted on input records, numeric and character. Character information, begun with a dollar sign ($) and terminated either at column 72 or by a second dollar sign, is ignored by the processor. It is used as a comment field. Numeric information is delimited by commas or one or more blanks, and is stored as a single-valued decimal constant. A number of special characters and character-numeric strings are also permitted. These are listed in Table IV.

The processor reads a "card" and completely processes it before reading the next "card," unless numeric information is continued over subsequent "cards." An input record is defined to be one or more card-images such that its' first non-blank character string is a digit string (record number) followed by the letter "D" (e.g., 25D 1, 300.0/). An input record is terminated either by a slash, (/) or by a column 72 preceding a new record or file declaration. A list of valid SSC record numbers is contained in this section.

Records are grouped to form data files. There are six data files and one control file which are used within SSC. Each of the data files contains data local to one section of the entire system. These files include:

(1) OPDATA - data pertaining to the initial overall plant operating conditions, plus specification of the plant balance initialization logic (see Reference 1, Section 4.1.2)

(2) VESSEL - all geometric and hydraulic data required to specify the core and in-vessel components.

<u>TABLE IV</u>

Special Characters Used in the Input Processor

Character	Description
(	Begins a section (which is terminated by a right parenthesis) enclosing a list of constants, specifications, or comments. The elements stored while processing this list can then be stored repeatedly. A section can be continued over more than one card. Sections can be nested to ten levels (up to ten unclosed left parentheses).
)	Terminates a section. If followed by a repeat spec, the constants generated within the section will be repeatedly stored in the word array. If no repeat spec follows, the word array is unchanged, that is, the list only be stored once.
R	Immediately following a digit string, N, identifies a repeat spec, NR. N, a positive integer that should be greater than one, is the total number of times the affected constant or list is to consecutively stored. Single numeric constants may be repeated as well as the set of constants generated in processing a section. NR follows the items it affects, so by the time NR is detected the constants will already have been stored once.
I	Immediately following a digit string, N, identified an interpolate spec, NI. N, a positive integer, tells the number of equally-spaced interpolates to insert between the previously processed constant and the endpoint, a real or integer constant follows the NI spec.

(3) NALOOP - all geometric and hydraulic data required to specify the primary and secondary loop pipings, pumps and IHX as well as sodium-side hydraulic information in the steam generator.

(4) STMGEN - all geometric and hydraulic data required to specify the steam generator heat exchanger(s), pump and water-side piping.

(5) MATDAT - data file used to alter the default values of the available material properties, or to create new material properties.

(6) TRNDAT - file used to specify data for the transient desired; e.g., pump trip time(s), scram time(s), pony motor speed, decay power curves, scram and reactivity, etc.

(7) OLDATA - file used to provide user control over which areas of the code will be accessed, and which input/output file(s) will be used.

A file is introduced by a "card" on which the first non-blank character string is a digit string (file version number) followed by the letter "V" (e.g., 1V NALOOP). Although a file version number must always be present, it's primary purpose is to identify different versions of the same file for user convenience. It is subsequently ignored by the processor. Generally, there is no prescribed sequence of records in a given file. However, certain records which set variable dimensionality must preceed all other records in the file the first time the file is declared. These records are:

FILE	RECORD
VESSEL	1
NALOOP	1
STMGEN	1001

As is implied in the previous statement, a file may be accessed more than once in a given input stream. The only restrictions on this type of procedure is that the records which set dimensionality mentioned above, may not be re-entered. If a file is declared more than once some or all the records in that file (with the exception made above) may be re-read; thus overwriting the previously stored values(s). This procedure is particularly useful when restarting (see below) a plant initialization with a previously stored input "deck." In this case a single record may be changed without reprocessing the entire "deck."

SSC processes input in two separate blocks. The first contains the following files: VESSEL, NALOOP, STMGEN, MATDAT and OLDATA. These files contain all the plant initialization data needed to establish a system-wide steady state, plus the control file OLDATA. There is no set sequence for the files in this block. The file TRNDAT is the only file in the second block. It contains the data needed to run a transient.

In a typical default control input stream, the first block is preceded by a title card of up to 80 characters in length and is terminated with a STOP command (characters STOP in columns 1-4). The second block follows and is also terminated with a STOP. The entire input stream is concluded with an END (characters END in columns 1-3). Default control calls for one or more successive cases such that a steady state preceeds a transient for each case. Some examples of other than default control are illustrated in the OLDATA input description in Section 4.1.7.

It should be noted that the program is provided with default material property values. These values will be used if not overwritten by the MATDAT file. As a result, if the default values are to be used, the file MATDAT need not be read.

The volume of output generated by SSC is determined by user option. The printing of intermediate results is controlled on a systems component basis. The output from the steady state modules is specified on record 5 in file OPDATA. Record 9005 in file TRNDAT allows the same type of control in the transient. For the sample output contained in this report all print options have been engaged.

4.1.1 In-Vessel Data

All geometric and hydraulic data required to specify the core and in-vessel components are input to SSC through the data file VESSEL. The listing included on subsequent pages of this section shows on a record-by-record basis how the specific information is supplied by the user.

These records may be input in any order, except that record 1 must be first, as it contains variable dimensioning data.

The core and in-vessel components are represented physically by a lower inlet plenum, core, and upper outlet mixing plenum. The core is composed of any number of parallel channels and a bypass. For the input data, a distinction is made between number of channels simulated (denoted by N6CHAN and use of counter K) and number of rod types (denoted by N5RTYP and use of counter L). This is done, because any number of channels may be represented, but the physical make-up of many of these channels will probably be identical (i.e., N5RTYP<N6CHAN).

The physical makeup of each rod type is assigned through records 101 to 200. The actual rod type identification (L) is assigned as; L = Record Number - 100. Here, by allocating (or setting to zero) the required lengths, materials, etc, of the regions provided (i.e., lower fission gas plenum, lower blanket, fuel, upper blanket, upper fission gas plenum), any fuel, blanket or control rod description may be specified.

The rod type (L) is assigned to the individual channels (K) through record 2. Records 3 through 21 contain various other geometric and hydraulic data for the channels (K).

Record 23 contains data which is very useful for off-normal initial operating conditions. This data enables the user to correctly initialize the flow split to the various core channels under off-normal conditions and make use of known information obtained under normal operation. Accurate data specifying the flow split to the core channels is usually available at design power and flow conditions. Thus, a steady-state case may be run at design conditions setting L6OPT = 0 and specifying the known flow fractions through record 4. The result of this run will be the calculation of the F6LSA4(K). To then run at some off-normal condition where the individual flow fractions are not known, L6OPT is set to 1 and the previously computed F6LSA4(K) values are used.

Records (a) 201-300, (b) 301-400, (c) 401-500 and (d) 501-600 contain various power profile and fission gas data for each channel (K). The actual K is computed by using the record number (N):

(a) K = N - 200,

(b) K = N - 300,

(c) K = N - 400,

(d) K = N - 500, respectively.

***** FILE VESSEL

RECORD 1	N6CHAN	-	NUMBER OF CHANNELS BEING SIMULATED
	N5RTYP	-	NUMBER OF ROD TYPES
	N5ASEC(L)	-	NUMBER OF AXIAL SECTIONS(SLICES) OF EACH ROD TYPE
	N5NFR(K)	-	NUMBER OF RADIAL FUEL NODES IN AN AXIAL SLICE OF EACH CHANNEL
RECORD 2	L6ATYP(K)	-	INTEGER VALUE INDICATING THE ROD TYPE OF EACH CHANNEL
RECORD 3	F6TPOW(K)	-	FRACTION OF TOTAL POWER IN EACH CHANNEL
RECORD 4	F6FLOW(K)	-	FRACTION OF TOTAL CORE FLOW IN EACH CHANNEL
RECORD 5	N6RODS(K)	-	NUMBER OF RODS ASSOCIATED WITH EACH CHANNEL
RECORD 7	A6ROD(K)	M2	SODIUM FLOW AREA PER ROD IN EACH CHANNEL
RECORD 8	Y6HYDR(K)	M	HYDRAULIC DIAMETER OF EACH COOLANT CHANNEL
RECORD 9	Y6HYOZ(K)	M	HYDRAULIC DIAMETER OF ORIFICE ZONE OF EACH CHANNEL
RECORD 10	F6LSA(I,K)	-	LOSS COEF. FOR AREA EXPANSION IN EACH CHANNEL, AREA CONTRACTION IN EACH CHANNEL AND ORIFICE OF EACH CHANNEL
RECORD 11	X5FIR(K)	M	FUEL INNER RADIUS OF EACH CHANNEL
RECORD 12	X5FOR(K)	M	FUEL OUTER RADIUS OF EACH CHANNEL
RECORD 13	X5CLIR(K)	M	CLADDING INNER RADIUS OF EACH CHANNEL
RECORD 14	X5CLOR(K)	M	CLADDING OUTER RADIUS OF EACH CHANNEL
RECORD 15	X5LBIR(K)	M	LOWER BLANKET INNER RADIUS OF EACH CHANNEL
RECORD 16	X5LBOR(K)	M	LOWER BLANKET OUTER RADIUS OF EACH CHANNEL
RECORD 17	X5UBIR(K)	M	UPPER BLANKET INNER RADIUS FOR EACH CHANNEL

			CHANNEL	
RECORD 20	H5NOGP(K)	W/(K*M2)	HEAT TRANSFER COEF. FOR FUEL-CLAD CONTACT FOR EACH CHANNEL	
RECORD 21	P5FGAS(K)	N/M2	FISSION GAS PRESSURE FOR EACH CHANNEL	
RECORD 23	L6WOPT	-	INDICATOR FOR FLOW FRACTION OPTION	0 FRACTIONS KNOWN 1 FRACTIONS UNKNOWN
	F6LSA4(K)	-	TOTAL LOSS COEF. AT TOP OF EACH CHANNEL	
	F6LSBP	-	BYPASS FLOW LOSS COEF.	
	P6DSGN	N/M2	DESIGN CORE PRESSURE DROP	
	W6DSGN	KG/S	DESIGN CORE FLOW RATE	
	N6PMAX	-	MAXIMUM ITERATION FOR PRESSURE CALULATION	
	N6FLMX	-	MAXIMUM ITERATIONS FOR FLOW CALCULATION	
	F6CONV	-	CONVERGENCE CRITERION (RELATIVE)	
	F6WSTP	-	MAXIMUM FLOW FRACTION CHANGE ALLOWED PER ITERATION	
	P6STEP	N/M2	MAXIMUM PRESSURE CHANGE ALLOWED PER ITERATION	
RECORD 24	V6LP	M3	VOLUME OF LOWER PLENUM	
	B6LPMC	J/K	METAL MASS IN LOWER PLENUM	
	H6LPUA	W/(K*M2)	HEAT TRANSFER COEFFICIENT IN LOWER PLENUM	
	A6LPLF	M	X-SECTIONAL FLOW AREA OF UPPER PLENUM	
RECORD 25	L5MESH	-	INDICATOR FOR FUEL RADIAL MESH	0 EQUI-RADIUS 1 EQUI-AREA
	T5REF	K	TEMP. AT WHICH THE ROD DIMENSIONS ARE REFERENCED	
RECORD 27	Z6REF	M	REFERENCE ELEVATION OF REACTOR VESSEL	
	Z6INOZ	M	ELEVATION OF VESSEL INLET NOZZLE ABOVE Z6REF	
	Z6BCOR	M	ELEVATION OF BOTTOM OF CORE ABOVE Z6REF	
	Z6TCOR	M	ELEVATION OF TOP OF CORE ABOVE Z6REF	
	Z6UPLN	M	RELATIVE ELEVATION OF VESSEL UPPER PLENUM TO Z6REF	
	Z6ONOZ	M	ELEVATION OF VESSEL OUTLET NOZZLE ABOVE Z6REF	
	X6INOZ	M	LENGTH OF INLET NOZZLE FOR CHANNEL ORIFICE ZONE	
RECORD 28	A6GL	M2	AREA BETWEEN GAS AND LIQUID IN VESSEL UPPER PLENUM	

	A6GM1	M2	AREA BETWEEN GAS AND METAL 1 IN VESSEL UPPER PLENUM
	A6GM2	M2	AREA BETWEEN GAS AND METAL 2 IN VESSEL UPPER PLENUM
	A6GM3	M2	AREA BETWEEN GAS AND METAL 3 IN VESSEL UPPER PLENUM
	A6LM1	M2	AREA BETWEEN LIQUID AND METAL 1 IN VESSEL UPPER PLENUM
	A6LM2	M2	AREA BETWEEN LIQUID AND METAL 2 IN VESSEL UPPER PLENUM
	A6JET	M2	AREA OF CORE JET FLOW
	H6GAS	W/(K*M2)	HEAT TRANSFER COEF. FOR COVER GAS IN UPPER PLENUM
	H6LNA	W/(K*M2)	HEAT TRANSFER COEF. BETWEEN SODIUM AND METAL IN UPPER PLENUM
	H6INF	W/(K*M2)	HEAT TRANSFER COEF. AT INTERFACE OF TWO SODIUM ZONES IN UPPER PLENUM
	Z6CHIM	M	LENGTH OF CHIMNEY
	Z6UPTL	M	TOTAL HEIGHT OF UPPER PLENUM
	F6LEAK	-	FRACTION OF BYPASS FLOW LEAKING DIRECTLY INTO UPPER PLENUM FROM LOWER BYPASS REGION
	B6UMC1	J/K	MASS HEAT CAPACITY OF METAL 1 IN UPPER PLENUM
	B6UMC2	J/K	MASS HEAT CAPACITY OF METAL 2 IN UPPER PLENUM
	B6UMC3	J/K	MASS HEAT CAPACITY OF METAL 3 IN UPPER PLENUM
RECORD 29			
	A6LFBP	M2	FLOW AREA OF LOWER REGION OF BYPASS CHANNEL
	A6UFBP	M2	FLOW AREA OF UPPER REGION OF BYPASS CHANNEL
	Y6LRBP	M	HYDRAULIC DIAMETER OF LOWER BYPASS REGION CHANNEL
	Y6URBP	M	HYDRAULIC DIAMETER OF UPPER BYPASS REGION CHANNEL
	F6INBP	-	FLOW LOSS COEF. AT BYPASS INLET
	H6ABP	W/K	OVERALL HEAT TRANSFER COEF. BETWEEN UPPER BYPASS REGION SODIUM AND LINER
RECORD 30			
	F6FRC1	-	FRICTION FACTOR CORRELATION COEF. FOR SODIUM FLOWING IN CHANNELS
	F6FRC2	-	FRICTION FACTOR CORRELATION COEF. FOR SODIUM FLOWING IN CHANNELS
	F6NUC1	-	CORRELATION CONSTANT FOR NUSSELT NUMBER
	F6NUC2	-	CORRELATION CONSTANT FOR NUSSELT NUMBER
	F6NUC3	-	CORRELATION CONSTANT FOR NUSSELT NUMBER
	F6NUC4	-	CORRELATION CONSTANT FOR NUSSELT NUMBER
RECORD 101 - 200			
	Z6LFGP(L)	M	AXIAL LENGTH OF LOWER FISSION GAS PLENUM REGION OF EACH ROD TYPE
	Z6LBLK(L)	M	AXIAL LENGTH OF LOWER BLANKET REGION OF EACH ROD TYPE

	Z6AFUL(L)	M	AXIAL LENGTH OF ACTIVE FUEL REGION OF EACH ROD TYPE
	Z6UBLK(L)	M	AXIAL LENGTH OF UPPER BLANKET REGION OF EACH ROD TYPE
	Z6UFGP(L)	M	AXIAL LENGTH OF UPPER FISSION GAS PLENUM REGION OF EACH ROD TYPE
	N6LFGP(L)	-	NUMBER OF AXIAL COOLANT NODES IN LOWER FISSION GAS PLENUM REGION OF EACH ROD TYPE
	N6LBLK(L)	-	NUMBER OF AXIAL COOLANT NODES IN LOWER BLANKET REGION OF EACH ROD TYPE
	N6AFUL(L)	-	NUMBER OF AXIAL COOLANT NODES IN ACTIVE FUEL REGION OF EACH ROD TYPE
	N6UBLK(L)	-	NUMBER OF AXIAL COOLANT NODES IN UPPER BLANKET REGION OF EACH ROD TYPE
	N6UFGP(L)	-	NUMBER OF AXIAL COOLANT NODES IN UPPER FISSION GAS PLENUM REGION OF EACH ROD TYPE
	F6PD(L)	-	PITCH TO DIAMETER RATIO FOR EACH ROD TYPE
	F6PWD(L)	-	PITCH TO DIAMETER RATIO FOR WIRE WRAP OF EACH ROD TYPE
	L5CLMT(L)	-	INDEX OF CLADDING MATERIAL FOR EACH ROD TYPE
	L5STMT(L)	-	INDEX OF STRUCTURAL MATERIAL FOR EACH ROD TYPE
	L5LBMT(L)	-	INDEX OF LOWER BLANKET MATERIAL FOR EACH ROD TYPE
	F5DLBU(L)	-	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF LOWER BLANKET FOR EACH ROD TYPE
	F5DLBE(L)	-	FRACTIONAL EQUIAXED GRAIN DENSITY OF LOWER BLANKET FOR EACH ROD TYPE
	F5DLBC(L)	-	FRACTIONAL COLUMNAR GRAIN DENSITY OF LOWER BLANKET FOR EACH ROD TYPE
	L5AFMT(L)	-	INDEX OF ACTIVE FUEL MATERIAL FOR EACH ROD TYPE
	F5DAFU(L)	-	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF ACTIVE FUEL FOR EACH ROD TYPE
	F5DAFE(L)	-	FRACTIONAL EQUIXED GRAIN DENSITY OF ACTIVE FUEL FOR EACH ROD TYPE
	F5DAFC(L)	-	FRACTIONAL COLUMNAR GRAIN DENSITY OF ACTIVE FUEL FOR EACH ROD TYPE
	L5UBMT(L)	-	INDEX OF UPPER BLANKET MATERIAL FOR EACH ROD TYPE
	F5DUBU(L)	-	FRACTIONAL UNSTRUCTURED GRAIN DENSITY OF UPPER BLANKET FOR EACH ROD TYPE
	F5DUBE(L)	-	FRACTIONAL EQUXIAXED GRAIN DENSITY OF UPPER BLANKET FOR EACH ROD TYPE
	F5DUBC(L)	-	FRACTIONAL COLUMNAR GRAIN DENSITY OF UPPER BLANKET FOR EACH ROD TYPE
RECORD	201 - 300		
	F5PAX(J,K)	-	AXIAL POWER FRACTION FOR EACH NODE IN EACH CHANNEL
RECORD	301 - 400		
	F5PRAD(I,K)	-	FUEL POWER FRACTION IN EACH RADIAL FUEL NODE IN EACH CHANNEL (NO AXIAL DEPENDENCE)
RECORD	401 - 500		
	F5PWR5(K)	-	FRACTION OF POWER GENERATED IN EACH CHANNEL DEPOSITED DIRECTLY INTO THE FUEL
	F5PWR6(K)	-	FRACTION OF POWER GENERATED IN EACH CHANNEL DEPOSITED DIRECTLY IN THE CLADDING

F5PWR1(K)	-	FRACTION OF POWER GENERATED IN EACH CHANNEL DEPOSITED DIRECTLY INTO THE COOLANT
RECORD 501 - 600		
L5GAS(I,K)	-	INDEX OF EACH FISSION GAS TYPE IN EACH CHANNEL
F5GAS(I,K)	-	MOLE FRACTION OF EACH FISSION GAS IN EACH CHANNEL

4.1.2 Sodium Loop Data

All geometric and hydraulic data required to specify the primary and secondary loop pipings, pumps and IHX, as well as sodium-side hydraulic information in the steam generator is input using data file NALOOP. The listing included on subsequent pages of this section shows on a record-by-record basis how the specific information is supplied by the user. These records may be input in any order, except that record 1 must be read first, as it contains variable dimensioning data.

The present version of SSC-L assumes that all primary heat transport systems (HTS) are geometrically identical and are operating initially at the same steady state. The same assumption applies to all secondary HTSs.

The numbering sequence for pipes within an HTS is important. In the primary loop, the pipe numbers must start at 1 at the vessel outlet and proceed sequentially around to the vessel inlet. On the primary loop, the IHX primary side is considered a pipe and a number must be assigned to it.

On the secondary side, the pipe numbers must start at 1 at the IHX secondary outlet and proceed sequentially around to the IHX secondary inlet. Here, in the intermediate HTS, the IHX secondary side and all steam generator heat exchangers (e.g., evaporator, superheater, etc) are not assigned pipe numbers. However, if an evaporator and superheater are specified in the steam generating system, a sodium pipe connecting the two must be assigned in the secondary HTS.

Piping data are read in on records 1101-1199 for the primary HTS and on records 1201-1299 for the secondary HTS. The individual pipe number (K) is derived from

(a) K = Record Number - 1100 and

(b) K = Record Number - 1200

for the primary and secondary HTS, respectively. IHX data (geometry, noding, etc.) is read in on records 101-104, 1002 and 1003.

The portions of the pumps in both primary and secondary loops are specified by the pipe number preceeding the pump on record 1001. Required data, e.g., rated head, speed, flow, torque etc., must be provided on records 112 for the primary pump and 122 for the secondary pump. The coefficients in the polynomial equations describing head and torque characteristics are given default values which may be satisfactory for most situations. These coefficients may optionally be supplied by the user on record 110, if necessary.

The position of the check valve in the primary loop is specified on record 1001 by the pipe number preceeding the check valve. If the number specified is zero then the pressure drop across the valve is always zero and the effects of the check valve are removed from the systems check valve data is supplied on record 111.

Provisions have been included in SSC to group all unbroken plant loops into one simulated loop for computational efficiency. Specification of loop simulation is given in records 1 and 2 of file NALOOP and record 1 of file OPDATA. In file OPDATA, two variables are of importance; N9DSEN, the number of physical loops present, and N9LOOP, the number of operational loops present. Simulation of these operational loops is divided in file NALOOP. N1LOOP is the number of loops actually simulated and N3STGN(K) is the number of physical steam generator loops to be represented by each simulated steam generator loop.

***** FILE NALOOP

RECORD	Variable	Unit	Description
RECORD 1	N1LOOP	-	NUMBER OF PRIMARY LOOPS SIMULATED
	N1PIPE(K)	-	NUMBER OF PIPES IN EACH PRIMARY LOOP
	N1NODE(J,K)	-	NUMBER OF NODES IN EACH PIPE OF EACH PRIMARY LOOP
	N2PIPE(K)	-	NUMBER OF PIPES IN EACH INTERMEDIATE LOOP
	N2NODE(J,K)	-	NUMBER OF NODES IN EACH PIPE OF EACH INTERMEDIATE LOOP
RECORD 2	N3STGN(K)	-	NUMBER OF PHYSICAL SG LOOPS TO BE REPRESENTED BY EACH SIMULATED SG LOOP (SUMMATION MUST EQUAL N9LOOP)
RECORD 100	N1TUBE	-	NUMBER OF TUBES IN IHX
	Y1TUB1	M	INNER DIAMETER OF IHX TUBES
	Y1TUB2	M	OUTER DIAMETER OF IHX TUBES
	A1IHX	M2	FLOW AREA ON PRIMARY SIDE OF IHX
	V1BYP	M3	VOLUME OF SODIUM IN IHX PRIMARY BYPASS
	V1IHX	M3	VOLUME OF SODIUM IN IHX PRIMARY HEAT EXCHANGE REGION
	B1SHEL	KG	MASS OF IHX SHELL
	A1SHEL	M2	HEAT TRANSFER AREA OF IHX SHELL
	F1POD	-	PITCH-TO-DIAMETER RATIO FOR IHX TUBE BUNDLE
	H1FLP	(M2-K)/W	FOULING RESISTANCE ON OUTER(PRIMARY) SURFACE OF TUBES
	H1FLS	(M2-K)/W	FOULING RESISTANCE ON INNER(SECONDARY) SURFACE OF TUBES
	L1STRC	-	PRIMARY LOOP STRUCTURAL MATERIAL ID
RECORD 101	L1FDIR	-	IHX FLOW INDICATOR: 1 FOR PARALLEL FLOW IN IHX; -1 FOR COUNTER FLOW
	L1KP	-	INPUT OPTION INDICATOR: 0 IF P1PDHX GIVEN; 1 IF F1LOSS(JIHX,1) GIVEN
	F1IN	-	PRIMARY INLET LOSS COEFFICIENT FOR IHX
	F1OUT	-	PRIMARY OUTLET LOSS COEFFICIENT FOR IHX
	L1KS	-	INPUT OPTION INDICATOR: 0 IF P2PDHX GIVEN; 1 IF F2LOSX(1) GIVEN
	F2INHX	-	INLET LOSS COEFFICIENT TO IHX SECONDARY SIDE
	F2EXPN	-	LOSS COEFFICIENT FOR EXPANSION FROM TUBES TO OUTLET REGION IN IHX
	F2CONT	-	LOSS COEFFICIENT FOR CONTRACTION FROM INLET PLENUM TO TUBES IN IHX
	F2OUHX	-	OUTLET LOSS COEFFICIENT FROM IHX SECONDARY SIDE

RECORD 102			
	X1PLEN(I)	M	LENGTH OF IHX PRIMARY PLENA (I = 1, 2)
	X2PLEN(I)	M	LENGTH OF IHX INTERMEDIATE PLENA (I = 1, 2)
	V1PLEN(I)	M3	SODIUM VOLUME OF IHX PRIMARY PLENA (I = 1, 2)
	V2PLEN(I)	M3	SODIUM VOLUME OF IHX INTERMEDIATE PLENA (I = 1, 2)
RECORD 103			
	R1PLEN(I)	D	THE ANGLE OF FLOW IN IHX PRIMARY PLENA (I = 1, 2)
	R2PLEN(I)	D	THE ANGLE OF FLOW IN IHX SECONDARY PLENA (I = 1, 2)
RECORD 104			
	X2DOWN	M	LENGTH OF IHX CENTRAL DOWNCOMER REGION
	Y2DOWN	M	INNER DIAMETER OF IHX CENTRAL DOWNCOMER
	R2DOWN	D	THE ANGLE OF FLOW IN THE IHX CENTRAL DOWNCOMER
RECORD 105			
	T1CONV	K	CONVERGENCE CRITERION FOR TEMPERATURES IN IHX
	F1EPS	M	ROUGHNESS OF PRIMARY LOOP PIPING
	F2EPS	M	ROUGHNESS OF INTERMEDIATE LOOP PIPING
RECORD 110			
	N1PUMP	-	NUMBER OF COEFFICIENTS IN POLYNOMIAL FOR PRIMARY PUMP HEAD
	F1PUMP(I)	-	COEFFICIENTS IN POLYNOMIAL EQUATION FOR PRIMARY PUMP HEAD
RECORD 111			
	I1FAIL	-	MODE OF PRIMARY CHECK VALVE 0 WORKING 1 FAILED
	I1TYPE	-	TYPE OF PRIMARY CHECK VALVE
	P1PCV	N/M2	BACKPRESSURE FOR CHECK VALVE TO CLOSE
	F1CVAL(I)	M4	CHECK VALVE CHARACTERISTIC COEFFICIENTS
RECORD 112			
	Z1HEDR	M	RATED HEAD OF PRIMARY PUMP
	U1OMGR	RPM	RATED SPEED OF PRIMARY PUMP
	Q1FLOR	M3/S	RATED VOLUMETRIC FLOW RATE OF PRIMARY PUMP
	T1ORKR	N-M	RATED TORQUE OF PRIMARY PUMP
	Z1RTOT	M	HEIGHT OF PRIMARY PUMP TANK
	A1RES	M2	X-SECTIONAL AREA OF PRIMARY PUMP TANK
RECORD 120			
	L2KEV	-	INPUT OPTION INDICATOR 0 IF P2PDEV(I) GIVEN 1 IF F2EV(I) GIVEN
	F2INEV	-	INLET LOSS COEFFICIENT TO EVAPORATOR SHELL SIDE
	F2OUEV	-	OUTLET LOSS COEFFICIENT FOR EVAPORATOR SHELL SIDE

	X2INEV	M	LENGTH OF INLET PLENUM ON EVAPORATOR SHELL SIDE
	X2OUEV	M	LENGTH OF OUTLET PLENUM ON EVAPORATOR SHELL SIDE
	V2INEV	M3	SODIUM VOLUME OF EVAPORATOR INLET PLENUM
	V2OUEV	M3	SODIUM VOLUME OF EVAPORATOR OUTLET PLENUM
	R2INEV	D	THE ANGLE OF FLOW AT INLET PLENUM OF EVAPORATOR SHELL SIDE
	R2OUEV	D	THE ANGLE OF FLOW AT THE OUTLET PLENUM OF EVAPORATOR SHELL SIDE
	R2EV	D	THE ANGLE OF FLOW IN THE EVAPORATOR SHELL SIDE
RECORD 121	L2KSH	-	INPUT OPTION INDICATOR 0 IF P2PDSH(1) GIVEN 1 IF F2SH(1) GIVEN
	F2INSH	-	INLET LOSS COEFFICIENT TO SUPERHEATER SHELL SIDE
	F2OUSH	-	OUTLET LOSS COEFFICIENT FOR SUPERHEATER SHELL SIDE
	X2INSH	M	LENGTH OF INLET PLENUM ON SUPERHEATER SHELL SIDE
	X2OUSH	M	LENGTH OF OUTLET PLENUM ON SUPERHEATER SHELL SIDE
	V2INSH	M3	SODIUM VOLUME OF SUPERHEATER INLET PLENUM
	V2OUSH	M3	SODIUM VOLUME OF SUPERHEATER OUTLET PLENUM
	R2INSH	D	THE ANGLE OF FLOW AT INLET PLENUM OF SUPERHEATER SHELL SIDE
	R2OUSH	D	THE ANGLE OF FLOW AT OUTLET PLENUM OF SUPERHEATER SHELL SIDE
	R2SH	D	THE ANGLE OF FLOW IN SUPERHEATER SHELL SIDE
RECORD 122	Z2HEDR	M	RATED HEAD OF INTERMEDIATE PUMP
	U2OMGR	RPM	RATED SPEED OF INTERMEDIATE PUMP
	Q2FLOR	M3/S	RATED VOLUMETRIC FLOW RATE OF INTERMEDIATE PUMP
	T2ORKR	N-M	RATED TORQUE OF INTERMEDIATE PUMP
	Z2RTOT	M	HEIGHT OF INTERMEDIATE PUMP TANK
	A2RES	M2	X-SECTIONAL AREA OF INTERMEDIATE PUMP TANK
	Z2TTOT	M	HEIGHT OF SURGE TANK
	A2TANK	M2	X-SECTIONAL AREA OF SURGE TANK
RECORD 1001	L1PUMP(K)	-	PIPE NUMBER PRECEDING PUMP IN EACH PRIMARY LOOP
	L1CV(K)	-	PIPE NUMBER PRECEDING CHECK VALVE IN EACH PRIMARY LOOP
	L1IHX(K)	-	PIPE NUMBER OF IHX IN EACH PRIMARY LOOP

	L2PUMP(K)	-	PIPE NUMBER PRECEDING PUMP IN EACH INTERMEDIATE LOOP
	L2TANK(K)	-	PIPE NUMBER PRECEDING EXPANSION TANK IN EACH INTERMEDIATE LOOP
	L2EV(K)	-	PIPE NUMBER PRECEDING EVAPORATOR IN EACH INTERMEDIATE LOOP
	L2SH(K)	-	PIPE NUMBER PRECEDING SUPERHEATER IN EACH INTERMEDIATE LOOP
RECORD	1002		
	F1BETA(K)	-	PRIMARY BYPASS FRACTION THROUGH EACH IHX
	N1ACTV(K)	-	NUMBER OF ACTIVE(UNPLUGGED) TUBES IN IHX OF EACH LOOP
	P1PDHX(K)	N/M2	PRESSURE DROP OVER IHX PRIMARY SIDE
RECORD	1003		
	P2PDHX(K)	N/M2	PRESSURE DROP OVER SECONDARY SIDE OF IHX
	F2LOSX(K)	-	LOSS COEFFICIENT FOR SECONDARY SIDE OF EACH IHX
	P2PDEV(K)	N/M2	PRESSURE DROP OVER EACH EVAPORATOR SHELL SIDE
	F2EV(K)	-	LOSS COEFFICIENT FOR SHELL SIDE OF EACH EVAPORATOR
	P2PDSH(K)	N/M2	PRESSURE DROP OVER SUPERHEATER SHELL SIDE
	F2SH(K)	-	LOSS COEFFICIENT FOR SHELL SIDE OF EACH SUPERHEATER
RECORD	1101 - 1199		
	F1LOSS(J,K)	-	LOSS COEFFICIENT FOR EACH PIPE IN EACH PRIMARY LOOP
	X1PIPE(J,K)	M	LENGTH OF EACH PIPE IN EACH PRIMARY LOOP
	Y1PIPE(J,K)	M	INNER DIAMETER OF EACH PIPE IN EACH PRIMARY LOOP
	Y1THIK(J,K)	M	THICKNESS OF EACH PIPE WALL IN EACH PRIMARY LOOP
	R1SIN(I,J,K)	D	THE ANGLE OF PRIMARY FLOW AT EACH NODE IN EACH PIPE OF EACH LOOP
RECORD	1201 - 1299		
	F2LOSS(J,K)	-	LOSS COEFFICIENT FOR EACH PIPE IN EACH INTERMEDIATE LOOP
	X2PIPE(J,K)	M	LENGTH OF EACH PIPE IN EACH PRIMARY LOOP
	Y2PIPE(J,K)	M	INNER DIAMETER OF EACH PIPE IN EACH INTERMEDIATE LOOP
	Y2THIK(J,K)	M	THICKNESS OF EACH PIPE WALL IN EACH INTERMEDIATE LOOP
	R2SIN(I,J,K)	D	THE ANGLE OF INTERMEDIATE FLOW AT EACH NODE OF EACH PIPE OF EACH LOOP

4.1.3 Steam Generator Data

The user constructs the simulation model of the steam generating system by interconnecting models of five types of components. These are a pipe, an accumulator, a pump, a heat exchanger, and a feedwater source. A pipe is a straight length of adiabatic, constant diameter pipe with a user-specified orientation to the vertical. Each pipe is divided into a user-specified number of control volumes and contains a loss coefficient at the downstream end of the pipe to account for pressure losses due to area changes, flanges, fittings, values, etc. An accumulator is modeled as a single control volume. A pump is modeled as a single control volume with no storage (i.e., zero volume). The pump pressure rise is computed from user input performance characteristics. The heat exchanger model is a single tube representation of a multi-tube, counter flow, straight tube heat exchanger. Inlet and outlet plena are included and the heat transfer tube is divided into a user-specified number of control volumes. A feedwater source is a source of fluid whose pressure and enthalpy are user specified functions of the ratio of feedwater flow to the feedwater flow at 100% power.

Each component in the simulation model is given a unique identification number and all data for each component is referenced by its ID number. The component numbering scheme is,

a) numbers 1 to 99 for pipes,

b) numbers 101 to 199 for accumulators,

c) numbers 201 to 299 for pumps,

d) numbers 301 to 399 for heat exchangers,

e) numbers 401 to 499 for feedwater sources, and

f) number 500 for turbine inlet.

In addition, certain numbers are reserved for the connections between the steam generating system and the intermediate sodium transport system. These reserved numbers are

a) number 300 for the connection between a heat exchanger and the IHX inlet, and

b) number 400 for the connection between a heat exchanger and the IHX outlet.

The identification numbers of the individual components may be chosen arbitrarily within the rules stated above.

Once the identification numbers for the components have been assigned, data describing each of the components must be supplied. The data for each component is divided into three types of data, (1) geometric data, (2) performance data, and (3) initialization data. The geometric data record consists of items identifying the components which precede and follow the component specified by the record number as well as physical parameters required to describe the component such as length, diameter, etc.

The performance data record contains items describing the operating characteristics of the components specified by the record number. For example, the performance data record for a pump would contain the pump head at rated condiions and the pump flow rate at rated conditions, etc.

The initialization data record specifies the values of the state variables at either the inlet or outlet of the component. If the user knows the values of some key state variables at steady state, the initialization data allows the user to utilize the known information to supplement his knowledge of the geometry of the system being simulated. For example, if a pressure is specified, the loss coefficient for that component is adjusted to produce the specified pressure. If a fluid temperature or quality in a heat exchanger is specified, an area correction factor is calculated so that the fluid temperature or quality at that location in the system is the user specified value. If the pump outlet pressure is specified, the pump speed is adjusted to produce the specified value of pump outlet pressure. For each component, some types of data are required, while other types of data are optional. Table V lists the types of required and optional data for each component.

The record number for the data record is the identification number of the component to which the data record applies. Because there are three types of data records for any single component, there may be up to three data records with the same record number, each containing a different number of data items. The code recognizes the type of record (geometric, performance, or initialization records) from the number of items in the record, so that the data records may be inserted in the data deck in any order. The only exception to this arbitrary ordering of the data records is that data record 1001, which specifies the number to data records in the data deck, must be the first record in the data deck.

The descriptions of the data items are for the most part self-explanatory but there are several items which require further explanation. The parameter N3KEY which appears as the second and third item of the geometric data records (the record number is considered as the first data item) specify the identification numbers of the components which precede and follow the component specified by the record number. These items are used to determine the geometric arrangement of the steam generating system. The fourth and fifth data items in the heat exchanger geometric data records specify the interconnection of the heat exchangers for the flow paths containing the sodium from the intermediate heat transport system. To illustrate the way in which the parameters are used to determine the geometric arrangement of the steam generating system, Figure 1

TABLE V

Required and Optional Data for Steam Generator Components

Component	Required Data	Optional Data
Pipe	Geometric Data	Initialization Data
Accumulator	Geometric Data Initialization Data	-
Heat Exchanger	Geometric Data	Initialization Data
Pumps	Geometric Data Performance Data	Initialization Data
Feedwater Source	Geometric Data Performance Data	-

is a diagram of a portion of hypothetical steam generating system containing pipes, a pump and a heat exchanger. The first three data items in the geometric data records for each of these components is given in Table VI.

A provision has been made in the code to allow parallel flow paths. These parallel flow paths are computationally equivalent and are lumped together by the code. In order to obtain the proper flow rates in the parallel paths for the computations, tee's can be constructed at the junction between two pipes by use of the parameter F3JUNC which appears in the pipe geometric record. The integer portion of the parameter specified the number of pipes upstream of the junction while the fractional part of the parameter specifies the number of pipes downstream of the junction. Thus, a parameter F3JUNC for a tee with one inlet and two outlets would be 1.2 and the parameter F3JUNC for a normal junction between two pipes would be 1.1.

The parameter I3EISL which appears in the initialization record for accumulators and is specified for each flow out of the accumulator must also be described further. If this parameter is zero, the enthalpy of the flow leaving the accumulator is the enthalpy of the fluid in the accumulator at the height of the outlet nozzle. Thus, if the outlet nozzle is above the liquid level in the accumulator, saturated vapor flows out through the outlet nozzle. If the outlet nozzle is below the liquid level, then saturated liquid flows through the exit nozzle. When feedwater is added to an accumulator and I3EISL for an exit nozzle of that accumulator is equal to 1, the enthalpy of the fluid leaving the outlet nozzle is the weighted average of the enthalpy of the fluid at the height of the exit nozzle and the enthalpy of the feedwater. The weighting fractions are defined by the ratio of the feedwater flow to the total flow through the outlet nozzle.

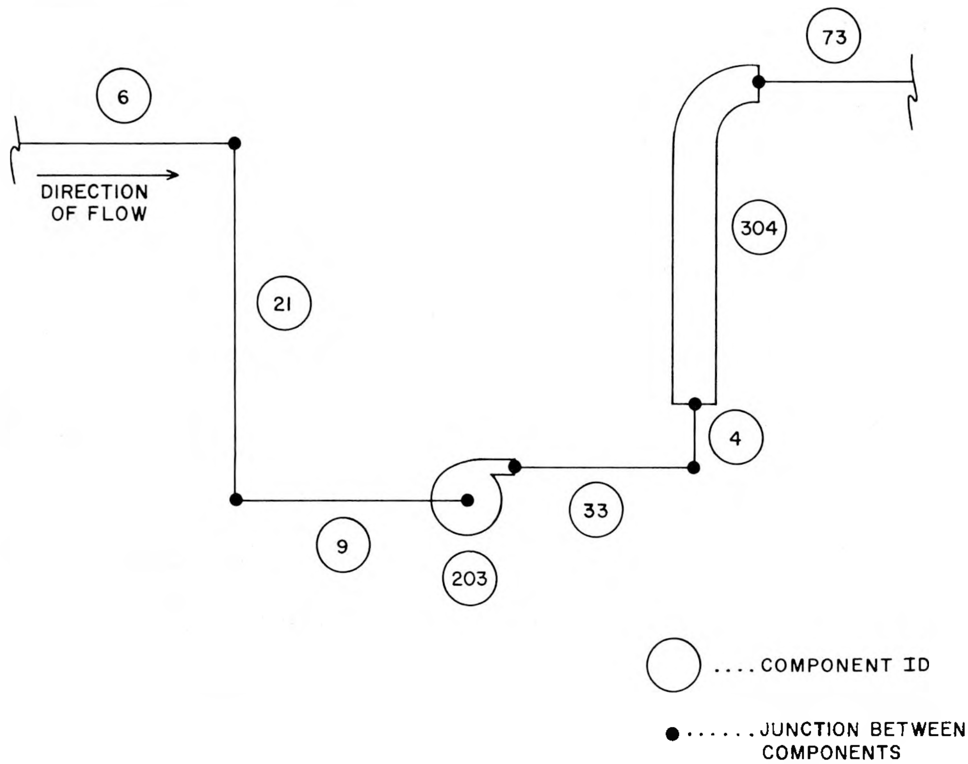

Figure 13. Schematic diagram of a portion of steam generating system.

TABLE VI

First Three Data Items of Geometric Data Records for System of Figure 13

Component ID (Record Number)	ID of Preceeding Component	ID of Following Component
Pipe Geometric Data Records		
6	NA	21
21	6	9
9	21	203
33	203	4
4	33	304
73	304	NA
Pump Geometric Data Records		
203	9	33
Heat Exchanger Data Record		
304	4	73

The parameter I3DNB which appears in the heat exchanger initialization record controls the calculation of the location of the departure from nucleate boiling. If the parameter is zero, a simple linear estimate of the DNB location is performed while if the parameter is equal to 1 then a more detailed (and time consuming) calculation of the DNB location is performed. The detailed calculation of the DNB location is recommended when a small number of control volumes is used in the simulation of a heat exchanger.

***** FILE STMGEN

**** REQUIRED DATA ****

RECORD	1001		RECORD 1001 MUST BE FIRST DATA RECORD IN FILE STMGEN
	N3PIPR	-	NUMBER OF PIPES WHOSE GEOMETRIC DATA IS TO BE READ ON INPUT
	N3HXR	-	NUMBER OF HX-S WHOSE GEOMETRIC DATA WILL BE READ ON INPUT
	N3VOLR	-	NUMBER OF ACCUMULATORS WHOSE GEOMETRIC DATA ARE TO BE READ ON INPUT (SAME NUMBER MUST BE INITIALIZED)
	N3PIPI	-	NUMBER OF PIPES TO BE INITIALIZED ON INPUT
	N3HXI	-	NUMBER OF HX-S TO BE INITIALIZED ON INPUT
	N3PMPI	-	PUMP INITIALIZATION CONTROL FLAG
RECORD	1002		
	A3CONV	-	RELATIVE AREA CONVERGENCE CRITERION FOR HEAT EXCHANGER AREA OPTION
	E3CONV	-	RELATIVE CONVERGENCE CRITERION FOR STEAM GENERATOR ENTHALPY CALCULATION
	F3QLCV	-	RELATIVE CONVERGENCE CRITERION FOR STEAM GENERATOR WATER QUALITY CALCULATION
	T3CONV	-	RELATIVE CONVERGENCE CRITERION FOR TEMPERATURE ITERATIVE CALCULATIONS
	P3CONV	-	RELATIVE CONVERGENCE CRITERION FOR SG PRESSURE CALCULATIONS
	W3CONV	-	RELATIVE CONVERGENCE CRITERION FOR SG ITERATIVE FLOW CALCULATIONS
	N3ITER	-	MAX NUMBER OF ALLOWED ITERATIONS FOR ANY ITERATIVE CALCULATION

* PIPE GEOMETRIC DATA RECORD *

RECORD	1 - 99		PIPE ID SET EQUAL TO RECORD NUMBER
	N3KEY	-	ID OF MODULE CONNECTED TO INLET OF THIS PIPE
	N3KEY	-	ID OF MODULE CONNECTED TO OUTLET OF THIS PIPE
	X3PIPE	M	PIPE LENGTH
	Z3PIPE	M	EXIT ELEVATION OF PIPE
	Y3ID	M	PIPE INNER DIAMETER
	F3ZY	-	SURFACE ROUGHNESS TO DIAMETER RATIO FOR PIPE
	F3JUNC	-	JUNCTION PARAMETER AT EXIT OF PIPE
	F3PW	-	PRESSURE LOSS COEFFICIENT FOR FITTING AT EXIT OF PIPE
	F3PWMP	-	TWO PHASE MULTIPLIER FOR LOSS COEFFICIENT OF FITTING AT EXIT OF PIPE
	Z3FIT	M	EXIT ELEVATION OF FITTING AT EXIT OF PIPE
	N3NODE	-	NUMBER OF CONTROL VOLUMES IN PIPE

* ACCUMULATOR GEOMETRIC DATA RECORD *

RECORD	101 - 199		ACCUMULATOR ID SET EQUAL TO RECORD NUMBER
	V3VOL	M3	VOLUME OF ACCUMULATOR

	N3VLOT	-	NUMBER OF EXIT NOZZLES
	N3VOSB	-	ID OF MODULE ATTACHED TO FIRST EXIT NOZZLE
	Z3INSL	M	ELEVATION OF FIRST EXIT NOZZLE
	F3INLV	-	RELATIVE HEIGHT OF FIRST EXIT NOZZLE (0.0 - 1.0)
	N3VOSB	-	ID OF MODULE ATTACHED TO K-TH (K=1, N3VLOT) EXIT NOZZLE
	Z3INSL	M	ELEVATION OF K-TH EXIT NOZZLE
	F3INLV	-	RELATIVE HEIGHT OF K-TH EXIT NOZZLE (0.0 - 1.0)
			* PUMP GEOMETRIC DATA RECORD *
RECORD	201 - 299		PUMP ID SET EQUAL TO RECORD NUMBER
	N3KEY	-	ID OF MODULE CONNECTED TO INLET OF PUMP
	N3KEY	-	ID OF MODULE CONNECTED TO OUTLET OF PUMP
	Z3PMOT	M	ELEVATION AT PUMP OUTLET
			* HEAT EXCHANGER GEOMETRIC DATA RECORD *
RECORD	301 - 399		HEAT EXCHANGER ID SET EQUAL TO RECORD NUMBER
	N3KEY	-	ID OF MODULE CONNECTED TO WATER INLET OF HEAT EXCHANGER
	N3KEY	-	ID OF MODULE CONNECTED TO WATER OUTLET OF HEAT EXCHANGER
	N3KEY	-	ID OF MODULE CONNECTED TO SODIUM INLET OF HEAT EXCHANGER
	N3KEY	-	ID OF MODULE CONNECTED TO SODIUM OUTLET OF HEAT EXCHANGER
	X3PIPE	M	LENGTH OF HEAT TRANSFER TUBE
	Z3PIPE	M	EXIT ELEVATION OF HEAT TRANSFER TUBE
	Y3ID	M	INNER DIAMETER OF HEAT TRANSFER TUBE
	F3ZY	M	SURFACE ROUGHNESS TO DIAMETER RATIO FOR HEAT TRANSFER TUBE
	N3TUBE	-	NUMBER OF HEAT TRANSFER TUBES IN HEAT EXCHANGER
	F3PWIP	-	INLET PLENUM PRESSURE LOSS COEFFICIENT FOR HEAT EXCHANGER
	F3IPMP	-	TWO-PHASE MULTIPLIER FOR INLET PLENUM LOSS COEFFICIENT FOR HEAT EXCHANGER
	Z3IP	M	ELEVATION AT EXIT OF INLET PLENUM OF HEAT EXCHANGER
	X3IP	M	FLOW PATH LENGTH IN INLET PLENUM OF HEAT EXCHANGER
	V3IP	M3	VOLUME OF INLET PLENUM OF HEAT EXCHANGER
	F3PWOP	-	OUTLET PLENUM LOSS COEFFICIENT FOR HEAT EXCHANGER
	F3OPMP	-	TWO-PHASE MULTIPLIER FOR OUTLET PLENUM LOSS COEFFICIENT FOR HEAT EXCHANGER
	Z3OP	M	ELEVATION AT EXIT OF OUTLET PLENUM OF HEAT EXCHANGER
	X3OP	M	FLOW PATH LENGTH IN OUTLET PLENUM OF HEAT EXCHANGER
	V3OP	M3	VOLUME OF OUTLET PLENUM OF HEAT EXCHANGER

N3NODE	-	NUMBER OF CONTROL VOLUMES IN HEAT TRANSFER TUBE
Y3OD	M	OUTER DIAMETER OF HEAT TRANSFER TUBE
F3TBPD	-	PITCH TO OUTER DIAMETER RATIO FOR TUBE BUNDLE IN HEAT EXCHANGER
A3NA	M2	TOTAL SODIUM FLOW AREA IN HEAT EXCHANGER TUBE BUNDLE
H3FOUL	W/(M2*K)	WATER SIDE FOULING HEAT TRANSFER COEFFICIENT FOR HEAT EXCHANGER
F3AQ	-	AREA CORRECTION FACTOR FOR HEAT EXCHANGER
M3TYPE	-	ID NUMBER OF HEAT TRANSFER TUBE MATERIAL
N3HMOD	-	NUMBER OF PHYSICAL UNITS REPRESENTED BY EACH HEAT EXCHANGER

* FEEDWATER SOURCE GEOMETRIC DATA RECORD *

RECORD 401 - 499		FEEDWATER SOURCE ID SET EQUAL TO RECORD NUMBER
N3KEY	-	ID OF MODULE WHERE FEEDWATER IS ADDED
N3KEY	-	ID OF MODULE WHERE FEEDWATER CONTROL FLOW SENSOR IS LOCATED (SENSOR AT EXIT OF MODULE)
Z3FILL	M	ELEVATION OF FILL JUNCTION

* PUMP PERFORMANCE DATA RECORD *

RECORD 201 - 299		PUMP ID SET EQUAL TO RECORD NUMBER
W3REF	KG/S	PUMP FLOW RATE AT RATED CONDITIONS
Z3PUMP	M	RATED HEAD OF PUMP AT RATED CONDITIONS
F3ZW	-	COEFFICIENT OF PUMP HEAD VARIATION WITH FLOW
S3PCST	S	PUMP COASTDOWN TIME CONSTANT

* FEEDWATER SOURCE PERFORMANCE DATA RECORD *

RECORD 401 - 499		FEEDWATER SOURCE ID SET EQUAL TO RECORD NUMBER
E3FWMN	J/KG	MINIMUM FEEDWATER ENTHALPY
F3ENFW(I)	-	COEFFICIENTS OF POLYNOMIAL FIT OF FEEDWATER ENTHALPY AS A FUNCTION OF NORMALIZED FEEDWATER FLOW
F3PSFW(I)	-	COEFFICIENT OF POLYNOMIAL FIT OF FEEDWATER PRESSURE AS A FUNCTION OF NORMALIZED FEEDWATER FLOW

* ACCUMULATOR INITIALIZATION DATA RECORD *

RECORD 101 - 199		ACCUMULATOR ID SET EQUAL TO RECORD NUMBER
P3VOL	N/M2	PRESSURE IN EACH ACCUMULATOR
F3LQLV	M	LIQUID LEVEL IN ACCUMULATOR
N3VLOT	-	NUMBER OF EXIT NOZZLES
N3VOSB	-	ID OF MODULE ATTACHED TO FIRST EXIT NOZZLE
I3EISL	-	CONTROL FLAG FOR CALCULATION OF ENTHALPY OF FLOW THRU FIRST EXIT NOZZLE
N3VOSB	-	ID OF MODULE ATTACHED TO K-TH (K=1, N3VLOT) EXIT NOZZLE
I3EISL	-	CONTROL FLAG FOR CALCULATION OF ENTHALPY OF FLOW THRU K-TH EXIT NOZZLE

**** OPTIONAL DATA ****

* PIPE INITIALIZATION DATA RECORD *

RECORD	1 - 99		PIPE ID SET EQUAL TO RECORD NUMBER
	P3OT	N/M2	OUTLET PRESSURE OF PIPE

* PUMP INITIALIZATION DATA RECORD *

RECORD	201 - 299		PUMP ID SET EQUAL TO RECORD NUMBER
	P3OT	N/M2	PUMP OUTLET PRESSURE

* HEAT EXCHANGER INITIALIZATION DATA RECORD *

RECORD	301 - 399		HEAT EXCHANGER ID SET EQUAL TO RECORD NUMBER
	I3DNB	-	CONTROL FLAG FOR DNB CALCULATION IN HEAT EXCHANGE
	E3OT	J/KG	WATER SIDE OUTLET ENTHALPY OF HEAT EXCHANGER
	F3QUAL	-	WATER SIDE OUTLET QUALITY OF HEAT EXCHANGER
	T3NAIN	K	SODIUM INLET TEMPERATURE OF HEAT EXCHANGER
	T3NAOT	K	SODIUM OUTLET TEMPERATURE OF HEAT EXCHANGER
	P3OT	N/M2	OUTLET PRESSURE OF HEAT EXCHANGER ON WATER SIDE
	P3DPIP	N/M2	INLET PLENUM PRESSURE DROP IN HEAT EXCHANGER
	P3DPOP	N/M2	OUTLET PLENUM PRESSURE DROP IN HEAT EXCHANGER

4.1.4 Operating Data

Data pertaining to the initial overall plant operating conditions, plus specification of the plant balance initialization logic are input to SSC through the data file OPDATA. The listing included at the end of this section shows on a record-by-record basis how the specific information is supplied by the user. The records for this data file may be entered in any order.

Record 2 is used to determine the particular plant balance initialization logic the user desires (refer to Section 4.1.2 of Reference 1). Of the four values contained on record 2, two must be specified as known (denoted by entering values greater than zero) while the other two are assumed unknown (denoted by entering values less than zero) and will be calculated by SSC. The two unknown values to be entered need not be precise; these can be an approximate initial guess (but these numbers must be entered as negative values).

The accuracy of the initial guesses entered on record 3 are more important. These values are used internally in SSC to start the iterative logic for the intermediate loop and steam generator balance. Thus, the more accurate the guess, the quicker the converged solution is obtained. In addition, a control flag is provided in record 3 for restart cases. For the first time through, L2PREV must equal zero. However, if multiple cases are to be run, the user can simply set L2PREV equal to 1 for the subsequent cases. The converged solution values from the previously run case will then automatically be used to provide the initial guesses required for the subsequent case.

***** FILE OPDATA

RECORD 1			
	P9DSGN	W	DESIGN REACTOR POWER
	F9PWRZ	-	FRACTION OF REFERENCE POWER AT T=0
	N9LOOP	-	NUMBER OF OPERATING LOOPS PRESENT IN PLANT
	N9DSGN	-	NUMBER OF PHYSICAL LOOPS PRESENT IN PLANT
	P3DSGN	N/M2	DESIGN PRESSURE AT TURBINE INLET
	E3DSGN	J/KG	DESIGN TURBINE INLET ENTHALPY
RECORD 2			
	T6OUTL	K	VESSEL SODIUM OUTLET TEMP.
	T6INLT	K	VESSEL COOLANT INLET TEMP.
	W1LOOP	KG/S	SODIUM FLOW RATE IN PRIMARY LOOP
	E3TURB	J/KG	DESIRED TURBINE INLET ENTHALPY
RECORD 3			
	L2PREV	-	FLAG, INITIAL GUESS FROM PREVIOUS CASE 0 NO 1 YES
	T2IHXI	K	GUESS OF IHX INTERMEDIATE SODIUM INLET TEMP.
	T2IHXO	K	GUESS OF IHX INTERMEDIATE SODIUM OUTLET TEMP.
	W2LOOP	KG/S	GUESS OF SODIUM FLOW RATE IN SECONDARY LOOP
	W2MXCG	KG/S	MAXIMUM ALLOWED CHANGE IN W2LOOP PER ITERATION
	T2MXCG	K	MAXIMUM ALLOWED CHANGE IN T2INHX PER ITERATION
	T6MXCG	K	MAXIMUM ALLOWED CHANGE IN PRIMARY LOOP CORNER TEMPERATURES PER ITERATION
RECORD 4			
	P1GASI	N/M2	COVERGAS PRESSURE IN EACH PRIMARY PUMP TANK
	P2GASI	N/M2	COVER GAS PRESSURE IN EACH INTERMEDIATE LOOP
	Z2TANK(1)	M	HEIGHT OF COOLANT IN SURGE (EXPANSION) TANK
	T1PUMP(1)	K	TEMPERATURE RISE ACROSS PRIMARY PUMP
	T2PUMP(1)	K	TEMPERATURE RISE ACROSS INTERMEDIATE PUMP
RECORD 5			
	L1EPRT	-	CONTROL FLAG FOR PRIMARY AND SECONDARY LOOP DETAILED PRINT
	L3PRNT	-	CONTROL FLAG FOR SG DETAILED PRINT
	L5PRNT	-	CONTROL FLAG FOR DETAILED IN-VESSEL TEMP. DISTRIBUTION PRINT
	L6PRNT	-	CONTROL FLAG FOR IN-VESSEL FLUID DYNAMICS DETAILED PRINT

4.1.5 Material Properties Data

A set of material properties data is built into the code. These are given in Reference 1. Any of these properties may be altered by the user. The data required to alter the default values of the material properties provided within SSC, or to create new material properties are input to the code through data file MATDAT. The listing included on subsequent pages of this section shows on a record-by-record basis how this specific information must be supplied by the user. The records within this file may be entered in any order.

The numbering scheme for the various records follows the global naming convention for material property constants (see Table II). For example, the 50-series records (50-59) are used to provide data for the fuel material types (global material property number 5). Computer storage within SSC is allocated to accomodate one heat transport system coolant (sodium), but 10 types of blanket material, 10 types of fuel material, 10 types of cladding material, 10 types of structural material, and 10 kinds of fission gases.

Default values are presently provided in SSC for material property numbers 10, 40, 50, 60, 70, 81, 82 and 83. Refer to Chapter 5 of Reference 1 for further specific information on these particular materials.

***** FILE MATDAT

RECORD 10

C1K0	W/(M*K)	ADDITIVE CONSTANT FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1
C1K1	W/(M*K2)	FIRST ORDER COEF. FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1
C1K2	W/(M*K3)	SECOND ORDER COEF. FOR LIQUID SODIUM THERMAL CONDUCTIVITY FUNCTION (5-29) REF.1
C1C0	J/(KG*K)	ADDITIVE CONSTANT FOR LIQUID SODIUM SPEC. HEAT CAP. FUNCTION (5-30) REF.1
C1C1	J/(KG*K2)	FIRST ORDER COEF. FOR LIQUID SODIUM SPEC. HEAT CAP. FUNCTION (5-30) REF.1
C1C2	J/(KG*K3)	SECOND ORDER COEF. FOR LIQUID SODIUM SPEC. HEAT CAP. FUNCTION (5-30) REF.1
C1D0	KG/(M3)	ADDITIVE CONSTANT FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1
C1D1	KG/(M3*K)	FIRST ORDER COEF. FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1
C1D2	KG/(M3*K2)	SECOND ORDER COEF. FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1
C1D3	KG/(M3*K3)	THIRD ORDER COEF. FOR SATURATED LIQUID SODIUM DENSITY FUNCTION (5-38) REF.1
C1DT1	K	LOWER SATURATED LIQUID SODIUM TEMP. BOUND FOR EQUATION (5-38) REF.1
C1DT2	K	UPPER SATURATED LIQUID SODIUM TEMP. BOUND FOR EQUATION (5-38) REF.1
C1H0	J/KG	ADDITIVE CONSTANT FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1
C1H1	J/(KG*K)	FIRST ORDER COEF. FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1
C1H2	J/(KG*K2)	SECOND ORDER COEF. FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1
C1H3	J/(KG*K3)	THIRD ORDER COEF. FOR SATURATED LIQUID SODIUM ENTHALPY FUNCTION (5-31) REF.1
C1P1	LN(N/M2)	ADDITIVE CONSTANT FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-35) REF.1
C1P2	LN(N/M2)*K	FIRST ORDER COEF. FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-35) REF.1
C1P3	LN(N/(M2*K))	FIRST ORDER COEF. FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-35) REF.1
C1P4	LN(N/M2)	ADDITIVE CONSTANT FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-36) REF.1
C1P5	LN(N/M2)*K	FIRST ORDER COEF. FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-36) REF.1
C1P6	LN(N/(M2*K))	FIRST ORDER COEF. FOR SODIUM SATURATED VAPOR PRESSURE FUNCTION (5-36) REF.1
C1PT1	K	SATURATED SODIUM VAPOR PRESSURE TEMP. CRITERION FOR EQUATION (5-35) AND (5-36) REF.1
C1N1	LN(N*S/M2)	ADDITIVE CONSTANT FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1
C1N2	LN(N*S/M2)*K	FIRST ORDER COEF. FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1
C1N3	LN(N*S/(M2*K))	FIRST ORDER COEF. FOR LIQUID SODIUM DYNAMIC VISCOSITY FUNCTION (5-41) REF.1
C1T1	-	FRACTION OF INITIAL TEMP. GUESS TO INCREMENT FOR SECOND PASS IN SATURATED SODIUMTEMP. ITERATION
C1T2	-	RELATIVE CONVERGENCE CRITERION FOR SATURATED SODIUM TEMP. CALCULATION
C1TT1	K	INITIAL GUESS FOR SATURATED SODIUM TEMP. CALCULATION

C1TS0	K*LN(N/M2)	CONSTANT USED IN CALCULATING SODIUM SATURATION TEMP. AS A FUNCTION OF PRESSURE (5-33) REF.1
C1TS1	LN(N/M2)	CONSTANT USED IN CALCULATING SODIUM SATURATED TEMP. AS A FUNCTION OF PRESSURE (5-33) REF.1
RECORD 40 - 49		
C4K0(I)	W/(M*K)	ADDITIVE CONSTANT FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
C4K1(I)	-	FIRST ORDER COEF. FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
C4K2(I)	1/K	SECOND ORDER COEF. FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.
C4K3(I)	1/K3	THIRD ORDER COEF. FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
C4K4(I)	-	FIRST ORDER COEF. ON POROSITY FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1
C4K5(I)	-	SECOND ORDER COEF. ON POROSITY FOR BLANKET MATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1
C4C0(I)	J/(KG*K)	ADDITIVE CONSTANT FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
C4C1(I)	1/K	FIRST ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
C4C2(I)	1/K2	SECOND ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
C4C3(I)	1/K3	THIRD ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
C4C4(I)	J/(KG*K)	ADDITIVE CONSTANT FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-4) REF.1
C4C5(I)	J/(KG*K2)	FIRTH ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION (5-4) REF.1
C4C6(I)	K2	INVERSE SECOND ORDER COEF. FOR BLANKET MATERIAL SPEC. HEAT CAP. FUNCTION(5-2) REF.1
C4CT1(I)	K	LOWER BLANKET MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1
C4CT2(I)	K	UPPER BLANKET MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1
C4A0(I)	M/(M*K)	ADDITIVE CONSTANT FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-10) REF.1
C4A1(I)	M/(M*K2)	FIRST ORDER COEF. FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-10) REF.1
C4A2(I)	M/(M*K)	ADDITIVE CONSTANT FOR BLANKET MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-11) REF.1
C4AT0(I)	K	REFERENCE TEMPERATURE FOR C4A0
C4AT1(I)	K	LOWER BLANKET MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1
C4AT2(I)	K	UPPER BLANKET MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1
C4D0(I)	KG/M3	FIRST ORDER COEF. FOR BLANKET MATERIAL DENSITY FUNCTION (5-15) REF.1
C4D1(I)	KG/M3	ADDITIVE CONSTANT FOR BLANKET MATERIAL DENSITY FUNCTION (5-16) REF.1
C4E0(I)	-	ADDITIVE CONSTANT FOR BLANKET MATERIAL EMISSIVITY FUNCTION (5-17) REF.
C4E1(I)	1/K	FIRST ORDER COEF. FOR BLANKET MATERIAL EMISSIVITY FUNCTION (5-18) REF.
C4ET0(I)	K	BLANKET MATERIAL TEMP. CRITERION FOR EQUATIONS (5-17) AND (5-18) REF.1
C4TMLT(I)	K	BLANKET MATERIAL MELTING TEMP.
C4TEGG(I)	K	TEMPERATURE AT ONSET OF COLMNAR GRAIN GROWTH FOR BLANKET MATERIALS

	C4TCGG(I)	K	TEMPERATURE AT ONSET OF COLMNAR GRAIN GROWTH FOR BLANKET MATERIALS
RECORD	50 - 59		
	C5K0(I)	W/(M*K)	ADDITIVE CONSTANT FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
	C5K1(I)	-	FIRST ORDER COEF. FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
	C5K2(I)	1/K	SECOND ORDER COEF. FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
	C5K3(I)	1/K3	THIRD ORDER COEF. FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-1) REF.1
	C5K4(I)	-	FIRST ORDER COEF. ON POROSITY FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1
	C5K5(I)	-	SECOND ORDER COEF. ON POROSITY FOR FUEL MATERIAL THERMAL CONDUCTIVITY FUNCTION(5-1) REF.1
	C5C0(I)	J/(KG*K)	ADDITIVE CONSTANT FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
	C5C1(I)	1/K	FIRST ORDER COEF. FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
	C5C2(I)	1/K2	SECOND ORDER COEF. FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
	C5C3(I)	1/K3	THIRD ORDER COEF. FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-2) REF.1
	C5C4(I)	J/(KG*K)	ADDITIVE CONSTANT FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-4) REF.1
	C5C5(I)	J/(KG*K2)	FIRTH ORDER COEF. FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION (5-4) REF.1
	C5C6(I)	K2	INVERSE SECOND ORDER COEF. FOR FUEL MATERIAL SPEC. HEAT CAP. FUNCTION(5-2) REF.1
	C5CT1(I)	K	LOWER FUEL MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1
	C5CT2(I)	K	UPPER FUEL MATERIAL TEMP. BOUND FOR EQUATIONS (5-2) THRU (5-4) REF.1
	C5A0(I)	M/(M*K)	ADDITIVE CONSTANT FOR FUEL MATERIAL COEF. OF THERMAL EXPANSION (5-10) REF.1
	C5A1(I)	M/(M*K2)	FIRST ORDER COEF. FOR FUEL MATERIAL COEF. OF THERMAL EXPANSION (5-10) REF.1
	C5A2(I)	M/(M*K)	ADDITIVE CONSTANT FOR FUEL MATERIAL COEF. OF THERMAL EXPANSION (5-11) REF.1
	C5AT0(I)	K	REFERENCE TEMPERATURE FOR C5A0
	C5AT1(I)	K	LOWER FUEL MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1
	C5AT2(I)	K	UPPER FUEL MATERIAL TEMP. BOUND FOR EQUATION (5-9) REF.1
	C5D0(I)	KG/M3	FIRST ORDER COEF. FOR FUEL MATERIAL DENSITY FUNCTION (5-15) REF.1
	C5D1(I)	KG/M3	ADDITIVE CONSTANT FOR FUEL MATERIAL DENSITY FUNCTION (5-16) REF.1
	C5E0(I)	-	ADDITIVE CONSTANT FOR FUEL MATERIAL EMISSIVITY FUNCTION (5-17) REF.1
	C5E1(I)	1/K	FIRST ORDER COEF. FOR FUEL MATERIAL EMISSIVITY FUNCTION (5-18) REF.1
	C5ET0(I)	K	FUEL MATERIAL TEMP. CRITERION FOR EQUATIONS (5-17) AND (5-18) REF.1
	C5TMLT(I)	K	FUEL MATERIAL MELTING TEMP.
	C5TEGG(I)	K	TEMPERATURE AT ONSET OF EQUIAXED GRAIN GROWTH FOR FUEL MATERIALS

	C5TCGG(I)	K	TEMPERATURE AT ONSET OF COLMNAR GRAIN GROWTH FOR FUEL MATERIALS
RECORD	60 - 69		
	C6K0(I)	W/(M*K)	ADDITIVE CONSTANT FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C6K1(I)	W/(M*K2)	FIRST ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C6K2(I)	W/(M*K3)	SECOND ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C6K3(I)	W/(M*K4)	THIRD ORDER COEF. FOR CLADDING MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C6C0(I)	J/(KG*K)	ADDITIVE CONSTANT FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C6C1(I)	J/(KG*K2)	FIRST ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C6C2(I)	J/(KG*K3)	SECOND ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C6C3(I)	J/(KG*K4)	THIRD ORDER COEF. FOR CLADDING MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C6A0(I)	M/(M*K)	ADDITIVE CONSTANT FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-21) REF.1
	C6A1(I)	M/(M*K2)	FIRST ORDER COEF. FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-21) REF.1
	C6A2(I)	M/(M*K3)	SECOND ORDER COEF. FOR CLADDING MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-21) REF.1
	C6AT0(I)	K	REFERENCE TEMPERATURE FOR C6A0
	C6AT1(I)	K	MAXIMUM TEMP. RANGE FOR CLADDING COEF. OF EXPANSION
	C6D0(I)	KG/M3	ADDITIVE CONSTANT FOR CLADDING MATERIAL DENSITY FUNCTION (5-22) REF.1
	C6E0(I)	-	ADDITIVE CONSTANT FOR CLADDING MATERIAL EMISSIVITY FUNCTION (5-23) AND (5-24) REF.1
	C6E1(I)	1/K	FIRST ORDER COEF. FOR CLADDING MATERIAL EMISSIVITY FUNCTION (5-24) REF.1
	C6ET0(I)	K	REFERENCE TEMPERATURE FOR C6E0
	C6TMLT(I)	K	CLADDING MATERIAL MELTING TEMP.
RECORD	70 - 79		
	C7K0(I)	W/(M*K)	ADDITIVE CONSTANT FOR STRUCTURAL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C7K1(I)	W/(M*K2)	FIRST ORDER COEF. FOR STRUCTURAL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C7K2(I)	W/(M*K3)	SECOND ORDER COEF. FOR STRUCTURAL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C7K3(I)	W/(M*K4)	THIRD ORDER COEF. FOR STRUCTURAL MATERIAL THERMAL CONDUCTIVITY FUNCTION (5-19) REF.1
	C7C0(I)	J/(KG*K)	ADDITIVE CONSTANT FOR STRUCTURAL MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C7C1(I)	J/(KG*K2)	FIRST ORDER COEF. FOR STRUCTURAL MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C7C2(I)	J/(KG*K3)	SECOND ORDER COEF. FOR STRUCTURAL MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C7C3(I)	J/(KG*K4)	THIRD ORDER COEF. FOR STRUCTURAL MATERIAL SPEC. HEAT CAP. FUNCTION (5-20) REF.1
	C7A0(I)	M/(M*K)	ADDITIVE CONSTANT FOR STRUCTURAL MATERIAL COEF. OF THERMAL EXPANSION FTION (5-21) REF.1
	C7A1(I)	M/(M*K2)	FIRST ORDER COEF. FOR STRUCTURAL MATERIAL COEF. OF THERMAL EXPANSION FTION (5-21) REF.1

	C7A2(I)	M/(M*K3)	SECOND ORDER COEF. FOR STRUCTURAL MATERIAL COEF. OF THERMAL EXPANSION FUNCTION (5-21) REF.1
	C7DT0(I)	K	TEMP. AT WHICH REFERENCE DENSITY IS SPECIFIED (5-22) REF.1
	C7D0(I)	KG/M3	ADDITIVE CONSTANT FOR STRUCTURAL MATERIAL DENSITY FUNCTION (5-22) REF.1
RECORD	80 - 89		
	C8K1(I)	W/(M*K)	FIRST ORDER COEF. FOR COVER GAS THERMAL CONDUCTIVITY FUNCTION
	C8K2(I)	W/(M*K2)	SECOND ORDER COEF. FOR COVER GAS THERMALCONDUCTIVITY FUNCTION
	C8K3(I)	W/(M*K3)	THIRD ORDER COEF. FOR COVER GAS THERMAL CONDUCTIVITY FUNCTION

4.1.6 Transient Data

All data required to specify the particular transient desired is input to SSC through data file TRNDAT. The listing included on subsequent pages of this section shows on a record-by-record basis how the specific information is provided by the user.

Wherever a series of record numbers if used to input certain information (e.g., records 5101-5199 for the transient decay power curves in each channel); the corresponding channel number (or loop number) is obtained by dropping the first two digits of the record number.

If no pipe break is to be simulated for a particular transient, the 1100-series and 1200-series records need not be input.

***** FILE TRNDAT

RECORD 1001			
	L1PONY	-	CONTROL FLAG FOR EACH PRIMARY LOOP PONY MOTOR 0 OFF 1 ON
	F1PONY	-	PRIMARY PONY MOTOR SPEED FRACTION
	Q1NRTA	KG*M2	PRIMARY PUMP INERTIA
RECORD 1002			
	L2PONY	-	CONTROL FLAG FOR EACH SECONDARY LOOP PONY MOTOR 0 OFF 1 ON
	F2PONY	-	SECONDARY PONY MOTOR SPEED FRACTION
	Q2NRTA	KG*M2	SECONDARY PUMP INERTIA
RECORD 1003			
	L1GV(K)	-	GUARD VESSEL OPTION FLAG 0 NO GUARD VESSEL 1-RV OUT, 2-RV IN; 3-P IN, 4-P OUT; 5-IHX IN, 6-IHX OUT
	V1MINR	M3	R.V. G.V. VOLUME AT LEVEL WITH BREAK
	Z1MAXR	M	R.V. G.V. MAXIMUM LEVEL THAT CAN BE REACHED BY COOLANT
	F1GVR(I)	-	R.V. G.V. VOLUME TO LEVEL COEF. (I = 1, 3)
	V1MINP	M3	PUMP G.V. VOLUME AT LEVEL WITH PIPE BREAK
	Z1MAXP	M	PUMP G.V. MAXIMUM LEVEL THAT CAN BE REACHED BY COOLANT
	F1GVP(I)	-	PUMP G.V. VOLUME TO LEVEL COEF. (I = 1, 3)
	V1MINX	M3	IHX G.V. VOLUME AT LEVEL WITH PIPE BREAK
	Z1MAXX	M	IHX G.V. MAXIMUM LEVEL THAT CAN REACHED BY COOLANT
	F1GVX(I)	-	IHX G.V. VOLUME TO LEVEL COEF. (I = 1, 3)
	V1MAX	M3	MAXIMUM VOLUME THAT CAN BE FILLED IN G.V. IN ANY LOCATION
RECORD 1101 - 1199			
	J1BREK(K)	-	PRIMARY LOOP PIPE NUMBER CONTAINING BREAK
	N1NBRK(K)	-	NUMBER OF NODES IN BROKEN PRIMARY PIPE UPSTREAM OF BREAK
	X1BREK(K)	M	LENGTH OF PRIMARY PIPE UPSTREAM OF BREAK
	F1LSBK(K)	-	LOSS COEFFICIENT AT PRIMARY BREAK
	A1BREK(K)	M2	BREAK AREA IN PRIMARY PIPE
	A1GAP(K)	M2	X-SECTIONAL AREA BETWEEN BROKEN PRIMARY PIPE AND GUARD VESSEL
	S1BREK(K)	S	TIME OF PRIMARY PIPE BREAK
RECORD 1201 - 1299			
	J2BREK(K)	-	SECONDARY LOOP PIPE NUMBER CONTAINING BREAK
	N2NBRK(K)	-	NUMBER OF NODES IN BROKEN SECONDARY PIPE UPSTREAM OF BREAK
	X2BREK(K)	M	LENGTH OF PRIMARY PIPE UPSTREAM OF BREAK

	F2LSBK(K)	-	LOSS COEFFICIENT AT SECONDARY BREAK	
	A2BREK(K)	M2	BREAK AREA IN SECONDARY PIPE	
	A2GAP(K)	M2	X-SECTIONAL AREA BETWEEN BROKEN SECONDARY PIPE AND GUARD PIPE	
	S2BREK(K)	S	TIME OF SECONDARY PIPE BREAK	
RECORD 3001	P3PTRB(I)	N/M2	TURBINE INLET PRESSURE (PAIRED WITH S3PTRB(I))	
	S3PTRB(I)	S	TIME (PAIRED WITH P3TRB(I))	
RECORD 5001	L5POPT	-	TRANSIENT POWER FLAG	0 PROMT JUMP APPOX. 1 EXACT
	N5DNGP	-	NUMBER OF DELAYED NEUTRON GROUPS (MAXIMUM OF 6)	
	C5LN	S	PROMT NEUTRON GENERATION TIME	
RECORD 5002	F5PFIS(K)	-	FRACTIONAL POWER IN EACH CHANNEL AND BYPASS DUE TO FISSION HEATING	
RECORD 5003	F5BETA(I)	-	FRACTION OF I-TH EFFECTIVE DELAYED NEUTRON GROUP	
RECORD 5004	C5LMDA(I)	S-1	DECAY CONSTANT OF I-TH DELAYED NEUTRON GROUP	
RECORD 5005	R5SROD(I)	R	SCRAM ROD REACTIVITY INSERTION (PAIRED WITH S5SROD(I))	
	S5SROD(I)	S	POSTSCRAM TIMES FOR SCRAM ROD INSERTION (PAIRED WITH R5SROD(I))	
RECORD 5006	F5PBPD(I)	-	FRACTIONAL TRANSIENT DECAY POWER IN BYPASS (PAIRED WITH S5PBPD(I))	
	S5PBPD(I)	S	TRANSIENT POSTSCRAM TIME FOR DECAY POWER IN BYPASS (PAIRED WITH F5PBPD)	
RECORD 5101 - 5199	F5PD(K,I)	-	FRACTIONAL TRANSIENT DECAY POWER IN CHANNEL K (K = RECORD NUMBER - 5100) (PAIRED WITH S5PD(K,I))	
	S5PD(K,I)	S	TRANSIENT POSTSCRAM TIME FOR DECAY POWER IN CHANNEL (PAIRED WITH F5PD(K,I))	
RECORD 5201 - 5299	F5BDOP(J,K)	R	MESH WEIGHTED DOPPLER REACT.COEF. WITH SODIUM PRESENT FOR CHANNEL K (J = 1, N5SLIC(K); K = RECORD NUMBER - 5200)	
RECORD 5301 - 5399	F5GDOP(J,K)	R	MESH WEIGHTED DOPPLER REACT.COEF. W/O SODIUM PRESENT FOR CHANNEL K (J = 1, N5SLIC(K); K = RECORD NUMBER - 5300)	
RECORD 5401 - 5499	F5VWGT(J,K)	R/KG	MESH WEIGHTED SODIUM VOID REACT.COEF. FOR CHANNEL K (J = 1, N5SLIC(K); K = RECORD NUMBER - 5400)	
RECORD 5501 - 5599	F5AWGT(J,K)	R/KG	MESH WEIGHTED FUEL AXIAL EXPANSION REACT.COEF. FOR CHANNEL K (J = 1, N5SLIC(K); K = RECORD NUMBER - 5500)	
RECORD 6001	L6MIX	-	INDICATOR FOR MIXING TYPE	1 ONE ZONE MIXING 2 TWO ZONE MIXING

				1 FLOW REDISTRIBUTION
	T6SUPH	K	SUPER HEAT TEMPERATURE	
RECORD	6002			
	L6CGAS	-	CONTROL FLAG FOR COVER GASS PRESSURE OPTION	1 CONSTANT MASS 2 CONSTANT FEED/BLEED RATE
	Q6CGFB	KG/S	COVER GASS FEED/BLEED RATE	
	P6CGFB	N/M2	COVER GASS PRESSURE CHANGE REQUIRED TO ACTUATE FEED/BLEED VALVE	
RECORD	9001			
	S9LAST	S	PROBLEM SIMULATION TIME	
	S9MAXA	S	MAXIMUM TIMESTEP ALLOWED	
	S9MINA	S	MINIMUM TIMESTEP ALLOWED	
	S9SINT	-	STORE INTERVAL (USED FOR SUBSEQUENT RE-START)	
	S9PINT(J)	S	PRINT INTERVAL	
RECORD	9002			
	F1EMXA	-	RELATIVE DEVIATION ACCEPTANCE LIMIT FOR LOOP THERMAL CALCULATIONS	
	F1WMXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR LOOP HYDRAULIC CALCULATIONS	
	F3EMXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR STEAM GENERATOR ENTHALPY CALCULATIONS	
	F3PMXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR STEAM GENERATOR PRESSURE CALCULATIONS	
	F3WMXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR STEAM GENERATOR FLOW CALCULATIONS	
	F5MAXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR FUEL CALCULATIONS	
	F6MAXA	-	RELATIVE ACCURACY ACCEPTANCE LIMIT FOR IN-VESSEL COOLANT CALCULATIONS	
RECORD	9003			
	F1ICDA	-	RELATIVE INTERFACE CONDITION ACCEPTANCE LIMIT FOR LOOP HYDRAULIC CALCULATIONS	
	F3ICDA	-	RELATIVE INTERFACE CONDITION ACCEPTANCE LIMIT FOR STEAM GENERATOR CALCULATIONS	
	F6ICDA	-	RELATIVE INTERFACE CONDITION ACCEPTANE LIMIT FOR IN-VESSEL COOLANT CALCULATIONS	
RECORD	9004			
	L1ECAL	-	FLAG TO CALL LOOP THERMAL CALCULATION	0 NO 1 YES
	L1WCAL	-	FLAG TO CALL LOOP HYDRAULIC CALCULATION	0 NO 1 YES
	L3CALL	-	FLAG TO CALL SG CALCULATION	0 NO 1 YES
	L5CALL	-	FLAG TO CALL FUEL CALCULATION	0 NO 1 YES
	L6CALL	-	FLAG TO CALL IN-VESSEL COOLANT CALC.	0 NO 1 YES
RECORD	9005			
	L1EPRT	-	FLAG TO PRINT LOOP THERMAL TRANSIENT DATA	0 NO 1 YES
	L1WPRT	-	FLAG TO PRINT LOOP HYDRAULIC TRANSIENT DATA	0 NO 1 YES
	L3PRNT	-	FLAG TO PRINT SG DATA	0 NO

			1 YES
L5PRNT	-	FLAG TO PRINT FUEL DATA	0 NO 1 YES
L6PRNT	-	FLAG TO PRINT IN-VESSEL COOLANT DATA	0 NO 1 YES
RECORD 9006			
L1SEPR	-	FLAG TO PRINT LOOP THERMAL CPU TIMING DATA	0 NO 1 YES
L1SWPR	-	FLAG TO PRING LOOP HYDRAULIC CPU TIMING DATA	0 NO 1 YES
L3SPRT	-	FLAG TO PRINT SG CPU TIMING DATA	0 NO 1 YES
L5SPRT	-	FLAG TO PRINT FUEL CPU TIMING DATA	0 NO 1 YES
L6SPRT	-	FLAG TO PRINT IN-VESSEL CPU TIMING DATA	0 NO 1 YES
RECORD 9007			
S1POFF(K)	S	PUMP MAIN MOTOR SHUTOFF TIME IN EACH PRIMARY LOOP	
S2POFF(K)	S	PUMP MAIN MOTOR SHUTOFF TIME IN EACH SECONDARY LOOP	
S3POFF(K)	S	TIME AT WHICH PUMP IN EACH STEAM GENERATOR IS SHUT OFF	
S5SCRA	S	REACTOR SCRAM TIME	

4.1.7 Program Control Data

The control file OLDATA allows the exercise of other than the default control. It is opened with a file card of the form,

'm'V OLDATA

where 'm' is a digit of the user's choice. In addition to this record, there may be up to three other records in this file. Each of these records is required to be of the form,

'N'D 'm', "IN", (±) "OUT"/

The record number 'N' may have a value of 1, 2 or 3. Each corresponds to one of the three principle subdivisions of the code

N	Area Effected
1	Initialization (pre-steady state)
2	Steady state
3	Transient

The function parameter 'm' indicated the type of control to be exercised. It may be assigned values according to the following table:

m	Function	Comment
0	Module not entered	- not permitted on 1D record
1	Read external restart files	- " " " 2D record - when used on 3D record it is assumed that a restart is to be made at time t=0 from a file created by the steady state module
-1	Read external restart file to restart transient at t>0	- permitted only on 3D record
2	Write external restart file	- permitted on 1D, 2D and 3D records
3	Read and Write external restart file	- not permitted on 2D record
4-999	Perform calculations with current core image	- default value

The "IN" and "OUT" parameters correspond to input and output devices, respectively, from which a restart file will be read and/or written. The program contains default values for these terms. The default values will be retained if the user terminated the control record after the function declaration (e.g., 2D 2/), The default values for the "IN" and "OUT" parameters are:

Record	In	Out
1D	10	20
2D	30	40
3D	50	60

It should be noted that the last digit in each of these terms is zero. This indicates that there is to be no file positioning before a read/write operation. This, once again, is the default mode of operation. If file positioning is required, up to 99 files may be shipped before a given I/O operation is inlisted. This type of control may be exercised by specifying the number of files to be shipped as part of the I/O device assignment. For example,

3D 1, 52, 40/

would read the third file (ship 2) from unit 50 for a transient initialization. Similarly,

3D 1, 347, 60/

would skip the first 47 files on unit 30 before initializing a transient. What should be evident from these examples is that a given I/O device assignment is comprised of two fields; the device field and the file positioning field. The first field contains only one digit (the first). By convention, user interaction is permitted only with a device whose unit number is an integer multiple of ten (10-90). The value found in the device field when multiplied by ten yields the I/O device. The remaining one or two digits make up the file positioning field and according to it's value the device will be positioned to retrieve a particular file.

An I/O device is rewound before it is either read or written. The rewind before a write may be suppressed by signing the "OUT" parameter negatively (e.g., 3D 1, 50, -60). This will result in a series of consecutive restart files. A particular file may be accessed on a subsequent restart by entering the appropriate file positioning controller as discussed above.

The file OLDATA was formulated primarily to give SSC a re-start capability. It should be noted that if a re-start (initialization or transient) is not desired the program will run under default control and OLDATA can be omitted from the input stream. The default control is equivalent to the following OLDATA file.

OV	OLDATA
1D	99, 10, 20/
2D	99, 30, 40/
3D	99, 50, 60/

The following examples are intended to illustrate some of the common uses of OLDATA.

EXAMPLE 1: CALCULATE A STEADY STATE AND WRITE A RE-START FILE ON UNIT 40 FOR LATER USE.

```
        SSC-L              EXAMPLE 1
        0V VESSEL
        1D ...
           :
           :
        0V NALOOP
        1D ...
           :
           :
        0V STMGEN
        1001D ...
           :
           :
        0V OPDATA
        1D ...
           :
           :
        0V OLDATA
        2D    2, 30, 40/
        3D    0/
     STOP
     END
```

EXAMPLE 2: READ A PREVIOUSLY CALCULATED STEADY STATE FROM UNIT 40 AND PROCEED WITH TRANSIENT CALCULATIONS.

```
        SSC-L              EXAMPLE 2
        0V OLDATA
        2D 0/
        3D 1, 40, 60/
           $ NOTE:  RE-START IS MADE IN THE TRANSIENT MODULE
           $        THE STEADY STATE MODULE IS NOT ENTERED.$
     STOP
        0V TRNDAT
        1001D ...
           :
           :
     STOP
     END
```

EXAMPLE 3: CALCULATE A SERIES OF STEADY STATES VARYING ONE DATA POINT (E.G. THE ELEVATION OF THE PRIMARY PUMP TANK) AND WRITE A RE-START FILE FOR EACH CASE FOR FUTURE USE.

```
        SSC-L              EXAMPLE 3-A
        0V VESSEL
        1D ...
           :
           :
        0V NALOOP
        1D ...
           :
        112D  137.2, 1150.0, 2.1135, 26927.0, 4.0, 3.0/
```

```
      :
    OV STMGEN
    1001D ...
      :
      :
    OV OPDATA
    1D ...
      :
    3D   0,  619.7,  771.5,  1610.2,  100.,  3.,  15./
      :
    OV OLDATA
    1D   2/
    2D   2, 30, 40/
    3D   0/
       $ NOTE:  A PRE-STEADY STATE PLANT INITIALIZATION
       $        WILL BE WRITTEN TO DEFAULT UNIT 20.$
       $ NOTE:  THE TRANSIENT MODULE WILL NOT BE ENTERED$
STOP
    SSC-L           EXAMPLE 3-B
    2V OLDATA
    1D  1, 20/
    2D  2, 30, -40/
    2V OPDATA
    3D    1,  619.7,  771.5,  1610.2,  100.,  3.,  15./
    2V NALOOP
    112D   137.2, 1150.0, 2.1135, 26927.0, 6.0, 3.0/
       $ NOTE:  ONLY THE RECORD(S) REQUIRING CHANGE NEEDS
       $        TO BE RE-ENTERED.$
       $ NOTE:  THE ENTIRE RECORD MUST BE RE-READ
       $        EVEN THOUGH ONLY ONE ENTRY HAS BEEN CHANGED.$
STOP
    SSC-L           EXAMPLE 3-C
    3V OLDATA
    1D  1, 20/
    2D  2, 30, -40/
    3V OPDATA
    3D    1,  619.7,  771.5,  1610.2,  100.,  3.,  15./
    3V NALOOP
    112D   137.2, 1150.0, 2.1135, 26927.0, 8.0, 3.0/
STOP
    SSC-L           EXAMPLE 3-D
    4V OLDATA
    1D  1, 20/
    2D  2, 30, -40/
    4V OPDATA
    3D    1,  619.7,  771.5,  1610.2,  100.,  3.,  15./
    4V NALOOP
    112D   137.2, 1150.0, 2.1135, 26927.0, 10.0, 3.0/
STOP
      :
      :
END
```

EXAMPLE 4: CALCULATE A TRANSIENT AS IN EXAMPLE 2 AND STORE A SERIES OF IN-STREAM TRANSIENT RE-START FILES AT 5.0 SECOND REAL TIME INTERVALS ON UNIT 60.

```
    SSC-L           EXAMPLE 4
```

```
     OV OLDATA
     2D 0/
     3D 1, 30, -60/
  STOP
     OV TRNDAT
     1001D ...
       :
     9001D   90.00, 2.0, 0.0001,  5.0,  999.9,10R/
       :
  STOP
  END
```

EXAMPLE 5: RE-START THE TRANSIENT CALCULATION BEGUN IN EXAMPLE 4
AT TIME T= 75.0 SECONDS (THE FIFTEENTH FILE ON UNIT 60)

```
     SSC-L           EXAMPLE 5
     OV OLDATA
     2D 0/
     3D -1, 614, -50/
        $ NOTE:  SINCE THE FIFTEENTH FILE IS NEEDED, THE FIRST
        $        FOURTEEN FILES MUST BE SKIPPED. $
        $ NOTE:  THIS PROCEDURE WILL CONTINUE TO WRITE
        $        RE-START FILES AT 5.0 SECOND INTERVALS
        $        (FOR THIS CASE ON UNIT 50 WITH ON OVERWRITE)
  STOP
        $ NOTE:  NO OTHER DATA FILE IS NECESSARY (OR PERMITTED)
        $        IN THIS TYPE OF RE-START. $
  END
```

4.2 Sample Problem 1

4.2.1 Problem Description

The following sample problem is a four channel, one loop simulation of the Clinch River Breeder Reactor Plant. The reactor core is modeled by four channels. The first channel models the average pin in the peak core assembly explicitly. It has all of the physical characteristics of the second channel with the exception of power generation. The second channel models the remaining 197 core assemblies. The third channel models all (150) of the radial blanket assemblies which surround the core. The fourth channel models all of the primary and secondary control systems assemblies. As SSC-L specifically takes into account a bypass channel, all unassigned flow and/or power is assigned to this channel. The radial shield assemblies, therefore, are lumped with the bypass channel in this sample problem. Alternately, the radial shield assemblies can also be represented by another channel.

Though the fuel assemblies are served by five orifice zones an "equivalent" nozzle zone was defined. Similarly, the radial blanket assemblies, which are served by four orifice zones, received the same treatment. However, the orificing pattern for the first channel was, explicitly included.

The heat transport system simulated represents the three physical loops in CRBRP as one. The primary loop consists of the piping from the vessel outlet to pump, pump to intermediate heat exchanger, intermediate heat exchanger to check valve, and finally the piping from the check valve to vessel inlet.

All core parameters used are for the end-of-the-equilibrium cycle (EOEC). These are taken to be the nominal design values as given in the Clinch River Breeder Reactor Plant PSAR. Some of the essential data are noted in Table VII.

A natural circulation transient in CRBRP is simulated. The loss of power to the pumps is assumed to occur at t = 0 sec. The reactor is scrammed 0.75 seconds later. The power to the pony motors is also assumed to be unavailable.

4.2.2 List of Input Cards

The input cards for this sample problem are given in the following pages. This input deck is interpreted by the code and it lists all input data one card at a time.

TABLE VII

Key Parameters Used in the Sample Problem 1

Parameter	Engineering Units	SI Units
Reactor Power	975 MW	9.75×10^{8} W
Number of HTS loops	3	3
Total primary coolant flow rate	41.4×10^{6} lb/hr	5223.9 kg/s
Total number of fuel assemblies	198	198
Fuel pellet inner/outer radii	0/0.0967 in	$0/2.457\times10^{-3}$ m
Axial blanket inner/outer radii	0/0.0967 in	$0/2.457\times10^{-3}$ m
Cladding inner/outer radii	0.100/0.115 in	$2.45/2.92\times10^{-3}$ m
Number of fuel rods per assembly	217	217
Number of fuel assemblies in Channel 1	1	1
Number of fuel rods in Channel 1	217	217
Fraction of total power in Channel 1	0.00848	0.00848
Fraction of total coolant flow in Channel 1	0.004592	0.004592
Number of fuel assemblies in Channel 2	197	197
Number of fuel rods in Channel 2	42749	42749
Fraction of total power in Channel 2	0.94783	0.94783
Fraction of total coolant flow in Channel 2	0.785616	0.785616
Power fractions in Channel 1		
in fuel	1.0	1.0
in cladding	0.0	0.0
in cooling	0.0	0.0
in structure	0.0	0.0

TABLE VII

Key Parameters Used in the Sample Problem 1 (Cont.)

Parameter	Engineering Units	SI Units
Power fractions in Channel 2		
in fuel	1.0	1.0
in cladding	0.0	0.0
in coolant	0.0	0.0
in structure	0.0	0.0
Total number of blanket assemblies	150	150
Number of blanket assemblies in Channel 3	150	150
Number of blanket rods per assembly	61	61
Total number of blanket rods	9150	9150
Blanket pellet inner/outer radii	0/0.243 in	$0/6.17\times10^{-3}$ m
Cladding inner/outer radii	0.245/0.260 in	$6.223/6.604\times10^{-3}$ m
Fraction of total power in Channel 3	0.03768	0.03768
Fraction of total flow in Channel 3	0.13495	0.13495
Power fractions in Channel 3 or 4		
in pellets	1.0	1.0
in cladding	0.0	0.0
in coolant	0.0	0.0
in structure	0.0	0.0
Total number of control assemblies	19	19
Number of control assemblies in Channel 4	19	19
Number of pins per control assembly	31	31
Number of pins in Channel 4	589	589
Absorber pellet inner/outer radii	0/0.235 in	$0/5.969\times10^{-3}$ m
Cladding inner/outer radii	0.2415/0.3055 in	$6.134/7/760\times10^{-3}$ m
Fraction of total power in Channel 4	0.006	0.006
Fraction of total flow in Channel 4	0.014647	0.014647

```
SSC-L, CRBR, 4-CHAN, 1-LOOP, CHAN-1 IS AVG IN PEAK, 09-15-78.
OV VESSEL
  1D 4, 3, 13,3R, 4,4R/
  2D 1,2R, 2, 3/
  3D 0.005984,  0.883016,  0.1040,  0.007  /
  4D 0.004592, 0.785616, 0.134950, 0.06/
  5D 217, 42749, 9150, 589/
  7D 1.9979E-05,2R, 4.3575E-05, 6.1613E-05/
  8D 3.2500E-03,2R, 3.4270E-03, 3.9370E-03/
  9D 4.035E-03, 3.655E-03, 3.089E-03, 1.013E-02 /
  10D (1.,1.,2.), 3R, 2.,2.,3. /
  11D 0.0,4R/
  12D 2.4570E-03,2R, 6.1600E-03, 5.9690E-03/
  13D 2.5400E-03,2R, 6.2230E-03, 6.1340E-03/
  14D 2.9210E-03,2R, 6.6040E-03, 7.7600E-03/
  15D 0.0,4R/
  16D 2.4570E-03,2R, 6.1600E-03, 5.9690E-03/
  17D 0.0,4R/
  18D 2.4570E-03,2R, 6.1600E-03, 5.9690E-03/
  19D 2.1605E-05, 4.2561E-03, 3.2407E-03, 4.1048E-04/
  20D 1.0E+04,4R/
  21D 3.5E+06,4R/
  23D 0, 0.0,5R, 8.12798E+05, 5223.9, 25, 25, 0.0001, 0.01, 14000.0/
  24D   86.2, 158533.2, 26205.3, 20./
  25D   1, 300.0/
  27D   0.0,2R,0.801,6.2725,12.7025,7.7457,0.6/
  28D   27.0,1.4,0.6,25.3,30.0,121.5,1.289,14.0,1400.0,
    560.0, 3.41, 13.043, 0.72, 4.7126E7, 1.95165E7, 12.8E7 /
  29D   20.15,1.25,2.585,0.1288,2.5E+5,920000.0/
  30D   0.316,0.25,-16.15,24.96,-8.55,0.3/
  101D 0.0, 0.356, 0.914, 0.356, 1.219, 0, 1, 10, 1, 1,
       1.25, 51.739, 60, 70, 40, 0.95, 0.96, 0.98, 50, 0.95, 0.96,
       0.98, 40, 0.95, 0.96, 0.98/
  102D 0.0, 0.0, 0.0, 1.6256, 1.0414, 0,3R, 12, 1,
       1.077, 7.6923, 60, 70, 0, 0.0,3R, 0, 0.0,3R, 40, 0.95, 0.96, 0.9
  103D 0.3619, 0.0, 0.9144, 0.0, 0.5765, 1, 0, 11, 0, 1, 1.05, 617.74,
       60, 70, 0, 0.0,3R, 51, 1.0,3R, 0, 0.0,3R/
  201D 0.073094, 0.750, 0.920, 1.090, 1.180, 1.210, 1.210, 1.130, 1.010
       0.850, 0.660, 0.029238, 0.001/
  202D 0.073094, 0.750, 0.920, 1.090, 1.180, 1.210, 1.210, 1.130, 1.010
       0.850, 0.660, 0.029238, 0.001/
  203D 0.133, 0.350, 0.700, 1.300, 1.750, 1.900, 1.900, 1.700, 1.250,
       0.750, 0.320, 0.133, 0.001/
  204D 0.001, 1.0, 11R, 0.001 /
  301D 1.0,4R/
  302D 1.0,4R/
  303D 1.0,4R/
  304D 1.0,4R/
  401D 1.0, 0., 0. /
  402D 1.0, 0., 0. /
  403D 1.0, 0., 0. /
  404D 1.0, 0., 0. /
  501D 80, 0.95, 81, 0.03, 82, 0.02/
  502D 80, 0.95, 81, 0.03, 82, 0.02/
  503D 80, 0.95, 81, 0.03, 82, 0.02/
  504D 80, 0.95, 81, 0.03, 82, 0.02/
OV NALOOP
  1D  1, 5, 19, 8, 20, 6, 16, 5, 31, 3, 3, 7, 19/
  2D    3/
```

```
  100D  2850, .019934, .02222, 1.9361, 7.5804, 14.5832,
    35607.0, 74.4153, 1.5, 0.0, 0.0, 70/
  101D  -1,  0,  .314,  .273,  0,  .437,  0.0,  0.0,  .194/
  102D  4.8585, 4.0234, 0.305, 4.572, 7.6172, 3.0582, 6.8527, 7.3624/
  103D  39.5507, -32.0256, 0.0, 47.1703/
  104D  13.259, 0.8, -90./
  110D  6, 1.2897, -0.061907, 0.17327, -0.57294, 0.033762,
    0.13865/
  105D  .001, 4.6E-5,2R/
  111D  1, 1, 6894.76, 19.54,2R, 2.286E08/
  112D  139.6, 1116.0, 2.12, 26927.0, 6.0, 3.066/
  120D  0, 1.5, 1.5, 1.0541, .8357, 4.605, 1.0068, 90., 90.,-90./
  121D  0, 3.5, 4.2,  1.0541,   .8357, 4.605, 1.0068, 90., 90.,-90./
  122D  139.6, 1116.0, 1.8612, 26927.0, 6.0, 3.0, 4.5, 12.0/
  1001D 1, 4, 3, 4, 4, 2, 1/
  1101D  0.4002, 36.1859, 0.889, 0.0127,
    10.0501, 46.1719, 2R, 20.7134, 6.9086, 9.44, 4R, 5.4087,
    0.0, -24.3443, -26.9663, -0.351, -32.2414, -46.88, -45.043, 0.0, 2R
    $ PUMP TO IHX $
  1102D  1.8161, 26.2311, 0.5842, 0.0127,
    27.854, 34.2896, 0.0, 4R, -33.636, 0.0/
    $ IHX,  J = 3  $
  1103D  132.54, 7.8639, 0.03686, 0.0127,
    -90.0, 20R/
  1104D  1.1243, 20.9702, 0.5842, 0.0127,
     16.53, 66.94, 2R, 22.487, 0.0, 0.0/
  1105D  1.3883, 26.8225, 0.5842, 0.0127,
    -1.3593, -9.24, 4R, -9.08, 0.0, -31.9, -90.0, 6R, 0.0, 2R/
  1002D  0.02825, 2850, 90024.9/
  1201D  1.1, 250.546, 0.5842, 0.0127,
    -8.18495, 0.0, 4R, -30.77520, -27.19762, -0.6, 18R, -0.32844,
    0.0, 22.93075, 43.73177, 39.36707, 0.0/
  1202D 0.56, 34.442, 0.4318, 0.0127,
    0.0, 44.7836, 0.0/
  1203D  0.65, 24.689, 0.4318, 0.0127,
    0.0, 3R/
  1204D  1.42, 32.918, 0.5842, 0.0127,
    45.1185, 3R, 39.0419, 0.0, 3R/
  1205D  1.2, 126.492, 0.5842, 0.0127,
    -69.85, 2R, -2.0746, 5.34, 10R, 2.1462, 0.0, 3R, 18.9839,
    0.0/
  1003D  73332.7, 0.0, 82737.0, 0.0, 330948.0, 0.0/
OV STMGEN
  1001D 10    2    2    2    2    0        /
  1002D 5.0E-07 1.0E-07 5.0E-07 5.0E-05 5.0E-07 5.0E-07 40    /
  1D     101 201 39.0 235.37 0.457 3.33E-06 1.1 0.0 1.0 235.37 4/
  2D     201 3 7.9 239.0 0.3048 5.0E-06 1.2 0.0 1.0 239.0 1/
  3D     2 4 25.0 230.15 0.254 6.0E-06 1.1 0.0 1.0 230.15 3/
  4D     3 301 3.2 232.25 0.457 3.33E-06 1.1 0.0 1.0 232.25 1/
  5D     301 101 23.5 253.8 0.406 3.75E-06 1.1 0.0 1.0 253.8 3/
  6D     101 7 54.86 230.27 0.3048 5.0E-06 1.1 0.0 1.0 230.27 5/
  7D     6 302 3.29 232.25 0.457 3.33E-06 1.1 0.0 1.0 232.25 1/
  8D     302 9 3.5 252.83 0.457 3.33E-06 1.1 0.0 1.0 252.83 1/
  9D     8 102 33.38 256.44 0.406 3.75E-06 1.1 0.0 1.0 256.44 3/
  10D    102 500 155.9 256.44 0.406 3.75E-06 1.1 0.0 1.0 256.44 1/
  301D   4 5 302 300 14.02 247.98 1.0339E-02 1.474E-04 757 0.0 1.0
         233.96 1.71 0.252 0.0 1.0 251.4 3.42 0.381 6 1.5874E-02 1.952
         0.529854 1.0E+10 0.55 71 2/
  302D   7 8 400 301 14.02 247.98 1.0339E-02 1.474E-04 757 0.0 1.0
         233.96 1.71 0.252 0.0 1.0 251.4 3.42 0.381 4 1.5874E-02 1.952
```

```
        0.529854 1.0E+10 0.55 71 1/
  201D  1 2 235.75/
  101D  23.7 2 1 253.73 0.0 6 256.44 1.0/
  102D  38.5 1 10 256.44 1.0 0 0.0 0.0/
  401D  101 302  254.66/
  201D  279.353 111.24 0.40 10.0/
  401D  7.18723E+05 4.967506E+05 1.20355E+06 -1.11879E+06 4.192087E+05
        1.242453E+07 0.0 0.0 0.0/
  101D  1.242453E+07 0.50 2 1 1 6 0/
  102D  1.0617925E+07 0.0 1 10 0 0 0/
  301D  0 0.0 0.50 0.0 0.0 1.259672E+07 2.89259E+05 0.0/
  302D  0 3.327526E+06 0.0 0.0 0.0 0.0 3.44738E+04 0.0/
  7D    1.224509E+07
  4D    1.3382723E+07
OV OPDATA
  1D    975.E 06,  1.0,  3,  3,  1.01E 07,  3.327526E 06/
  2D    -800.72,  -641.9,   1741.3,  3.327526E 06/
  3D    0,  619.7,  771.5,  1610.2,  100.,  3.,  15./
  4D    1.04E 05,  8.6E 05,  4.0,  0.6,  1.0/
  5D    1, 1, 1, 1 /
OV MATDAT
  10D   109.7, -6.4499E-02, 1.1728E-05, 1630.22, -0.83354, 4.62838E-04,
        1011.597, -0.220510, -1.92243E-05, 5.63769E-09, 370.9, 1644.2,
        -6.7511E+04, 1630.22, -0.41674, 1.54279E-04, 11.35977, -5567.0,
        -0 5, 11.68672, -5544.97, -0.61344, 1144.2, -2.4892, 220.65,
        -0.4925, 0.001, 1.0E-05, 750.0, -12130.0, 10.5/

  51D     334.130      21.6178        5.381E-02       0.0
              2.2          0.0          1741.79  2.34856E-04
              0.0          0.0              0.0       0.0
         -46634.7       9999.0           9999.0  2.25E-06
          2.5E-09          0.0            295.4    9999.0
           9999.0       2381.0              0.0      0.55
          2.5E-04        400.0           9999.0        3R   /
  71D   4.9341695E+01 -1.71228E-02 0.0 0.0 460.59 0.0 0.0 0.0 0.0 0.0 0
        0.0 7833.35 /
OV OLDATA
  2D 99/
  3D 99/
STOP
OV TRNDAT
  1001D 0, 0.1, 1180.0/
  1002D 0, 0.1, 1180.0/
  1003D 0, 0, 21.946, 10.912, 0.0, 0.2002, 0.0, 0.0,10R, 76.45/
  3001D    1.01E 07, 0.0, 1.01E 07, 9999./
  5001D 1, 6, 6.0E-07/
  5002D  0.915582, 0.91763, 0.901424, 0.95, 0.999/
  5003D 8.145E-05, 7.554E-04, 6.438E-04, 1.287E-03, 5.583E-04
     1.732E-04 /
  5004D 0.0129, 0.0308, 0.132, 0.335, 1.34, 3.27/
  5005D 0., 0., -6., 2., -6., 9999. /
  5006D 1.0, 0.0, 0.5, 200.0, 0.25, 400.0, 0.25, 9999.0 /
  5101D 1.0,0.0, .959,1.0, .892,2.031, .813,4.125, .715,10.0,
    .637,20.31, .564,41.25, .514,70.17, .481,100.0, .451,142.5,
    .420,203.1, .365,412.5, .301,1000.0, .228,2894.0,
    .195,4925.0 /
  5102D 1.0,0.0, .959,1.0, .892,2.031, .813,4.125, .715,10.0,
    .637,20.31, .564,41.25, .514,70.17, .481,100.0, .451,142.5,
    .420,203.1, .365,412.5, .301,1000.0, .228,2894.0,
    .195,4925.0 /
```

```
    5103D 1.0,0.0, .964,1.0, .909,2.031, .844,4.125, .761,10.0,
       .696,20.31, .634,41.25, .591,70.17, .562,100.0, .535,142.5,
       .508,203.1, .454,412.5, .383,1000.0, .288,2894.0,
       .246,4925.0  /
    5104D 1.0,0.0, 0.5,200.0, 0.25,1000.0, .100,9999.0 /
    5201D 0.0,13R/
    5202D 0.0,13R/
    5203D     0.0    13R  /
    5204D     0.0    13R  /
    5301D 0.0,13R/
    5302D 0.0,13R/
    5303D   0.0    13R    /
    5304D   0.0    13R    /
    5401D 0.0,13R/
    5402D 0.0,13R/
    5403D   0.0    13R  /
    5404D   0.0    13R  /
    5501D 0.0,13R/
    5502D 0.0,13R/
    5503D   0.0    13R  /
    5504D   0.0    13R  /
    6001D 2, 1, 9999./
    6002D 1, 0., 0./
    9001D  180.0, 2.0, 0.00001, 9999.0, 0.25,2.0, 1.0,10.0, 2.0,
           9999.0, 5R /
    9002D 0.001, 0.001, 0.01, 0.01, 0.01, 0.001, 0.001 /
    9003D 0.01, 3R/
    9004D 1, 1, 1, 1, 1/
    9005D 1, 1, 1, 1, 1 /
    9006D 1, 5R /
    9007D 0., 0., .0, 0.75 /
    9008D 1, 4R /
  STOP
  END
```

4.2.3 Data Verification

All of the input data are checked for this consistency, as discussed earlier. A sample of the output from the data verification module is shown for OPDATA file.

*****VERIFICATION OF FILE OPDATA BEGUN*****

RECORD	1	P9DSGN	W	9.7500E+08
		F9PWRZ	-	1.0000E+00
		N9LOOP	-	3
		N9DSGN	-	3
		P3DSGN	N/M2	1.0100E+07
		E3DSGN	N/M2	3.3275E+06
RECORD	2	T6OUTL	K	-8.0072E+02
		T6INLT	K	-6.4190E+02
		W1LOOP	KG/S	1.7413E+03
		E3TURB	J/KG	3.3275E+06
RECORD	3	L2PREV	-	0
		T2IHXI	K	6.1970E+02
		T2IHXO	K	7.7150E+02
		W2LOOP	KG/S	1.6102E+03
		W2MXCG	-	1.0000E+02
		T2MXCG	K	3.0000E+00
		T6MXCG	K	1.5000E+01
RECORD	4	P1GAS	N/M2	1.0400E+05
		P2GAS	N/M2	8.6000E+05
		Z2TANK	-	4.0000E+00
		T1PUMP	K	6.0000E-01
		T2PUMP	K	1.0000E+00
RECORD	5	L1EPRT	-	1
		L3PRNT	-	1
		L5PRNT	-	1
		L6PRNT	-	1

*****VERIFICATION OF FILE OPDATA COMPLETE*****

4.2.4 Steady-State Output

The output for steady-state calculations is shown in the following pages.

STEAM GENERATOR LOOP

MODULE 1 IS A PIPE

NODE	ENTHALPY	PRESSURE		
0(INLET)	1.2545644E+06	1.2424530E+07		
4(OUTLET)	1.2545644E+06	1.2558808E+07	LOSS COEFFICIENT=	0.

MODULE 2 IS A PUMP

NODE	ENTHALPY	PRESSURE
INLET	1.2545644E+06	1.2558808E+07
OUTLET	1.2545644E+06	1.3381001E+07

MODULE 3 IS A PIPE

NODE	ENTHALPY	PRESSURE		
0(INLET)	1.2545644E+06	1.3381001E+07		
1(OUTLET)	1.2545644E+06	1.3350119E+07	LOSS COEFFICIENT=	0.

MODULE 4 IS A PIPE

NODE	ENTHALPY	PRESSURE		
0(INLET)	1.2545644E+06	1.3350119E+07		
3(OUTLET)	1.2545644E+06	1.3406500E+07	LOSS COEFFICIENT=	0.

MODULE 5 IS A PIPE

NODE	ENTHALPY	PRESSURE		
0(INLET)	1.2545644E+06	1.3406500E+07		
1(OUTLET)	1.2545644E+06	1.3382723E+07	LOSS COEFFICIENT=	1.7082576E+01

MODULE 6 IS A HEAT EXCHANGER

	WATER/STEAM		SODIUM
NODE	ENTHALPY	PRESSURE	TEMPERATURE
INLET PLENUM	1.2545644E+06	1.3382723E+07	
0(TUBE INLET)	1.2545644E+06	1.3093464E+07	618.7000
6(TUBE OUTLET)	2.0900004E+06	1.2821083E+07	732.0295
OUTLET PLENUM	2.0900004E+06	1.2596720E+07	

LOSS COEFFICIENTS,INLET PLENUM= 8.6257042E+01 OUTLET PLENUM= 1.2088528E+01

MODULE 7 IS A PIPE

NODE	ENTHALPY	PRESSURE	
0(INLET)	2.0900004E+06	1.2596720E+07	
3(OUTLET)	2.0900004E+06	1.2424530E+07	LOSS COEFFICIENT= 3.8039447E+01

MODULE 8 IS A VOLUME

NODE	ENTHALPY	PRESSURE
0	2.0900004E+06	1.2424530E+07

LIQUID LEVEL= 5.0000000E-01

MODULE 9 IS A PIPE

NODE	ENTHALPY	PRESSURE	
0(INLET)	2.6715916E+06	1.2424530E+07	
5(OUTLET)	2.6715916E+06	1.2376771E+07	LOSS COEFFICIENT= 0.

MODULE 10 IS A PIPE

NODE	ENTHALPY	PRESSURE	
0(INLET)	2.6715916E+06	1.2376771E+07	
1(OUTLET)	2.6715916E+06	1.2245090E+07	LOSS COEFFICIENT= 2.4327309E+01

MODULE 11 IS A HEAT EXCHANGER

	WATER/STEAM		SODIUM
NODE	ENTHALPY	PRESSURE	TEMPERATURE
INLET PLENUM	2.6715916E+06	1.2245090E+07	
0(TUBE INLET)	2.6715916E+06	1.2210616E+07	732.0295
4(TUBE OUTLET)	3.3275259E+06	1.1067890E+07	777.0118
OUTLET PLENUM	3.3275259E+06	1.1066662E+07	

LOSS COEFFICIENTS,INLET PLENUM= 9.3639216E-01 OUTLET PLENUM= 0.

MODULE 12 IS A PIPE

NODE	ENTHALPY	PRESSURE	
0(INLET)	3.3275259E+06	1.1066662E+07	
1(OUTLET)	3.3275259E+06	1.1071513E+07	LOSS COEFFICIENT= 0.

MODULE 13 IS A PIPE

NODE	ENTHALPY	PRESSURE

```
        0(INLET)        3.3275259E+06        1.1071513E+07
        3(OUTLET)       3.3275259E+06        1.0617925E+07     LOSS COEFFICIENT=   2.7735579E+01
     TURBINE LOOP
MODULE   1 IS A VOLUME
        NODE             ENTHALPY             PRESSURE
        0               3.3275259E+06        1.0617925E+07
LIQUID LEVEL=   0.
MODULE   2 IS A PIPE
        NODE             ENTHALPY             PRESSURE
        0(INLET)        3.3275259E+06        1.0617925E+07
        1(OUTLET)       3.3275259E+06        1.0100000E+07     LOSS COEFFICIENT=   1.6161100E-01
```

FOR SODIUM IN CHANNEL NUMBER 1

HEIGHT (M)	NODE	TEMPERATURE (K)	ENTHALPY (J/KG)	PRESSURE (N/M2)	HEAT TRANSFER COEFICIENT W/(M2*K)	FRICTION FACTOR (-)
0.000	1	6.55127E+02	8.65008E+05	5.69257E+05	2.12141E+05	2.10329E-02
.356	2	6.60255E+02	8.71583E+05	5.25215E+05	2.11101E+05	2.09819E-02
.447	3	6.73784E+02	8.88903E+05	5.13798E+05	2.09434E+05	2.08508E-02
.539	4	6.90421E+02	9.10149E+05	5.02377E+05	2.07448E+05	2.06965E-02
.630	5	7.10186E+02	9.35321E+05	4.90956E+05	2.05231E+05	2.05220E-02
.722	6	7.31644E+02	9.62572E+05	4.79549E+05	2.02928E+05	2.03427E-02
.813	7	7.53707E+02	9.90515E+05	4.68166E+05	2.00628E+05	2.01684E-02
.904	8	7.75823E+02	1.01846E+06	4.56807E+05	1.98436E+05	2.00030E-02
.996	9	7.96516E+02	1.04455E+06	4.45484E+05	1.96459E+05	1.98559E-02
1.087	10	8.15041E+02	1.06788E+06	4.34202E+05	1.94763E+05	1.97301E-02
1.179	11	8.30647E+02	1.08751E+06	4.22962E+05	1.93400E+05	1.96281E-02
1.270	12	8.42774E+02	1.10275E+06	4.11770E+05	1.92707E+05	1.95513E-02
1.626	13	8.44867E+02	1.10538E+06	3.68697E+05	1.92594E+05	1.95382E-02
2.845	14	8.45112E+02	1.10569E+06	2.21300E+05	1.92594E+05	1.95367E-02

FOR SODIUM IN CHANNEL NUMBER 2

HEIGHT (M)	NODE	TEMPERATURE (K)	ENTHALPY (J/KG)	PRESSURE (N/M2)	HEAT TRANSFER COEFICIENT W/(M2*K)	FRICTION FACTOR (-)
0.000	1	6.55127E+02	8.65008E+05	4.93748E+05	2.03389E+05	2.17762E-02
.356	2	6.59549E+02	8.70679E+05	4.58705E+05	2.02529E+05	2.17306E-02
.447	3	6.71215E+02	8.85618E+05	4.49638E+05	2.01149E+05	2.16131E-02
.539	4	6.85556E+02	9.03943E+05	4.40569E+05	1.99502E+05	2.14739E-02
.630	5	7.02589E+02	9.25655E+05	4.31503E+05	1.97661E+05	2.13155E-02
.722	6	7.21075E+02	9.49158E+05	4.22449E+05	1.95744E+05	2.11517E-02
.813	7	7.40077E+02	9.73260E+05	4.13413E+05	1.93825E+05	2.09914E-02
.904	8	7.59122E+02	9.97362E+05	4.04397E+05	1.91993E+05	2.08383E-02
.996	9	7.76941E+02	1.01987E+06	3.95409E+05	1.90337E+05	2.07013E-02
1.087	10	7.92893E+02	1.03999E+06	3.86449E+05	1.88912E+05	2.05836E-02
1.179	11	8.06333E+02	1.05692E+06	3.77521E+05	1.87767E+05	2.04878E-02
1.270	12	8.16778E+02	1.07006E+06	3.68626E+05	1.87183E+05	2.04153E-02
1.626	13	8.18581E+02	1.07233E+06	3.34323E+05	1.87087E+05	2.04029E-02
2.845	14	8.18792E+02	1.07260E+06	2.16925E+05	1.87087E+05	2.04015E-02

FOR SODIUM IN CHANNEL NUMBER 3

HEIGHT (M)	NODE	TEMPERATURE (K)	ENTHALPY (J/KG)	PRESSURE (N/M2)	HEAT TRANSFER COEFICIENT W/(M2*K)	FRICTION FACTOR (-)
0.000	1	6.55127E+02	8.65008E+05	2.70326E+05	7.74192E+04	5.35672E-02
.135	2	6.56337E+02	8.66561E+05	2.65334E+05	7.73039E+04	5.35411E-02
.271	3	6.59524E+02	8.70646E+05	2.60341E+05	7.70535E+04	5.34727E-02
.406	4	6.65902E+02	8.78817E+05	2.55348E+05	7.65774E+04	5.33376E-02
.542	5	6.77764E+02	8.93992E+05	2.50354E+05	7.58541E+04	5.30927E-02
.677	6	6.93769E+02	9.14419E+05	2.45364E+05	7.49930E+04	5.27748E-02
.813	7	7.11190E+02	9.36597E+05	2.40383E+05	7.41017E+04	5.24439E-02
.948	8	7.28652E+02	9.58776E+05	2.35413E+05	7.32627E+04	5.21270E-02
1.084	9	7.44308E+02	9.78619E+05	2.30455E+05	7.25790E+04	5.18545E-02
1.219	10	7.55839E+02	9.93210E+05	2.25509E+05	7.21175E+04	5.16605E-02
1.355	11	7.62764E+02	1.00196E+06	2.20573E+05	7.18714E+04	5.15465E-02
1.490	12	7.65720E+02	1.00570E+06	2.15644E+05	7.17673E+04	5.14985E-02
1.626	13	7.66949E+02	1.00725E+06	2.10719E+05	7.17350E+04	5.14786E-02
2.667	14	7.67020E+02	1.00734E+06	1.72868E+05	7.17350E+04	5.14774E-02

FOR SODIUM IN CHANNEL NUMBER 4

HEIGHT (M)	NODE	TEMPERATURE (K)	ENTHALPY (J/KG)	PRESSURE (N/M2)	HEAT TRANSFER COEFICIENT W/(M2*K)	FRICTION FACTOR (-)
0.000	1	6.55127E+02	8.65008E+05	7.43080E+05	7.93128E+04	1.74782E-02
.362	2	6.55134E+02	8.65018E+05	6.70382E+05	7.92776E+04	1.74781E-02
.445	3	6.56813E+02	8.67171E+05	6.53643E+05	7.92074E+04	1.74640E-02
.528	4	6.58492E+02	8.69324E+05	6.36910E+05	7.91373E+04	1.74499E-02
.611	5	6.60172E+02	8.71477E+05	6.20183E+05	7.90673E+04	1.74358E-02
.694	6	6.61852E+02	8.73630E+05	6.03461E+05	7.89973E+04	1.74219E-02
.778	7	6.63532E+02	8.75783E+05	5.86745E+05	7.89274E+04	1.74080E-02
.861	8	6.65213E+02	8.77936E+05	5.70034E+05	7.88576E+04	1.73941E-02
.944	9	6.66895E+02	8.80089E+05	5.53329E+05	7.87878E+04	1.73804E-02
1.027	10	6.68577E+02	8.82242E+05	5.36630E+05	7.87181E+04	1.73667E-02
1.110	11	6.70259E+02	8.84395E+05	5.19936E+05	7.86485E+04	1.73530E-02
1.193	12	6.71942E+02	8.86548E+05	5.03247E+05	7.86136E+04	1.73394E-02
1.276	13	6.71944E+02	8.86550E+05	4.86604E+05	7.86136E+04	1.73394E-02
1.853	14	6.71944E+02	8.86550E+05	3.71185E+05	7.86136E+04	1.73394E-02

LOSS COEFFICIENTS		FLOW RATES	
F6LSA4(1) =	2.94252E+00	W6CHAN(1) =	2.39881E+01
F6LSA4(2) =	3.58869E+00	W6CHAN(2) =	4.10398E+03
F6LSA4(3) =	2.85325E+00	W6CHAN(3) =	7.04965E+02
F6LSA4(4) =	4.43649E+00	W6CHAN(4) =	3.13434E+02

W6BPAS =	7.75331E+01	T6BPAS =	6.55127E+02	F6LSBP =	4.12687E+06
T6INLT =	6.55127E+02	E6INLT =	8.65008E+05	P6INLT =	9.56964E+05
T6OUTL =	8.00602E+02	E6OUTL =	1.04970E+06	P6OUTL =	1.44166E+05
T6BPUE =	8.65267E+02	T6BPM =	7.60436E+02	T6CGAS =	7.99900E+02
T6M1 =	8.00601E+02	T6M2 =	7.66703E+02	T6M3 =	7.99900E+02

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 1

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0060

TOTAL FRACTIONAL FLOW IN THIS CHANNEL = .0046

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.178	748.02;U	731.64;U	719.02;U	706.95;U	660.69;-	659.38;-	658.21;-	657.69;-	657.69;-
.402	1569.80;R	1305.89;U	1112.94;U	950.52;U	697.55;-	684.26;-	672.40;-	667.02;-	667.02;-
.493	2021.91;R	1609.29;U	1332.46;U	1103.86;U	719.36;-	703.21;-	688.78;-	682.10;-	682.10;-
.585	2293.24;R	1793.91;R	1444.55;U	1161.71;U	744.16;-	725.24;-	708.31;-	700.30;-	700.30;-
.676	2448.44;R	1898.97;R	1509.97;U	1196.64;U	767.92;-	747.74;-	729.67;-	720.92;-	720.92;-
.767	2516.47;R	1950.36;R	1545.87;U	1219.73;U	790.41;-	770.01;-	751.75;-	742.68;-	742.68;-
.859	2542.13;R	1975.25;R	1567.53;U	1237.60;U	812.05;-	791.94;-	773.94;-	764.77;-	764.77;-
.950	2454.19;R	1927.06;R	1548.82;U	1239.89;U	829.96;-	811.41;-	794.83;-	786.17;-	786.17;-
1.042	2303.09;R	1837.58;R	1504.93;U	1229.64;U	844.65;-	828.24;-	813.60;-	805.78;-	805.78;-
1.133	2082.43;R	1702.11;R	1431.09;U	1203.09;U	855.37;-	841.68;-	829.48;-	822.84;-	822.84;-
1.224	1799.84;R	1520.24;U	1324.00;U	1154.15;U	861.69;-	851.20;-	841.86;-	836.71;-	836.71;-
1.448	881.70;U	873.97;U	867.95;U	862.13;U	844.93;-	844.46;-	844.05;-	843.82;-	843.82;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	844.99;-	844.99;-	844.99;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 2

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .8830

TOTAL FRACTIONAL FLOW IN THIS CHANNEL = .7856

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.178	724.71;U	712.74;U	703.48;U	694.59;U	659.61;-	658.62;-	657.75;-	657.34;-	657.34;-
.402	1436.80;U	1234.53;U	1092.27;U	968.39;U	688.44;-	678.46;-	669.58;-	665.38;-	665.38;-
.493	1650.24;R	1377.05;U	1188.89;U	1028.34;U	706.52;-	694.39;-	683.57;-	678.39;-	678.39;-
.585	1865.79;R	1519.37;U	1282.49;U	1083.61;U	727.12;-	712.93;-	700.27;-	694.07;-	694.07;-
.676	2004.03;R	1607.98;U	1340.79;U	1118.61;U	747.43;-	732.21;-	718.62;-	711.83;-	711.83;-
.767	2055.69;R	1655.05;R	1374.14;U	1141.42;U	766.90;-	751.44;-	737.63;-	730.58;-	730.58;-
.859	2079.27;R	1676.20;R	1392.61;U	1157.22;U	785.63;-	770.35;-	756.72;-	749.60;-	749.60;-
.950	2010.22;R	1638.25;R	1375.70;U	1155.96;U	801.44;-	787.33;-	774.74;-	768.03;-	768.03;-
1.042	1886.48;R	1560.55;U	1334.31;U	1141.57;U	814.38;-	801.98;-	790.92;-	784.92;-	784.92;-
1.133	1718.82;R	1456.48;U	1272.81;U	1113.77;U	824.29;-	813.93;-	804.70;-	799.61;-	799.61;-
1.224	1510.58;U	1322.76;U	1188.29;U	1069.20;U	830.61;-	822.63;-	815.53;-	811.56;-	811.56;-
1.448	845.77;U	840.18;U	835.83;U	831.62;U	818.53;-	818.17;-	817.86;-	817.68;-	817.68;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	818.74;-	818.69;-	818.69;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 3

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .1040

TOTAL FRACTIONAL FLOW IN THIS CHANNEL = .1350

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.068	680.83;U	674.28;U	669.18;U	664.26;U	656.46;-	656.23;-	656.01;-	655.73;-	655.73;-
.203	725.07;U	707.03;U	693.17;U	679.94;U	659.85;-	659.24;-	658.65;-	657.93;-	657.93;-
.339	800.62;U	761.91;U	732.69;U	705.30;U	666.55;-	665.32;-	664.16;-	662.71;-	662.71;-
.474	939.46;U	858.96;U	800.03;U	746.41;U	678.94;-	676.68;-	674.53;-	671.83;-	671.83;-
.610	1059.44;U	941.44;U	856.87;U	781.55;U	695.31;-	692.30;-	689.43;-	685.77;-	685.77;-
.745	1116.99;U	983.62;U	888.66;U	804.64;U	712.81;-	709.58;-	706.50;-	702.48;-	702.48;-
.881	1140.27;U	1004.37;U	907.56;U	821.86;U	730.22;-	727.03;-	723.99;-	719.92;-	719.92;-
1.016	1113.71;U	993.35;U	906.80;U	829.45;U	745.68;-	742.85;-	740.16;-	736.48;-	736.48;-
1.151	1023.82;U	939.73;U	877.95;U	821.55;U	756.83;-	754.77;-	752.81;-	750.07;-	750.07;-
1.287	920.09;U	872.98;U	837.50;U	804.30;U	763.35;-	762.12;-	760.95;-	759.30;-	759.30;-
1.422	831.33;U	812.54;U	798.07;U	784.23;U	765.97;-	765.45;-	764.95;-	764.24;-	764.24;-
1.558	793.93;U	786.36;U	780.47;U	774.78;U	767.05;-	766.83;-	766.63;-	766.33;-	766.33;-
2.146	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	766.99;-	766.98;-	766.98;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 4

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0070

TOTAL FRACTIONAL FLOW IN THIS CHANNEL = .0600

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.181	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	655.13;-	655.13;-	655.13;-
.403	1158.59;U	1052.04;U	973.20;U	900.68;U	684.62;-	670.66;-	659.19;-	655.97;-	655.97;-
.487	1160.41;U	1053.74;U	974.81;U	902.19;U	686.27;-	672.33;-	660.88;-	657.65;-	657.65;-
.570	1162.23;U	1055.43;U	976.41;U	903.71;U	687.92;-	674.00;-	662.56;-	659.33;-	659.33;-
.653	1164.05;U	1057.12;U	978.01;U	905.23;U	689.57;-	675.67;-	664.24;-	661.01;-	661.01;-
.736	1165.87;U	1058.82;U	979.61;U	906.75;U	691.23;-	677.34;-	665.92;-	662.69;-	662.69;-
.819	1167.69;U	1060.52;U	981.22;U	908.27;U	692.88;-	679.01;-	667.61;-	664.37;-	664.37;-
.902	1169.51;U	1062.21;U	982.82;U	909.79;U	694.54;-	680.68;-	669.29;-	666.05;-	666.05;-
.985	1171.33;U	1063.91;U	984.43;U	911.31;U	696.19;-	682.35;-	670.98;-	667.74;-	667.74;-
1.068	1173.15;U	1065.61;U	986.03;U	912.83;U	697.85;-	684.02;-	672.66;-	669.42;-	669.42;-
1.152	1174.98;U	1067.31;U	987.64;U	914.35;U	699.50;-	685.69;-	674.35;-	671.10;-	671.10;-
1.235	1175.89;U	1068.16;U	988.44;U	915.11;U	700.33;-	686.53;-	675.19;-	671.94;-	671.94;-
1.565	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	671.95;-	671.94;-	671.94;-

P R I M A R Y   C O O L A N T   L O O P   S T E A D Y   S T A T E

LOOP DATA

THERE ARE 5 PIPES IN THE PRIMARY COOLANT LOOP

THE PUMP IS BETWEEN PIPES 1 AND 2 .
THE CHECK VALVE IS BETWEEN PIPES 4 AND 5 .
PIPE NUMBER 3 IS THE IHX.

RESERVOIR DATA

TOTAL HEIGHT OF RESERVOIR IS	6.00000E+00 M
X-SECTION AREA OF RESERVOIR IS	3.06600E+00 M2
THE MASS OF THE RESERVOIR COVER GAS IS	3.40330E+00 KG
THE HEIGHT OF THE COOLANT IN THE RESERVOIR IS	4.21982E+00 M
THE PRESSURE OF THE RESERVOIR COVER GAS IS	1.04000E+05 N/M2

PUMP DATA

THE PUMP HEAD IS	1.51026E+02 M
THE ROTATIONAL VELOCITY IS	1.14883E+03 RPM
THE PRESSURE RISE IS	1.22379E+06 N/M2

INITIAL CONDITIONS

LOOP INLET TEMPERATURE	8.00602E+02 K
LOOP INLET PRESSURE	1.44166E+05 N/M2
LOOP OUTLET PRESSURE	9.56964E+05 N/M2
MASS FLOW RATE	1.74130E+03 KG/S
IHX INLET TEMPERATURE (SECONDARY SIDE)	7.77012E+02 K
IHX MASS FLOW RATE (SECONDARY SIDE)	1.61020E+03 KG/S

P R I M A R Y   C O O L A N T   L O O P   S T E A D Y   S T A T E

PIPE NUMBER 1

PIPE LENGTH	=	3.61859E+01 M
DIAMETER	=	8.89000E-01 M
X-SECTION AREA	=	6.20717E-01 M2
INLET PRESSURE	=	1.44166E+05 N/M2
OUTLET PRESSURE	=	1.38194E+05 N/M2
LOSS COEFFICIENT	=	4.00200E-01
NUMBER OF NODES	=	19
COOLANT TEMPERATURE	=	8.00602E+02 K

PIPE NUMBER 2

PIPE LENGTH	=	2.62311E+01 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	1.36198E+06 N/M2
OUTLET PRESSURE	=	1.24092E+06 N/M2
LOSS COEFFICIENT	=	1.81610E+00
NUMBER OF NODES	=	8
COOLANT TEMPERATURE	=	8.01202E+02 K

PRIMARY COOLANT LOOP STEADY STATE

HEAT EXCHANGER

PIPE NUMBER 3

PIPE LENGTH	=	7.86390E+00 M
DIAMETER	=	3.68600E-02 M
X-SECTION AREA	=	1.93610E+00 M2
INLET PRESSURE	=	1.24092E+06 N/M2
OUTLET PRESSURE	=	1.15089E+06 N/M2
LOSS COEFFICIENT	=	1.31007E+02
NUMBER OF NODES	=	20

NODE	TEMPERATURE (K) PRIMARY	TUBE	SECONDARY
1	8.01202E+02	7.85570E+02	7.77012E+02
2	7.94148E+02	7.78299E+02	7.69615E+02
3	7.87000E+02	7.70931E+02	7.62119E+02
4	7.79756E+02	7.63467E+02	7.54525E+02
5	7.72417E+02	7.55906E+02	7.46833E+02
6	7.64983E+02	7.48247E+02	7.39041E+02
7	7.57452E+02	7.40491E+02	7.31151E+02
8	7.49826E+02	7.32638E+02	7.23162E+02
9	7.42104E+02	7.24688E+02	7.15074E+02
10	7.34287E+02	7.16641E+02	7.06887E+02
11	7.26374E+02	7.08497E+02	6.98602E+02
12	7.18365E+02	7.00257E+02	6.90219E+02
13	7.10262E+02	6.91921E+02	6.81738E+02
14	7.02064E+02	6.83489E+02	6.73160E+02
15	6.93771E+02	6.74963E+02	6.64486E+02
16	6.85386E+02	6.66343E+02	6.55717E+02
17	6.76908E+02	6.57629E+02	6.46852E+02
18	6.68338E+02	6.48824E+02	6.37894E+02
19	6.59677E+02	6.39927E+02	6.28843E+02
20	6.50926E+02		6.19700E+02

P R I M A R Y   C O O L A N T   L O O P   S T E A D Y   S T A T E

PIPE NUMBER 4

PIPE LENGTH	=	2.09702E+01 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	1.15089E+06 N/M2
OUTLET PRESSURE	=	9.96389E+05 N/M2
LOSS COEFFICIENT	=	1.12430E+00
NUMBER OF NODES	=	6
COOLANT TEMPERATURE	=	6.55127E+02 K

PIPE NUMBER 5

PIPE LENGTH	=	2.68225E+01 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	9.27534E+05 N/M2
OUTLET PRESSURE	=	9.56964E+05 N/M2
LOSS COEFFICIENT	=	1.38830E+00
NUMBER OF NODES	=	16
COOLANT TEMPERATURE	=	6.55127E+02 K

I N T E R M E D I A T E   C O O L A N T   L O O P   S T E A D Y   S T A T E

LOOP DATA
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THE INTERMEDIATE LOOP CONSISTS OF
  5       PIPES
  1       SUPER HEATER(S) FOLLOWING PIPE NUMBER   1
  2       EVAPORATOR(S) FOLLOWING PIPE NUMBER   2
          A PUMP FOLLOWING PIPE   4
          A SURGE TANK FOLLOWS PIPE   4
          PRESSURE DROP OVER SUPER HEATER DEFINED
          PRESSURE DROP OVER EVAPORATOR DEFINED
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I N T E R M E D I A T E   C O O L A N T   L O O P   S T E A D Y   S T A T E

PIPE NUMBER 1

PIPE LENGTH	=	2.50546E+02 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	1.87083E+06 N/M2
OUTLET PRESSURE	=	1.68356E+06 N/M2
LOSS COEFFICIENT	=	1.10000E+00
NUMBER OF NODES	=	31
COOLANT TEMPERATURE	=	7.77012E+02 K

SUPER HEATER

INLET PLENUM DATA

LENGTH	=	1.05410E+00 M
COOLANT TEMPERATURE	=	7.77012E+02 K
LOSS COEFFIEIENT	=	3.50000E+00

HEAT EXCHANGE REGION

LENGTH	=	1.40200E+01 M
DIAMETER	=	5.08200E-02 M
FLOW AREA	=	5.29854E-01 M2
LOSS COEFFICIENT	=	9.91654E+00
PRESSURE DROP	=	3.30948E+05 N/M2

OUTLET PLENUM DATA

LENGTH	=	8.35700E-01 M
COOLANT TEMPERATURE	=	7.32029E+02 K
LOSS COEFFICIENT	=	4.20000E+00

INTERMEDIATE COOLANT LOOP STEADY STATE

PIPE NUMBER 2

PIPE LENGTH	=	3.44420E+01 M
DIAMETER	=	4.31800E-01 M
X-SECTION AREA	=	1.46438E-01 M2
INLET PRESSURE	=	1.35261E+06 N/M2
OUTLET PRESSURE	=	1.21408E+06 N/M2
LOSS COEFFICIENT	=	5.60000E-01
NUMBER OF NODES	=	3
COOLANT TEMPERATURE	=	7.32029E+02 K

EVAPORATOR

INLET PLENUM DATA

LENGTH	=	1.05410E+00 M
COOLANT TEMPERATURE	=	7.32029E+02 K
LOSS COEFFIEIENT	=	1.50000E+00

HEAT EXCHANGE REGION

LENGTH	=	1.40200E+01 M
DIAMETER	=	5.08200E-02 M
FLOW AREA	=	5.29854E-01 M2
LOSS COEFFICIENT	=	2.71428E+01
PRESSURE DROP	=	8.27370E+04 N/M2

OUTLET PLENUM DATA

LENGTH	=	8.35700E-01 M
COOLANT TEMPERATURE	=	6.18700E+02 K
LOSS COEFFICIENT	=	1.50000E+00

INTERMEDIATE COOLANT LOOP STEADY STATE

PIPE NUMBER 3

PIPE LENGTH	=	2.46890E+01	M
DIAMETER	=	4.31800E-01	M
X-SECTION AREA	=	1.46438E-01	M2
INLET PRESSURE	=	1.13135E+06	N/M2
OUTLET PRESSURE	=	1.09609E+06	N/M2
LOSS COEFFICIENT	=	6.50000E-01	
NUMBER OF NODES	=	3	
COOLANT TEMPERATURE	=	6.18700E+02	K

I N T E R M E D I A T E   C O O L A N T   L O O P   S T E A D Y   S T A T E

PIPE NUMBER 4

PIPE LENGTH	=	3.29180E+01 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	1.09609E+06 N/M2
OUTLET PRESSURE	=	8.94121E+05 N/M2
LOSS COEFFICIENT	=	1.42000E+00
NUMBER OF NODES	=	7
COOLANT TEMPERATURE	=	6.18700E+02 K

PUMP AND RESERVOIR

ORDER OF PUMP POLYNOMIAL	=	5
TEMPERATURE RISE ACROSS PUMP	=	1.00000E+00 K
RATED PUMP HEAD	=	1.39600E+02 M
COMPUTED PUMP HEAD	=	1.30913E+02 M
RATED ROTATIONAL SPEED	=	1.11600E+03 RPM
COMPUTED ROTATIONAL SPEED	=	1.08751E+03 RPM

RESERVOIR DATA

TOTAL HEIGHT	=	6.00000E+00 M
COOLANT HEIGHT	=	4.00000E+00 M
X-SECTION AREA	=	3.00000E+00 M2
GAS PRESSURE	=	8.60000E+05 N/M2
MASS OF GAS	=	4.00330E+01 KG

SURGE TANK

TOTAL HEIGHT	=	4.50000E+00 M
COOLANT HEIGHT	=	4.00000E+00 M
X-SECTION AREA	=	1.20000E+01 M2
GAS PRESSURE	=	8.60000E+05 N/M2
MASS OF GAS	=	4.00330E+01 KG

INTERMEDIATE COOLANT LOOP STEADY STATE

PIPE NUMBER 5

PIPE LENGTH	=	1.26492E+02 M
DIAMETER	=	5.84200E-01 M
X-SECTION AREA	=	2.68048E-01 M2
INLET PRESSURE	=	2.01085E+06 N/M2
OUTLET PRESSURE	=	1.94416E+06 N/M2
LOSS COEFFICIENT	=	1.20000E+00
NUMBER OF NODES	=	19
COOLANT TEMPERATURE	=	6.19700E+02 K

PLANT BALANCE SUMMARY (100.00 PER CENT OF RATED POWER)

REACTOR VESSEL

OUTLET TEMPERATURE= 800.60 K

OUTLET PRESSURE = 1.4416579E+05 N/(M*M)

INLET TEMPERATURE = 655.13 K

INLET PRESSURE = 9.5696378E+05 N/(M*M)

INTERMEDIATE HEAT EXCHANGER

PRIMARY SIDE

INLET TEMPERATURE = 801.20 K

INLET PRESSURE = 1.1508945E+06 N/(M*M)

OUTLET TEMPERATURE= 655.13 K

OUTLET PRESSURE = 1.1508945E+06 N/(M*M)

SECONDARY SIDE

OUTLET TEMPERATURE= 777.01 K

OUTLET PRESSURE = 1.8708301E+06 N/(M*M)

INLET TEMPERATURE = 619.70 K

INLET PRESSURE = 1.9441628E+06 N/(M*M)

PRIMARY SODIUM PUMP

INLET TEMPERATURE = 800.60 K

OUTLET TEMPERATURE= 801.20 K

INLET PRESSURE = 1.3819393E+05 N/(M*M)

OUTLET PRESSURE = 1.3619835E+06 N/(M*M)

PRIMARY PUMP SPEED= 1.0294

PRIMARY FLOW RATE= 1741.30 KG/S

S T E A M   G E N E R A T O R

S U P E R H E A T E R

SODIUM SIDE		STEAM/WATER SIDE	
INLET TEMPERATURE =	777.01 K	OUTLET ENTHALPY =	3.3275259E+06 J/KG
INLET PRESSURE =	1.6835617E+06 N/(M*M)	OUTLET PRESSURE =	1.1066662E+07 N/(M*M)
OUTLET TEMPERATURE=	732.03 K	INLET ENTHALPY =	2.6715916E+06 J/KG
OUTLET PRESSURE =	1.3526137E+06 N/(M*M)	INLET PRESSURE =	1.2245090E+07 N/(M*M)

AREA CORRECTION FACTOR= .6448

E V A P O R A T O R

SODIUM SIDE		STEAM/WATER SIDE	
INLET TEMPERATURE =	732.03 K	OUTLET ENTHALPY =	2.0900004E+06 J/KG
INLET PRESSURE =	1.2140830E+06 N/(M*M)	OUTLET PRESSURE =	1.2596720E+07 N/(M*M)
OUTLET TEMPERATURE=	618.70 K	INLET ENTHALPY =	1.2545644E+06 J/KG
OUTLET PRESSURE =	1.1313460E+06 N/(M*M)	INLET PRESSURE =	1.3382723E+07 N/(M*M)

AREA CORRECTION FACTOR= .5886

S E C O N D A R Y   S O D I U M   P U M P

INLET TEMPERATURE = 618.70 K

OUTLET TEMPERATURE= 619.70 K

INLET PRESSURE = 8.9412106E+05 N/(M*M)

OUTLET PRESSURE = 2.0108464E+06 N/(M*M)

PUMP SPEED= .9745

SECONDARY FLOW RATE= 1610.20 KG/S

R E C I R C U L A T I O N   P U M P

INLET ENTHALPY = 1.2545644E+06 J/KG

OUTLET ENTHALPY = 1.2545644E+06 J/KG

INLET PRESSURE = 1.2558808E+07 N/(M*M)

OUTLET PRESSURE = 1.3381001E+07 N/(M*M)

PUMP SPEED= 1.0000

RECIRCULATION FLOW RATE=279.3530 KG/S

S T E A M   H E A D E R

ENTHALPY= 3.3275259E+06 J/KG

PRESSURE= 1.0617925E+07 N/(M*M)

T U R B I N E

ENTHALPY= 3.3275259E+06 J/KG

PRESSURE= 1.0100000E+07 N/(M*M)

FLOW RATE= 419.03 KG/S

S T E A M   D R U M

PRESSURE= 1.2424530E+07 N/(M*M)

LIQUID LEVEL= .5000

F E E D W A T E R

ENTHALPY= 1.0007193E+06 J/KG

PRESSURE= 1.2424530E+07 N/(M*M)

FLOW RATE= 139.68 KG/S

4.2.5 Transient-State Output

A sample of the transient calculations is included in the following pages. Printouts for only one channel (Channel No.1) are shown for t = 60 and 120 seconds.

MASTER CLOCK TIME = 60.00000

VARIABLES INTEGRATED BY LOOP HYDRAULICS PACKAGE

Y1	5.31512E+01	5.96572E+01	1.01248E+01	3.48108E+03	0.	0.
	6.40970E+00	7.92929E+02	7.88689E+02	7.96145E+02	8.00194E+02	7.69726E+02
	7.99900E+02	5.73755E+00	1.28085E+02	1.28085E+02	4.43225E+01	3.47658E+03
	3.47658E+03	0.				
Y1DYDT	1.82645E+00	-2.30902E+00	-7.73713E+00	-2.12201E+00	0.	0.
	1.10803E-04	-2.04035E-02	1.15975E-01	-9.49833E-03	-8.69259E-03	8.38432E-02
	-1.03900E-05	0.	-3.32507E+00	-3.32507E+00	-2.88825E+00	0.
	0.	0.				

VARIABLE 3 IS CURRENTLY RESTRICTING THE HYDRAULIC TIMESTEP.

TIMESTEP INFORMATION

L1WSTP= 382 L1STEP= 383 L3STEP= 483 L5STEP= 2231 L6STEP= 3657
S1DELW= 2.5000E-01 S1DELT= 2.5000E-01 S3DELT= 2.5000E-01 S5DELT= 2.5000E-01 S6DELT= 1.2500E-01
S1DELA= 2.5000E-01 S5DELA= 2.5000E-01 S6DELA= 1.2500E-01

THERMAL RESULTS LOOP NO 1

TIME= -R REAL TIME = 60.00

FLOW RATES (KG/S)

W1PIPE= 53.15 59.66 59.66 59.66 59.66

W2PIPE= 128.08 64.04 64.04 128.08 128.08

TEMPERATURES (K)

PRIMARY LOOP

T1INLT= 788.689

PIPE =	1	788.689	789.655	790.810	791.913	792.933	793.849	794.647	795.315	795.849	796.253
PIPE =	1	796.550	796.776	796.979	797.202	797.474	797.803	798.180	798.581	798.977	
PIPE =	2	798.991	799.339	799.652	799.920	800.143	800.326	800.474	800.594		
PIPE =	4	628.538	630.673	632.746	634.761	636.720	638.623				
PIPE =	5	638.623	639.418	640.201	640.973	641.733	642.481	643.215	643.936	644.641	645.330
PIPE =	5	646.003	646.657	647.292	647.905	648.497	649.066				

T1OUTL= 649.066

IHX PRIMARY

T1INHX= 800.594

T1OUHX= 628.538

T1BYP = 801.196

ACTIVE H.T. REGION

800.964	755.812	754.447	743.116	735.536	727.142	719.051	710.865	702.652	694.383
686.067	677.720	669.372	661.069	652.880	644.914	637.334	630.401	624.530	620.368

INTERMEDIATE LOOP

T2OUEV= 558.790

PIPE =	2	663.415	677.848	693.478							
PIPE =	3	558.790	574.146	586.248							
PIPE =	4	586.248	590.225	593.903	597.284	600.369	603.159	605.660			
PIPE =	5	605.670	608.456	610.809	612.763	614.354	615.624	616.617	617.380	617.956	618.387
PIPE =	5	618.707	618.947	619.128	619.267	619.375	619.459	619.525	619.576	619.614	
PIPE =	1	783.713	783.327	782.767	782.117	781.433	780.753	780.104	779.505	778.970	778.508
PIPE =	1	778.123	777.812	777.570	777.390	777.259	777.169	777.108	777.069	777.045	777.030
PIPE =	1	777.022	777.017	777.015	777.013	777.012	777.012	777.012	777.012	777.012	777.012
PIPE =	1	777.012									

T2INSH= 777.012

IHX SECONDARY SIDE

T2INHX= 619.614

T2OUHX= 783.713

ACTIVE H.T. REGION

783.285	756.640	750.674	741.028	733.041	724.794	716.662	708.475	700.245	691.961
683.634	675.285	666.945	658.669	650.535	642.665	635.249	628.587	623.157	619.689

STEAM GENERATORS

TIME= 60.00000

HEAT EXCHANGER FLOW SEGMENTS SODIUM FLOW = 128.085 IN LOOP 1

1	1085727.53780	85.72067				
2	1065763.66688	86.37918				
3	1060565.75327	86.55319				
4	1073042.17326	86.15496				
5	1101756.71673	85.21102				
6	1101756.71673	85.21102				
7	1114012.55426	84.79974				
8	1134756.50395	84.09249				
9	1156559.95009	83.33477				
10	1177661.99666	82.58780				
11	1200293.54902	81.77218				
12	1210114.88708	81.41350	558.78955			
13	1265384.60400	81.16702	569.17277	559.89217	58462.80185	10
14	1317479.96792	80.88987	577.38074	569.54607	54192.03279	10
15	1359960.57948	80.61342	582.47376	577.02299	43231.33032	10
16	1389079.92914	80.39371	585.13524	581.90371	29163.26283	10
17	1379907.33900	79.78171	562.11126	577.57351	-26671.68086	10
18	1767903.37503	72.56598	693.47734	593.45021	399764.76689	40
19	1808725.65639	66.91153				
20	1940408.04969	53.48301				

```
   21  2050696.63318           45.84816
   22  2128161.61849           41.72800
   23  2090000.41801            0.00000
   24  2717394.81151           21.92732
   25  2716971.34764           21.94846
   26  2716492.20866           21.97088
   27  2715964.42148           21.99451
   28  2715408.32506           22.01881
   29  2714851.25741           22.04315
   30  2714483.53681           22.05945
   31  2714314.31936           22.06702              663.41530
DNB IN HX    2  BETWEEN   31  AND   32  AT Z=          -.69930          677.84743        143619.79625
   32  3076807.57391           22.11056              719.66032          677.84743        143619.79625        66
   33  3245434.23714           22.13037              751.48509          728.53476         66700.97159        60
   34  3327659.33228           22.14060              768.75753          756.49745         32491.63007        60
   35  3366873.13831           22.14620              777.01181          771.17254         15475.71791        60
   36  3366473.82470           22.15563
   37  3365863.48585           22.16998
   38  3364293.51070           22.20664
   39  3362712.36088           22.24355
   40  3361166.63646           22.27999

TURBINE FLOW SEGMENT
    1  3327525.92645            0.00000
    2  3352280.92927           67.35013
    3  3348162.13637           67.57095

FLOW SEGMEST VARIABLES
    1        80.21037          44.14389
    2        22.06276
    3        67.46054

VOLUMES
    1 10168895.74574       1983885.52866
    2 10111917.16509       3352280.92927

MAXIMUN CHANGES IN STATE VARIABLES DURING THIS STEP WERE, PRESSURE     .0001480  ENTHALPY     .0036278  FLOW RATE     .0077886
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RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 1

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0060

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.178	661.76;U	660.99;U	660.38;U	659.79;U	657.31;-	657.24;-	657.18;-	657.14;-	657.69;-
.402	708.14;R	700.21;U	693.63;U	687.30;U	671.11;-	670.41;-	669.79;-	669.41;-	667.02;-
.493	743.94;R	732.83;U	724.41;U	716.37;U	690.44;-	689.60;-	688.87;-	688.36;-	682.10;-
.585	773.59;R	760.45;R	750.17;U	740.39;U	711.47;-	710.50;-	709.64;-	709.01;-	700.30;-
.676	799.77;R	785.23;R	773.86;U	763.05;U	733.08;-	732.05;-	731.15;-	730.44;-	720.92;-
.767	822.08;R	806.91;R	795.06;U	783.79;U	753.92;-	752.89;-	751.99;-	751.23;-	742.68;-
.859	841.40;R	826.01;R	813.99;U	802.55;U	773.22;-	772.22;-	771.34;-	770.55;-	764.77;-
.950	853.91;R	839.47;R	828.17;U	817.42;U	789.98;-	789.06;-	788.26;-	787.49;-	786.17;-
1.042	860.53;R	847.66;R	837.59;U	827.99;U	803.21;-	802.40;-	801.70;-	800.99;-	805.78;-
1.133	860.63;R	849.95;R	841.57;U	833.57;U	812.31;-	811.65;-	811.07;-	810.44;-	822.84;-
1.224	854.07;R	845.95;U	839.70;U	833.68;U	816.97;-	816.47;-	816.05;-	815.53;-	836.71;-
1.448	797.27;U	797.52;U	797.73;U	797.93;U	798.61;-	798.63;-	798.66;-	798.53;-	843.82;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	844.99;-	778.57;-	844.99;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 2

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .8830

	RADIAL NODE NUMBER (TYPE)								
	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
HGT (M)	TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)								
.178	660.07;U	659.50;U	659.05;U	658.62;U	656.80;-	656.75;-	656.71;-	656.68;-	657.34;-
.402	701.13;U	694.95;U	690.15;U	685.52;U	668.40;-	667.89;-	667.44;-	667.15;-	665.38;-
.493	724.03;R	716.26;U	710.28;U	704.53;U	684.56;-	683.95;-	683.41;-	683.03;-	678.39;-
.585	747.82;R	738.43;U	731.22;U	724.29;U	701.74;-	701.03;-	700.41;-	699.94;-	694.07;-
.676	769.17;R	758.60;U	750.61;U	742.95;U	719.30;-	718.55;-	717.89;-	717.36;-	711.83;-
.767	786.98;R	776.31;R	767.95;U	759.97;U	736.21;-	735.45;-	734.78;-	734.22;-	730.58;-
.859	802.51;R	791.72;R	783.26;U	775.19;U	751.80;-	751.05;-	750.41;-	749.82;-	749.60;-
.950	812.61;R	802.51;R	794.59;U	787.02;U	765.24;-	764.56;-	763.97;-	763.40;-	768.03;-
1.042	817.70;R	808.65;U	801.69;U	795.00;U	775.57;-	774.98;-	774.47;-	773.94;-	784.92;-
1.133	817.85;R	810.33;U	804.54;U	798.97;U	782.48;-	781.99;-	781.56;-	781.10;-	799.61;-
1.224	812.88;U	807.26;U	802.89;U	798.67;U	785.82;-	785.45;-	785.14;-	784.76;-	811.56;-
1.448	769.16;U	769.33;U	769.46;U	769.59;U	770.04;-	770.06;-	770.08;-	769.99;-	817.68;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	818.74;-	753.24;-	818.69;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 3

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .1040

HGT (M)	RADIAL NODE NUMBER (TYPE) 1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
	TEMPERATURE (K) FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)								
.068	656.91;U	656.44;U	656.08;U	655.73;U	655.17;-	655.15;-	655.14;-	655.12;-	655.73;-
.203	662.90;U	661.78;U	660.93;U	660.11;U	658.81;-	658.77;-	658.74;-	658.69;-	657.93;-
.339	673.65;U	671.43;U	669.73;U	668.12;U	665.64;-	665.56;-	665.49;-	665.39;-	662.71;-
.474	693.10;U	688.87;U	685.66;U	682.61;U	678.17;-	678.03;-	677.90;-	677.71;-	671.83;-
.610	716.48;U	710.68;U	706.29;U	702.13;U	696.42;-	696.24;-	696.07;-	695.81;-	685.77;-
.745	739.10;U	732.63;U	727.77;U	723.16;U	717.11;-	716.92;-	716.74;-	716.45;-	702.48;-
.881	760.64;U	753.95;U	748.92;U	744.18;U	738.14;-	737.96;-	737.78;-	737.49;-	719.92;-
1.016	778.41;U	772.26;U	767.65;U	763.31;U	757.87;-	757.71;-	757.55;-	757.29;-	736.48;-
1.151	788.61;U	784.05;U	780.65;U	777.45;U	773.42;-	773.30;-	773.19;-	772.99;-	750.07;-
1.287	792.22;U	789.50;U	787.48;U	785.58;U	783.16;-	783.09;-	783.03;-	782.91;-	759.30;-
1.422	791.33;U	790.22;U	789.40;U	788.63;U	787.64;-	787.61;-	787.58;-	787.53;-	764.24;-
1.558	790.62;U	790.17;U	789.84;U	789.53;U	789.13;-	789.12;-	789.11;-	789.09;-	766.33;-
2.146	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	766.99;-	789.35;-	766.98;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 4

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0070

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.181	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	655.13;-	653.91;-	655.13;-
.403	694.31;U	687.26;U	682.09;U	677.29;U	658.16;-	657.05;-	656.14;-	655.76;-	655.97;-
.487	697.61;U	690.60;U	685.47;U	680.69;U	661.78;-	660.68;-	659.79;-	659.40;-	657.65;-
.570	700.88;U	693.89;U	688.78;U	684.04;U	665.34;-	664.26;-	663.38;-	663.00;-	659.33;-
.653	704.13;U	697.14;U	692.05;U	687.32;U	668.82;-	667.75;-	666.89;-	666.51;-	661.01;-
.736	707.35;U	700.36;U	695.27;U	690.56;U	672.18;-	671.13;-	670.28;-	669.90;-	662.69;-
.819	710.55;U	703.56;U	698.47;U	693.76;U	675.48;-	674.44;-	673.60;-	673.22;-	664.37;-
.902	713.73;U	706.74;U	701.65;U	696.94;U	678.76;-	677.72;-	676.88;-	676.50;-	666.05;-
.985	716.91;U	709.90;U	704.82;U	700.10;U	682.01;-	680.98;-	680.14;-	679.77;-	667.74;-
1.068	720.07;U	713.06;U	707.96;U	703.25;U	685.23;-	684.21;-	683.38;-	683.00;-	669.42;-
1.152	723.22;U	716.20;U	711.10;U	706.38;U	688.43;-	687.41;-	686.59;-	686.21;-	671.10;-
1.235	726.33;U	719.30;U	714.19;U	709.47;U	691.61;-	690.59;-	689.78;-	689.40;-	671.94;-
1.565	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	671.95;-	690.89;-	671.94;-

0 60.00000 .12500 .12500 60.00000

***** LOWER INLET PLENUM *****

T6INLT	T6LPN	T6LMT	P6BCOR
6.5513E+02	6.5390E+02	6.5403E+02	1.9676E+05

***** UPPER OUTLET PLENUM *****

P6OUTL	Z6NALV	Z6JET	T6AVER	T6OUTL	P6CGAS
1.3780E+05	6.4097E+00	3.7586E+00	7.5387E+02	7.8869E+02	9.7688E+04
T6NAA	T6NAB	T6CGAS	T6M1	T6M2	T6M3
7.9293E+02	7.8869E+02	7.9615E+02	8.0019E+02	7.6973E+02	7.9990E+02

***** BYPASS CHANNEL *****

W6BPAS	T6LPN	T6BPAS	T6BPM	F6FLBP	F6REBP(1)	F6REBP(2)
1.4183E+00	6.5390E+02	6.5451E+02	7.6770E+02	7.9031E-03	6.4382E+02	1.7561E+02

---- CORE ----

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
1	8.57316E-01	4.77708E-03	2.91029E+04

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53901E+02	1.22536E+03	1.84792E+05	8.63436E+05	4.77518E-02	1.69280E+05
2	3.56000E-01	6.60383E+02	1.22325E+03	1.81668E+05	8.71747E+05	4.74780E-02	1.67877E+05
3	4.47400E-01	6.78430E+02	1.22271E+03	1.80869E+05	8.94842E+05	4.70733E-02	1.65724E+05
4	5.38800E-01	6.98294E+02	1.22217E+03	1.80073E+05	9.20185E+05	4.66558E-02	1.63401E+05
5	6.30200E-01	7.19733E+02	1.22163E+03	1.79283E+05	9.47454E+05	4.62463E-02	1.61015E+05
6	7.21600E-01	7.41150E+02	1.22108E+03	1.78496E+05	9.74619E+05	4.58700E-02	1.58724E+05
7	8.13000E-01	7.61313E+02	1.22055E+03	1.77715E+05	1.00013E+06	4.55373E-02	1.56616E+05
8	9.04400E-01	7.79786E+02	1.22001E+03	1.76937E+05	1.02346E+06	4.52580E-02	1.54785E+05
9	9.95800E-01	7.95204E+02	1.21947E+03	1.76164E+05	1.04290E+06	4.50434E-02	1.53337E+05
10	1.08720E+00	8.06777E+02	1.21893E+03	1.75393E+05	1.05748E+06	4.48970E-02	1.52329E+05
11	1.17860E+00	8.14108E+02	1.21840E+03	1.74624E+05	1.06670E+06	4.48195E-02	1.51788E+05
12	1.27000E+00	8.16947E+02	1.21786E+03	1.73857E+05	1.07028E+06	4.50818E-02	1.53599E+05
13	1.62600E+00	7.80115E+02	1.21573E+03	1.70854E+05	1.02387E+06	4.54045E-02	1.55752E+05
14	2.84500E+00	7.77034E+02	1.20817E+03	1.60512E+05	1.01999E+06	4.54045E-02	1.55752E+05

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
2	1.41267E+02	7.87158E-01	2.25410E+03

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53901E+02	1.22528E+03	1.84666E+05	8.63436E+05	5.17736E-02	1.69333E+05
2	3.56000E-01	6.59456E+02	1.22319E+03	1.81570E+05	8.70559E+05	5.08996E-02	1.68134E+05
3	4.47400E-01	6.74847E+02	1.22265E+03	1.80778E+05	8.90263E+05	4.95834E-02	1.66327E+05
4	5.38800E-01	6.91218E+02	1.22211E+03	1.79990E+05	9.11167E+05	4.89444E-02	1.64419E+05
5	6.30200E-01	7.08653E+02	1.22157E+03	1.79205E+05	9.33372E+05	4.85860E-02	1.62468E+05
6	7.21600E-01	7.26067E+02	1.22104E+03	1.78424E+05	9.55496E+05	4.82546E-02	1.60597E+05
7	8.13000E-01	7.42369E+02	1.22050E+03	1.77647E+05	9.76163E+05	4.79603E-02	1.58878E+05
8	9.04400E-01	7.57273E+02	1.21996E+03	1.76874E+05	9.95024E+05	4.77134E-02	1.57394E+05
9	9.95800E-01	7.69525E+02	1.21943E+03	1.76103E+05	1.01051E+06	4.75272E-02	1.56248E+05
10	1.08720E+00	7.78357E+02	1.21889E+03	1.75334E+05	1.02166E+06	4.74034E-02	1.55473E+05
11	1.17860E+00	7.83846E+02	1.21836E+03	1.74567E+05	1.02858E+06	4.73410E-02	1.55079E+05
12	1.27000E+00	7.85667E+02	1.21782E+03	1.73801E+05	1.03088E+06	4.75963E-02	1.56676E+05
13	1.62600E+00	7.54308E+02	1.21570E+03	1.70806E+05	9.91275E+05	4.78978E-02	1.58506E+05
14	2.84500E+00	7.52169E+02	1.20816E+03	1.60498E+05	9.88568E+05	4.78978E-02	1.58506E+05

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
3	2.49999E+01	1.39303E-01	9.09519E+02

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53901E+02	1.22434E+03	1.83277E+05	8.63436E+05	1.12380E-01	7.74516E+04
2	1.35467E-01	6.56331E+02	1.22356E+03	1.82123E+05	8.66553E+05	1.11610E-01	7.72644E+04
3	2.70933E-01	6.61040E+02	1.22278E+03	1.80970E+05	8.72589E+05	1.10196E-01	7.69138E+04
4	4.06400E-01	6.69736E+02	1.22199E+03	1.79819E+05	8.83726E+05	1.07700E-01	7.62721E+04
5	5.41867E-01	6.85684E+02	1.22121E+03	1.78673E+05	9.04106E+05	1.04259E-01	7.53364E+04
6	6.77333E-01	7.05931E+02	1.22042E+03	1.77532E+05	9.29909E+05	1.00628E-01	7.42789E+04
7	8.12800E-01	7.26975E+02	1.21963E+03	1.76398E+05	9.56648E+05	9.72181E-02	7.32124E+04

8	9.48267E-01	7.48000E+02	1.21885E+03	1.75271E+05	9.83293E+05	9.42449E-02	7.22187E+04
9	1.08373E+00	7.66572E+02	1.21806E+03	1.74151E+05	1.00678E+06	9.20338E-02	7.14374E+04
10	1.21920E+00	7.79406E+02	1.21728E+03	1.73036E+05	1.02298E+06	9.06992E-02	7.09472E+04
11	1.35467E+00	7.86404E+02	1.21649E+03	1.71924E+05	1.03181E+06	9.00917E-02	7.07192E+04
12	1.49013E+00	7.88661E+02	1.21570E+03	1.70814E+05	1.03465E+06	8.98897E-02	7.06426E+04
13	1.62560E+00	7.89513E+02	1.21491E+03	1.69704E+05	1.03573E+06	8.98560E-02	7.06298E+04
14	2.66700E+00	7.89185E+02	1.20866E+03	1.61173E+05	1.03531E+06	8.98560E-02	7.06298E+04

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
4	1.04292E+01	5.81127E-02	4.57093E+03

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53901E+02	1.22291E+03	1.81162E+05	8.63436E+05	4.14467E-02	5.23223E+04
2	3.61900E-01	6.53922E+02	1.22069E+03	1.77922E+05	8.63463E+05	4.13626E-02	5.22570E+04
3	4.45027E-01	6.57591E+02	1.22017E+03	1.77178E+05	8.68169E+05	4.11965E-02	5.21279E+04
4	5.28155E-01	6.61215E+02	1.21966E+03	1.76435E+05	8.72814E+05	4.10329E-02	5.20008E+04
5	6.11282E-01	6.64785E+02	1.21914E+03	1.75692E+05	8.77387E+05	4.08737E-02	5.18771E+04
6	6.94409E-01	6.68233E+02	1.21862E+03	1.74951E+05	8.81802E+05	4.07199E-02	5.17576E+04
7	7.77536E-01	6.71572E+02	1.21810E+03	1.74210E+05	8.86075E+05	4.05700E-02	5.16411E+04
8	8.60664E-01	6.74865E+02	1.21758E+03	1.73470E+05	8.90286E+05	4.04594E-02	5.15258E+04
9	9.43791E-01	6.78141E+02	1.21706E+03	1.72731E+05	8.94473E+05	4.03990E-02	5.14114E+04
10	1.02692E+00	6.81393E+02	1.21654E+03	1.71993E+05	8.98628E+05	4.03396E-02	5.12981E+04
11	1.11005E+00	6.84615E+02	1.21602E+03	1.71255E+05	9.02742E+05	4.02813E-02	5.11860E+04
12	1.19317E+00	6.87811E+02	1.21549E+03	1.70518E+05	9.06821E+05	4.02239E-02	5.10748E+04
13	1.27630E+00	6.90989E+02	1.21496E+03	1.69781E+05	9.10874E+05	4.01974E-02	5.10233E+04
14	1.85280E+00	6.90783E+02	1.21126E+03	1.64675E+05	9.10612E+05	4.01974E-02	5.10233E+04

-COOLANT HYDRAULIC RESULTS-PRIMARY LOOP

NO PIPE BREAK

TIME = 60.00 (S)

PRESSURES (N/(M*M))

		LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE INTO LOOP	=	.1378E+06		
PRESSURE AT VESSEL INLET	=	.2035E+06		
PUMP INLET PRESSURE	=	.1376E+06		
PUMP OUTLET PRESSURE	=	.1372E+06		
PUMP PRESSURE RISE	=	-.4086E+03		
COVER GAS PRESSURE	=	.1035E+06		

	FLOW RATE (KG/S)			PRESSURE LOSS (N/(M*M))		
	LOOP NO 1	LOOP NO 2	LOOP NO 3	LOOP NO 1	LOOP NO 2	LOOP NO 3
PIPE 1	.532E+02			.647E+02		
PIPE 2	.597E+02			.146E+05		
PIPE 3	.597E+02			-.586E+05		
PIPE 4	.597E+02			.895E+05		
PIPE 5	.597E+02			-.111E+06		

TOTAL CORE FLOW RATE = .1790E+03 (KG/S)

CHECK VALVE

		LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE LOSS (N/(M*M))	=	.8045E+02		

PUMP AND PUMP TANK PARAMETERS

		LOOP NO 1	LOOP NO 2	LOOP NO 3
ROTATIONAL SPEED (RPM)	=	.1012E+02		
HEAD (M)	=	-.5040E-01		
HYDRAULIC TORQUE (N*M)	=	-.3090E+01		
FRICTIONAL TORQUE (N*M)	=	.9592E+03		
ENTHALPY RISE (J/KG)	=	.1699E+02		
COOLANT LEVEL IN TANK (M)	=	.4214E+01		

WCORE= .3426017E-01

W1,W2 = .3052384E-01 .3426017E-01

OMEGA = .9072373E-02

H/ALPHA2,NU/ALPHA -.5462938E+07 .4190652E+04
H/ANU2,ALPHA/NU -.3110736E+00 .2386264E-03

-COOLANT HYDRAULIC RESULTS- INTERMEDIATE LOOP

NO PIPE BREAK

TIME = 60.00 (S)

PRESSURES (N/(M*M))

	LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE AT SURGE TANK =	.8701E+06		
PUMP INLET PRESSURE =	.8701E+06		
PUMP OUTLET PRESSURE =	.8698E+06		
PUMP PRESSURE RISE =	-.3765E+03		
COVER GAS PRESSURE =	.8360E+06		

		FLOW RATE (KG/S)			PRESSURE LOSS (N/(M*M))		
		LOOP NO 1	LOOP NO 2	LOOP NO 3	LOOP NO 1	LOOP NO 2	LOOP NO 3
PIPE	1	.1281E+03			.2907E+05		
PIPE	2	.6404E+02			.1021E+06		
PIPE	3	.6404E+02			.2311E+03		
PIPE	4	.1281E+03			.1304E+06		
PIPE	5	.1281E+03			*********		
SH		.1281E+03			*********		
EV		.6404E+02			*********		

PUMP AND PUMP TANK PARAMETERS

	LOOP NO 1	LOOP NO 2	LOOP NO 3
ROTATIONAL SPEED (RPM) =	.4432E+02		
HEAD (M) =	-.4398E-01		
HYDRAULIC TORQUE (N*M) =	.9179E+01		
FRICTIONAL TORQUE (N*M) =	.3477E+03		
ENTHALPY RISE (J/KG) =	.1293E+02		
COOLANT LEVEL IN TANK (M)=	.3986E+01		
SURGE TANK LEVEL (M) =	.3986E+01		

MASTER CLOCK TIME = 120.00000

VARIABLES INTEGRATED BY LOOP HYDRAULICS PACKAGE

Y1	4.79502E+01	5.24864E+01	9.11441E-01	3.47103E+03	0.	0.
	6.40737E+00	7.87145E+02	7.87136E+02	7.93971E+02	7.99617E+02	7.74942E+02
	7.99899E+02	5.73755E+00	5.42632E+01	5.42632E+01	9.38879E-01	3.47658E+03
	3.47658E+03	0.				
Y1DYDT	3.21830E+00	-6.56658E-01	0.	-1.47952E+00	0.	0.
	1.37913E-04	7.42441E-02	7.42441E-02	-1.77082E-01	-1.11253E-02	6.50192E-02
	-1.64055E-05	0.	-1.90160E-01	-1.90160E-01	0.	0.
	0.	0.				

VARIABLE 2 IS CURRENTLY RESTRICTING THE HYDRAULIC TIMESTEP.

TIMESTEP INFORMATION

L1WSTP= 605	L1STEP= 606	L3STEP= 813	L5STEP= 2490	L6STEP= 3987
S1DELW= 2.5000E-01	S1DELT= 2.5000E-01	S3DELT= 2.5000E-01	S5DELT= 2.5000E-01	S6DELT= 2.5000E-01
S1DELA= 2.5000E-01	S5DELA= 2.5000E-01	S6DELA= 2.5000E-01		

THERMAL RESULTS LOOP NO 1

TIME= -R REAL TIME = 120.00

FLOW RATES (KG/S)

W1PIPE=	47.95	52.49	52.49	52.49	52.49
W2PIPE=	54.26	27.13	27.13	54.26	54.26

TEMPERATURES (K)

PRIMARY LOOP

T1INLT= 787.136

PIPE =	1	787.136	787.590	788.455	789.456	790.500	791.530	792.511	793.416	794.229	794.936
PIPE =	1	795.532	796.019	796.411	796.728	796.999	797.254	797.519	797.808	798.125	
PIPE =	2	798.125	798.439	798.766	799.089	799.396	799.676	799.923	800.136		
PIPE =	4	626.126	627.401	629.008	630.825	632.735	634.661				
PIPE =	5	634.661	635.476	636.286	637.087	637.879	638.660	639.429	640.187	640.932	641.665
PIPE =	5	642.386	643.093	643.786	644.464	645.127	645.773				

T1OUTL= 645.773

IHX PRIMARY

T1INHX= 800.136

T1OUHX= 626.126

T1BYP = 801.184

ACTIVE H.T. REGION

800.739	755.129	747.149	739.797	730.665	722.824	714.499	706.329	698.047	689.741
681.393	673.037	664.712	656.481	648.442	640.746	633.630	627.473	622.822	619.935

INTERMEDIATE LOOP

T2OUEV= 531.887

PIPE =	2	695.175	679.136	686.748						
PIPE =	3	531.887	556.702	574.078						
PIPE =	4	574.078	579.369	584.021	588.192	591.982	595.441	598.598		
PIPE =	5	598.598	602.204	605.362	608.092	610.417	612.365	613.970	615.272	616.308	617.120
PIPE =	5	617.746	618.224	618.585	618.858	619.063	619.220	619.339	619.431	619.502	
PIPE =	1	785.286	783.992	783.310	782.798	782.270	781.691	781.080	780.470	779.884	779.343
PIPE =	1	778.860	778.441	778.089	777.802	777.577	777.404	777.277	777.186	777.123	777.081
PIPE =	1	777.053	777.036	777.026	777.020	777.016	777.014	777.013	777.012	777.012	777.012
PIPE =	1	777.012									

T2INSH= 777.012

IHX SECONDARY SIDE

T2INHX= 619.502

T2OUHX= 785.286

ACTIVE H.T. REGION

791.549	753.587	746.462	738.385	729.642	721.668	713.387	705.197	696.913	688.600
680.248	671.894	663.577	655.365	647.363	639.729	632.718	626.734	622.343	619.661

STEAM GENERATORS

TIME= 120.00000

HEAT EXCHANGER FLOW SEGMENTS SODIUM FLOW = 54.263 IN LOOP 1

1	1213774.44875	55.51450				
2	1170861.05556	56.57883				
3	1136919.35557	57.39324				
4	1110336.09911	58.01443				
5	1092480.99766	58.42339				
6	1092480.99766	58.42339				
7	1087306.19255	58.54066				
8	1082968.45597	58.63854				
9	1082351.69624	58.65247				
10	1085725.69230	58.57648				
11	1095912.32646	58.34543				
12	1102125.08653	58.20340	531.88672			
13	1140150.93172	58.07279	540.75112	534.45204	27779.66159	10
14	1183822.04595	57.91006	550.00930	543.25377	31701.35706	10
15	1227371.71787	57.72507	557.57846	551.75414	31091.00830	10
16	1277344.89952	57.54588	570.97684	561.63622	37049.67235	10
17	1264427.63237	57.39536	540.24804	557.44082	-15410.68824	10
18	1458741.78411	57.14658	686.76024	599.14079	162788.17012	10
19	1461958.98291	56.07526				
20	1486294.44708	49.08499				

21	1534127.21327	39.41825				
22	1598218.07556	31.18855				
23	2090000.41801	0.00000				
24	2718772.66667	3.44537				
25	2718734.77554	3.44570				
26	2718665.50172	3.44605				
27	2718546.59518	3.44652				
28	2718379.05875	3.44711				
29	2718175.85910	3.44778				
30	2718026.85491	3.44827				
31	2717955.03223	3.44851	695.17497			
32	3280324.05592	3.47222	747.65778	717.21484	35382.37977	60
33	3335869.20442	3.47590	766.36378	756.12597	3519.34926	60
34	3369040.32570	3.47733	774.57329	770.05353	2096.63132	60
35	3380759.60467	3.47764	777.01187	775.66999	734.53494	60
36	3380563.16291	3.47815				
37	3380258.93840	3.47895				
38	3379194.19474	3.48166				
39	3377845.19541	3.48505				
40	3376347.97124	3.48881				

TURBINE FLOW SEGMENT

1	3327525.92645	0.00000
2	3364933.53509	10.55013
3	3359532.58453	10.59019

FLOW SEGMEST VARIABLES

1	56.43664	15.67389
2	3.45930	
3	10.57016	

VOLUMES

1	10097179.50475	2421170.76372
2	10100270.59632	3364933.53509

MAXIMUN CHANGES IN STATE VARIABLES DURING THIS STEP WERE, PRESSURE .0000020 ENTHALPY .0008304 FLOW RATE .0001582

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 1

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0060

HGT (M)	RADIAL NODE NUMBER (TYPE)								
	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
	TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)								
.178	660.60;U	659.96;U	659.46;U	658.98;U	656.95;-	656.89;-	656.84;-	656.82;-	657.69;-
.402	700.03;R	693.76;U	688.55;U	683.52;U	670.54;-	669.98;-	669.48;-	669.21;-	667.02;-
.493	734.03;R	725.09;U	718.31;U	711.80;U	690.64;-	689.96;-	689.35;-	689.01;-	682.10;-
.585	767.10;R	756.28;R	747.80;U	739.71;U	715.75;-	714.94;-	714.23;-	713.83;-	700.30;-
.676	801.39;R	789.08;R	779.45;U	770.28;U	745.15;-	744.28;-	743.51;-	743.08;-	720.92;-
.767	835.68;R	822.50;R	812.19;U	802.37;U	777.15;-	776.28;-	775.50;-	775.06;-	742.68;-
.859	869.03;R	855.42;R	844.76;U	834.60;U	809.91;-	809.06;-	808.29;-	807.85;-	764.77;-
.950	896.50;R	883.57;R	873.41;U	863.73;U	840.82;-	840.04;-	839.35;-	838.92;-	786.17;-
1.042	917.04;R	905.50;R	896.42;U	887.73;U	867.35;-	866.69;-	866.10;-	865.68;-	805.78;-
1.133	928.85;R	919.39;R	911.90;U	904.71;U	887.66;-	887.13;-	886.66;-	886.27;-	822.84;-
1.224	931.15;R	924.17;U	918.73;U	913.45;U	900.52;-	900.13;-	899.80;-	899.47;-	836.71;-
1.448	878.43;U	879.35;U	880.03;U	880.65;U	882.38;-	882.43;-	882.49;-	882.38;-	843.82;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	844.99;-	854.02;-	844.99;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 2

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .8830

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.178	659.34;U	658.88;U	658.51;U	658.16;U	656.66;-	656.62;-	656.59;-	656.57;-	657.34;-
.402	695.03;U	690.14;U	686.33;U	682.65;U	668.96;-	668.55;-	668.18;-	667.99;-	665.38;-
.493	719.54;R	713.23;U	708.36;U	703.67;U	687.35;-	686.85;-	686.40;-	686.16;-	678.39;-
.585	748.66;R	740.84;U	734.82;U	729.03;U	710.35;-	709.76;-	709.23;-	708.95;-	694.07;-
.676	779.27;R	770.26;U	763.43;U	756.87;U	737.14;-	736.51;-	735.94;-	735.64;-	711.83;-
.767	808.87;R	799.62;R	792.35;U	785.40;U	765.64;-	765.00;-	764.43;-	764.11;-	730.58;-
.859	836.36;R	826.99;R	819.61;U	812.54;U	793.37;-	792.76;-	792.21;-	791.87;-	749.60;-
.950	857.47;R	848.75;R	841.87;U	835.26;U	817.76;-	817.21;-	816.73;-	816.38;-	768.03;-
1.042	871.47;R	863.78;U	857.81;U	852.04;U	836.82;-	836.35;-	835.94;-	835.60;-	784.92;-
1.133	878.06;R	871.83;U	866.97;U	862.27;U	849.73;-	849.36;-	849.04;-	848.72;-	799.61;-
1.224	877.13;U	872.67;U	869.15;U	865.71;U	856.34;-	856.07;-	855.85;-	855.57;-	811.56;-
1.448	828.82;U	829.61;U	830.19;U	830.73;U	832.36;-	832.41;-	832.47;-	832.36;-	817.68;-
2.236	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	818.74;-	801.23;-	818.69;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 3

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .1040

HGT (M)	RADIAL NODE NUMBER (TYPE)								
	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
	TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)								
.068	656.20;U	655.80;U	655.47;U	655.16;U	654.66;-	654.64;-	654.63;-	654.61;-	655.73;-
.203	663.27;U	662.28;U	661.50;U	660.74;U	659.54;-	659.50;-	659.47;-	659.43;-	657.93;-
.339	676.04;U	674.12;U	672.62;U	671.16;U	668.93;-	668.86;-	668.80;-	668.72;-	662.71;-
.474	698.52;U	694.92;U	692.13;U	689.42;U	685.51;-	685.39;-	685.27;-	685.12;-	671.83;-
.610	726.43;U	721.56;U	717.79;U	714.15;U	709.21;-	709.06;-	708.91;-	708.71;-	685.77;-
.745	753.15;U	747.92;U	743.90;U	740.03;U	735.01;-	734.86;-	734.71;-	734.49;-	702.48;-
.881	776.28;U	771.12;U	767.19;U	763.41;U	758.68;-	758.53;-	758.40;-	758.17;-	719.92;-
1.016	793.66;U	789.10;U	785.65;U	782.35;U	778.28;-	778.15;-	778.04;-	777.84;-	736.48;-
1.151	802.30;U	799.12;U	796.74;U	794.47;U	791.65;-	791.56;-	791.49;-	791.34;-	750.07;-
1.287	802.92;U	801.26;U	800.06;U	798.93;U	797.49;-	797.45;-	797.42;-	797.33;-	759.30;-
1.422	798.30;U	797.84;U	797.56;U	797.33;U	797.02;-	797.01;-	797.01;-	796.97;-	764.24;-
1.558	794.14;U	794.05;U	794.03;U	794.03;U	794.04;-	794.04;-	794.04;-	794.03;-	766.33;-
2.146	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	766.99;-	791.85;-	766.98;-

RADIAL TEMPERATURE DISTRIBUTION DATA FOR EACH AXIAL SLICE IN REACTOR CHANNEL 4

TOTAL FRACTIONAL POWER IN THIS CHANNEL = .0070

RADIAL NODE NUMBER (TYPE)

TEMPERATURE (K) ; FUEL STATE (R=RESTRUCTURED, U=UNRESTRUCTURED)

HGT (M)	1 (FU)	2 (FU)	3 (FU)	4 (FU)	6 (CL)	7 (CL)	8 (CL)	9 (CO)	10 (ST)
.181	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	655.13;-	653.13;-	655.13;-
.403	674.09;U	670.80;U	668.25;U	665.80;U	655.70;-	655.12;-	654.64;-	654.44;-	655.97;-
.487	677.09;U	673.73;U	671.14;U	668.63;U	658.37;-	657.78;-	657.29;-	657.08;-	657.65;-
.570	680.21;U	676.79;U	674.14;U	671.58;U	661.15;-	660.55;-	660.05;-	659.84;-	659.33;-
.653	683.45;U	679.96;U	677.25;U	674.65;U	664.04;-	663.43;-	662.91;-	662.70;-	661.01;-
.736	686.80;U	683.24;U	680.48;U	677.82;U	667.04;-	666.41;-	665.89;-	665.67;-	662.69;-
.819	690.23;U	686.61;U	683.80;U	681.09;U	670.16;-	669.52;-	668.99;-	668.77;-	664.37;-
.902	693.73;U	690.06;U	687.21;U	684.45;U	673.40;-	672.75;-	672.20;-	671.98;-	666.05;-
.985	697.27;U	693.57;U	690.68;U	687.89;U	676.74;-	676.08;-	675.53;-	675.30;-	667.74;-
1.068	700.83;U	697.10;U	694.19;U	691.37;U	680.17;-	679.51;-	678.95;-	678.72;-	669.42;-
1.152	704.38;U	700.64;U	697.72;U	694.88;U	683.66;-	683.01;-	682.44;-	682.21;-	671.10;-
1.235	707.90;U	704.16;U	701.23;U	698.39;U	687.20;-	686.55;-	685.98;-	685.75;-	671.94;-
1.565	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	0.00;-	671.95;-	687.79;-	671.94;-

0 120.00000 .12500 .25000 120.00000

***** LOWER INLET PLENUM *****

T6INLT	T6LPN	T6LMT	P6BCOR
6.5513E+02	6.5312E+02	6.5321E+02	1.9538E+05

***** UPPER OUTLET PLENUM *****

P6OUTL	Z6NALV	Z6JET	T6AVER	T6OUTL	P6CGAS
1.3694E+05	6.4074E+00	6.4074E+00	7.8958E+02	7.8714E+02	9.6797E+04

T6NAA	T6NAB	T6CGAS	T6M1	T6M2	T6M3
7.8714E+02	7.8714E+02	7.9397E+02	7.9962E+02	7.7494E+02	7.9990E+02

***** BYPASS CHANNEL *****

W6BPAS	T6LPN	T6BPAS	T6BPM	F6FLBP	F6REBP(1)	F6REBP(2)
-2.5403E-01	6.5312E+02	6.5711E+02	7.7409E+02	1.6075E-03	9.6165E+01	2.6350E+01

---- CORE ----

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
1	8.13243E-01	5.14636E-03	2.75732E+04

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53122E+02	1.22449E+03	1.83494E+05	8.62436E+05	4.84214E-02	1.69317E+05
2	3.56000E-01	6.60517E+02	1.22238E+03	1.80381E+05	8.71919E+05	4.81407E-02	1.67899E+05
3	4.47400E-01	6.77907E+02	1.22183E+03	1.79584E+05	8.94174E+05	4.77122E-02	1.65649E+05
4	5.38800E-01	7.00118E+02	1.22129E+03	1.78791E+05	9.22509E+05	4.72071E-02	1.62860E+05
5	6.30200E-01	7.27539E+02	1.22075E+03	1.78004E+05	9.57363E+05	4.66527E-02	1.59616E+05
6	7.21600E-01	7.58631E+02	1.22021E+03	1.77223E+05	9.96741E+05	4.60917E-02	1.56124E+05
7	8.13000E-01	7.91494E+02	1.21967E+03	1.76449E+05	1.03822E+06	4.55595E-02	1.52602E+05
8	9.04400E-01	8.24196E+02	1.21913E+03	1.75682E+05	1.07940E+06	4.50905E-02	1.49318E+05
9	9.95800E-01	8.53638E+02	1.21860E+03	1.74922E+05	1.11640E+06	4.47113E-02	1.46533E+05
10	1.08720E+00	8.77722E+02	1.21807E+03	1.74168E+05	1.14664E+06	4.44337E-02	1.44416E+05
11	1.17860E+00	8.94826E+02	1.21755E+03	1.73418E+05	1.16810E+06	4.42619E-02	1.43073E+05
12	1.27000E+00	9.04108E+02	1.21702E+03	1.72672E+05	1.17975E+06	4.44855E-02	1.44817E+05
13	1.62600E+00	8.60642E+02	1.21494E+03	1.69750E+05	1.12519E+06	4.48783E-02	1.47774E+05
14	2.84500E+00	8.47398E+02	1.20753E+03	1.59661E+05	1.10856E+06	4.48783E-02	1.47774E+05

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
2	1.28294E+02	8.11871E-01	2.21151E+03

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53122E+02	1.22446E+03	1.83447E+05	8.62436E+05	5.58979E-02	1.69346E+05
2	3.56000E-01	6.60014E+02	1.22236E+03	1.80362E+05	8.71275E+05	5.50354E-02	1.68039E+05
3	4.47400E-01	6.75956E+02	1.22182E+03	1.79572E+05	8.91681E+05	5.36727E-02	1.65972E+05
4	5.38800E-01	6.96369E+02	1.22128E+03	1.78787E+05	9.17733E+05	5.19835E-02	1.63407E+05
5	6.30200E-01	7.21521E+02	1.22075E+03	1.78007E+05	9.49725E+05	5.00308E-02	1.60438E+05
6	7.21600E-01	7.49751E+02	1.22021E+03	1.77233E+05	9.85509E+05	4.88891E-02	1.57314E+05
7	8.13000E-01	7.78460E+02	1.21968E+03	1.76466E+05	1.02179E+06	4.83977E-02	1.54312E+05
8	9.04400E-01	8.05271E+02	1.21915E+03	1.75704E+05	1.05558E+06	4.79895E-02	1.51696E+05
9	9.95800E-01	8.27482E+02	1.21862E+03	1.74948E+05	1.08353E+06	4.76847E-02	1.49667E+05
10	1.08720E+00	8.43722E+02	1.21810E+03	1.74197E+05	1.10394E+06	4.74840E-02	1.48295E+05
11	1.17860E+00	8.53722E+02	1.21757E+03	1.73448E+05	1.11650E+06	4.73815E-02	1.47582E+05
12	1.27000E+00	8.57418E+02	1.21704E+03	1.72701E+05	1.12114E+06	4.77353E-02	1.50008E+05
13	1.62600E+00	8.07312E+02	1.21496E+03	1.69771E+05	1.05815E+06	4.82428E-02	1.53333E+05
14	2.84500E+00	7.95147E+02	1.20752E+03	1.59647E+05	1.04283E+06	4.82428E-02	1.53333E+05

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
3	2.08346E+01	1.31845E-01	7.80715E+02

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53122E+02	1.22372E+03	1.82354E+05	8.62436E+05	1.35388E-01	7.74781E+04
2	1.35467E-01	6.56101E+02	1.22294E+03	1.81201E+05	8.66257E+05	1.34138E-01	7.72253E+04
3	2.70933E-01	6.62758E+02	1.22215E+03	1.80050E+05	8.74790E+05	1.31799E-01	7.67399E+04
4	4.06400E-01	6.74674E+02	1.22136E+03	1.78902E+05	8.90041E+05	1.27887E-01	7.58875E+04
5	5.41867E-01	6.95572E+02	1.22058E+03	1.77759E+05	9.16717E+05	1.22708E-01	7.46739E+04
6	6.77333E-01	7.21844E+02	1.21979E+03	1.76624E+05	9.50135E+05	1.17572E-01	7.33636E+04
7	8.12800E-01	7.47128E+02	1.21901E+03	1.75498E+05	9.82189E+05	1.13274E-01	7.21742E+04

8	9.48267E-01	7.69219E+02	1.21822E+03	1.74379E+05	1.01012E+06	1.09975E-01	7.11974E+04
9	1.08373E+00	7.86458E+02	1.21744E+03	1.73267E+05	1.03188E+06	1.07838E-01	7.05321E+04
10	1.21920E+00	7.96228E+02	1.21666E+03	1.72160E+05	1.04419E+06	1.06921E-01	7.02385E+04
11	1.35467E+00	7.98439E+02	1.21587E+03	1.71054E+05	1.04698E+06	1.06976E-01	7.02560E+04
12	1.49013E+00	7.95510E+02	1.21508E+03	1.69948E+05	1.04329E+06	1.07424E-01	7.04001E+04
13	1.62560E+00	7.92553E+02	1.21429E+03	1.68841E+05	1.03956E+06	1.07760E-01	7.05072E+04
14	2.66700E+00	7.91156E+02	1.20803E+03	1.60327E+05	1.03780E+06	1.07760E-01	7.05072E+04

CHANNEL NO.	MASS FLOWRATE	FRACTION OF FLOW	REYNOLDS NUMBER
4	7.77138E+00	4.91788E-02	3.39264E+03

AXIAL NODE	HEIGHT	T	TSAT	P	ENTHALPY	FRICTION COEFFICIENT	HEAT TRANS. COEFFICIENT
1	0.	6.53122E+02	1.22206E+03	1.79915E+05	8.62436E+05	4.75261E-02	5.23498E+04
2	3.61900E-01	6.53147E+02	1.21987E+03	1.76741E+05	8.62468E+05	4.74818E-02	5.23035E+04
3	4.45027E-01	6.55737E+02	1.21936E+03	1.76012E+05	8.65790E+05	4.73924E-02	5.22100E+04
4	5.28155E-01	6.58429E+02	1.21886E+03	1.75283E+05	8.69243E+05	4.72991E-02	5.21125E+04
5	6.11282E-01	6.61245E+02	1.21835E+03	1.74556E+05	8.72853E+05	4.72023E-02	5.20112E+04
6	6.94409E-01	6.64160E+02	1.21784E+03	1.73828E+05	8.76587E+05	4.71021E-02	5.19063E+04
7	7.77536E-01	6.67188E+02	1.21732E+03	1.73102E+05	8.80465E+05	4.69979E-02	5.17973E+04
8	8.60664E-01	6.70345E+02	1.21681E+03	1.72376E+05	8.84505E+05	4.68899E-02	5.16842E+04
9	9.43791E-01	6.73615E+02	1.21630E+03	1.71650E+05	8.88688E+05	4.67784E-02	5.15675E+04
10	1.02692E+00	6.76987E+02	1.21578E+03	1.70926E+05	8.92999E+05	4.66639E-02	5.14477E+04
11	1.11005E+00	6.80449E+02	1.21526E+03	1.70202E+05	8.97422E+05	4.65472E-02	5.13254E+04
12	1.19317E+00	6.83972E+02	1.21475E+03	1.69479E+05	9.01921E+05	4.64290E-02	5.12017E+04
13	1.27630E+00	6.87527E+02	1.21423E+03	1.68756E+05	9.06458E+05	4.63603E-02	5.11297E+04
14	1.85280E+00	6.88053E+02	1.21058E+03	1.63749E+05	9.07129E+05	4.63603E-02	5.11297E+04

-COOLANT HYDRAULIC RESULTS-PRIMARY LOOP

NO PIPE BREAK

TIME = 120.00 (S)

PRESSURES (N/(M*M))

	LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE INTO LOOP =	.1369E+06		
PRESSURE AT VESSEL INLET =	.2022E+06		
PUMP INLET PRESSURE =	.1367E+06		
PUMP OUTLET PRESSURE =	.1361E+06		
PUMP PRESSURE RISE =	-.5672E+03		
COVER GAS PRESSURE =	.1026E+06		

	FLOW RATE (KG/S)			PRESSURE LOSS (N/(M*M))		
	LOOP NO 1	LOOP NO 2	LOOP NO 3	LOOP NO 1	LOOP NO 2	LOOP NO 3
PIPE 1	.480E+02			.842E+02		
PIPE 2	.525E+02			.146E+05		
PIPE 3	.525E+02			-.587E+05		
PIPE 4	.525E+02			.895E+05		
PIPE 5	.525E+02			-.111E+06		

TOTAL CORE FLOW RATE = .1575E+03 (KG/S)

CHECK VALVE

	LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE LOSS (N/(M*M)) =	.6221E+02		

PUMP AND PUMP TANK PARAMETERS

	LOOP NO 1	LOOP NO 2	LOOP NO 3
ROTATIONAL SPEED (RPM) =	.9114E+00		
HEAD (M) =	-.6994E-01		
HYDRAULIC TORQUE (N*M) =	-.8622E+01		
FRICTIONAL TORQUE (N*M) =	.3248E+03		
ENTHALPY RISE (J/KG) =	.5750E+00		
COOLANT LEVEL IN TANK (M)=	.4201E+01		

WCORE= .3014209E-01

W1,W2 = .2753702E-01 .3014209E-01

OMEGA = .8167038E-03

H/ALPHA2,NU/ALPHA	-.9355391E+09	.4094622E+05
H/ANU2,ALPHA/NU	-.5580000E+00	.2442228E-04

-COOLANT HYDRAULIC RESULTS- INTERMEDIATE LOOP

NO PIPE BREAK

TIME = 120.00 (S)

PRESSURES (N/(M*M))

	LOOP NO 1	LOOP NO 2	LOOP NO 3
PRESSURE AT SURGE TANK =	.8572E+06		
PUMP INLET PRESSURE =	.8572E+06		
PUMP OUTLET PRESSURE =	.8565E+06		
PUMP PRESSURE RISE =	-.7143E+03		
COVER GAS PRESSURE =	.8231E+06		

		FLOW RATE (KG/S)			PRESSURE LOSS (N/(M*M))		
		LOOP NO 1	LOOP NO 2	LOOP NO 3	LOOP NO 1	LOOP NO 2	LOOP NO 3
PIPE	1	.5426E+02			.2824E+05		
PIPE	2	.2713E+02			.1018E+06		
PIPE	3	.2713E+02			.4323E+02		
PIPE	4	.5426E+02			.1304E+06		
PIPE	5	.5426E+02			*********		
SH		.5426E+02			*********		
EV		.2713E+02			*********		

PUMP AND PUMP TANK PARAMETERS

	LOOP NO 1	LOOP NO 2	LOOP NO 3
ROTATIONAL SPEED (RPM) =	.9389E+00		
HEAD (M) =	-.8328E-01		
HYDRAULIC TORQUE (N*M) =	-.6820E-02		
FRICTIONAL TORQUE (N*M) =	.3346E+03		
ENTHALPY RISE (J/KG) =	.6062E+00		
COOLANT LEVEL IN TANK (M)=	.3978E+01		
SURGE TANK LEVEL (M) =	.3978E+01		

4.3 Sample Problem 2

4.3.1 Problem Description

This problem is a simulation of pipe rupture in one of the three primary heat transport systems of the CRBRP. The reactor is assumed to be operating at its nominal value of 100% power and 100% flow conditions.

The reactor core is modeled by a total of twelve channels and the bypass channel. Each of the nine orificing zones is represented by a separate channel. Thus, there are nine channels out of which five are fuel and the remainder represent blanket channels. One hot channel each in the fuel and blanket regions is also included. All of the control assemblies are represented by the twelfth channel. Flows in bypass and shielding assemblies are represented by the bypass channel.

4.3.2 List of Input Cards

The list of input cards for this problem is given in the following pages.

```
  SSC-L, CRBR, 12-CHAN, 1-LOOP, CHAN-1 IS HOT IN PEAK, 09-19-78.
0V VESSEL
1D 12  3  13  3R  4  12R  /
2D  1  6R  2  5R  3  /
3D  .006735, .332516, .347304, .139851, .044578, .018016,
    .002000, .019182, .018327, .041306, .023185, .007000 /
4D  .003326, .299674, .3085000, .1231000, .0390400, .0165680,
    .000763, .0485330, .0375770, .031286, .0167910, .0600000 /
5D  217,    14105,  16926,   7812,    2604,    1302,
     61,     2196,   1830,   2501,    2562,     589  /
7D  1.9979E-05  6R  4.3575E-05  5R  6.1613E-05  /
8D  3.2500E-03  6R  3.4270E-03  5R  3.9370E-03  /
9D  .003249, .004029, .003606, .003298, .003207, .002941,
    .002870, .003785, .003636, .002870, .002198, .010130  /
10D  (1.,1.,2.), 11R, 2.,2.,3. /
11D  0.0  12R  /
12D  2.4570E-03  6R  6.1600E-03  5R  5.9690E-03  /
13D  2.5400E-03  6R  6.2230E-03  5R  6.1340E-03  /
14D  2.9210E-03  6R  6.6040E-03  5R  7.7600E-03  /
15D  0.0  12R  /
16D  2.4570E-03  6R  6.1600E-03  5R  5.9690E-03  /
17D  0.0  12R  /
18D  2.4570E-03  6R  6.1600E-03  5R  5.9690E-03  /
19D      2.1605E-05     1.40429E-03     1.68518E-03     7.77765E-04
         2.5925E-04     1.29627E-04     2.16046E-05     4.96905E-04
         6.4813E-04     1.16666E-03     9.07393E-04     4.10487E-04   /
20D   1.0E+4  12R    /
21D   3.5E+06        12R  /
23D   00 2.6434      2.6545     2.43488   2.04911
 1.85412 1.17837     4.17792    3.9336    3.31732
 6.82151 6.99849     6.37856    1.90039E+04
  8.12800E+05  5223.9   25  25  0.0010 0.0001  14000.0  /
24D   86.2, 158533.2, 26205.3, 20./
25D   1, 300.0/
27D   0.0,2R,0.801,6.2725,12.7025,7.7457,0.6/
28D   27.0,1.4,0.6,25.3,30.0,121.5,1.289,14.0,1400.0,
  560.0, 3.41, 13.043, 0.00, 4.7126E7, 1.95165E7, 12.8E7 /
29D   20.15,1.25,2.585,0.1288,2.5E+5,920000.0/
30D   0.316,0.25,-16.15,24.96,-8.55,0.3/
101D       0.0         0.356      0.914        0.356        1.219
             0             1         10            1            1
          1.25        51.739         60           70           40
          0.95          0.96       0.98           50         0.95
          0.96          0.98         40         0.95         0.96
          0.98  /
102D       0.0           0.0        0.0       1.6256       1.0414
             0             0          0           12            1
         1.077        7.6923         60           70            0
           0.0           0.0        0.0            0          0.0
           0.0           0.0         40         0.95         0.96
          0.98  /
103D    0.3619           0.0     0.9144          0.0       0.5765
             1             0         11            0            1
          1.05        617.74         60           70            0
           0.0           0.0        0.0           51         1.00
          1.00          1.00          0          0.0          0.0
           0.0  /
201D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, 0.001 /
```

```
202D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, .001 /
203D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, .001 /
204D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, .001 /
205D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, .001 /
206D  .073, .75, .92, 1.09, 1.18, 1.21, 1.21, 1.13, 1.01, .85,
      .66, .030, .001 /
207D  .133, .35, .70, 1.30, 1.75, 1.90, 1.90, 1.70, 1.25, .75,
      .32, .133, .001 /
208D  .133, .35, .70, 1.30, 1.75, 1.90, 1.90, 1.70, 1.25, .75,
      .32, .133, .001 /
209D  .133, .35, .70, 1.30, 1.75, 1.90, 1.90, 1.70, 1.25, .75,
      .32, .133, .001 /
210D  .133, .35, .70, 1.30, 1.75, 1.90, 1.90, 1.70, 1.25, .75,
      .32, .133, .001 /
211D  .133, .35, .70, 1.30, 1.75, 1.90, 1.90, 1.70, 1.25, .75,
      .32, .133, .001 /
212D  .001, 1.0, 11R, .001 /
301D  1.00000         4R  /
302D  1.00000         4R  /
303D  1.00000         4R  /
304D  1.00000         4R  /
305D  1.00000         4R  /
306D  1.00000         4R  /
307D  1.00000         4R  /
308D  1.00000         4R  /
309D  1.00000         4R  /
310D  1.00000         4R  /
311D  1.00000         4R  /
312D  1.00000         4R  /
401D    1.000       0.0       0.0  /
402D    1.000       0.0       0.0  /
403D    1.000       0.0       0.0  /
404D    1.000       0.0       0.0  /
405D    1.000       0.0       0.0  /
406D    1.000       0.0       0.0  /
407D    1.000       0.0       0.0  /
408D    1.000       0.0       0.0  /
409D    1.000       0.0       0.0  /
410D    1.000       0.0       0.0  /
411D    1.000       0.0       0.0  /
412D    1.000       0.0       0.0  /
501D     80       0.95       81        0.03       82       0.02  /
502D     80       0.95       81        0.03       82       0.02  /
503D     80       0.95       81        0.03       82       0.02  /
504D     80       0.95       81        0.03       82       0.02  /
505D     80       0.95       81        0.03       82       0.02  /
506D     80       0.95       81        0.03       82       0.02  /
507D     80       0.95       81        0.03       82       0.02  /
508D     80       0.95       81        0.03       82       0.02  /
509D     80       0.95       81        0.03       82       0.02  /
510D     80       0.95       81        0.03       82       0.02  /
511D     80       0.95       81        0.03       82       0.02  /
512D     80       0.95       81        0.03       82       0.02  /
OV STMGEN
 1001D   10    2    2    2    2    0       /
 1002D 5.0E-07 1.0E-07 5.0E-07 5.0E-05 5.0E-07 5.0E-07 40    /
```

```
1D 101 201 39.0 235.37 0.457 3.33E-06 1.1 0.0 1.0 235.37 4/
2D 201 3 7.9 239.0 0.3048 5.0E-06 1.2 0.0 1.0 239.0 1/
3D 2 4 25.0 230.15 0.254 6.0E-06 1.1 0.0 1.0 230.15 3/
4D 3 301 3.2 232.25 0.457 3.33E-06 1.1 0.0 1.0 232.25 1/
5D 301 101 23.5 253.8 0.406 3.75E-06 1.1 0.0 1.0 253.8 3/
6D 101 7 54.86 230.27 0.3048 5.0E-06 1.1 0.0 1.0 230.27 5/
7D 6 302 3.29 232.25 0.457 3.33E-06 1.1 0.0 1.0 232.25 1/
8D 302 9 3.5 252.83 0.457 3.33E-06 1.1 0.0 1.0 252.83 1/
9D 8 102 33.38 256.44 0.406 3 75E-06 1.1 0.0 1.0 256.44 3/
10D 102 500 155.9 256.44 0.406 3.75E-06 1.1 0.0 1.0 256.44 1/
301D 4 5 302 300 14.02 247.98 1.0339E-02 1.474E-04 757 0.0 1.0
 233.96 1.71 0.252 0.0 1.0 251.4 3.42 0.381 6 1.5874E-02 1.952
 0.529854 1.0E+10 0.55 71 2/
302D 7 8 400 301 14.02 247.98 1.0339E-02 1.474E-04 757 0.0 1.0
 233.96 1.71 0.252 0.0 1.0 251.4 3.42 0.381 4 1.5874E-02 1.952
 0.529854 1.0E+10 0.55 71 1/
201D 1 2 235.75/
101D 23.7 2 1 253.73 0.0 6 256.44 1.0/
102D 38.5 1 10 256.44 1.0 0 0.0 0.0/
401D 101 302  254.66/
201D 279.353 111.24 0.40 10.0/
401D 7.18723E+05 4.967506E+05 1.20355E+06 -1.11879E+06 4.192087E+05
 1.242453E+07 0.0 0.0 0.0/
101D 1.242453E+07 0.50 2 1 1 6 0/
102D 1.0617925E+07 0.0 1 10 0 0 0/
301D 0 0.0 0.50 0.0 0.0 1.259672E+07 2.89259E+05 0.0/
302D 0 3.327526E+06 0.0 0.0 0.0 0.0 3.44738E+04 0.0/
7D 1.224509E+07
4D 1.3382723E+07
0V OPDATA
1D    975.E+06    1.000000  03  3    1.01E+07    3.327526E+06   /
2D     -800.72,  -641.9,    1741.3,   3.327526E 06/
3D     0,  619.7,   771.5,   1610.2,   100.,   3.,   15./
4D     1.04E 05,  8.6E 05,   4.0,   0.6,   1.0/
5D     1, 1, 1, 1 /
0V MATDAT
10D    109.7, -6.4499E-02, 1.1728E-05, 1630.22, -0.83354, 4.62838E-04,
  1011.597, -0.220510, -1.92243E-05, 5.63769E-09, 370.9, 1644.2,
  -6.7511E+04, 1630.22, -0.41674, 1.54279E-04, 11.35977, -5567.0,
  -0.5, 11.68672, -5544.97, -0.61344, 1144.2, -2.4892, 220.65,
  -0.4925, 0.001, 1.0E-05, 750.0, -12130.0, 10.5/
51D     334.130       21.6178         5.381E-02          0.0
             2.2           0.0            1741.79  2.34856E-04
             0.0           0.0               0.0         0.0
        -46634.7       9999.0            9999.0    2.25E-06
          2.5E-09          0.0             295.4      9999.0
          9999.0        2381.0               0.0        0.55
          2.5E-04        400.0            9999.0          3R    /
71D 4.9341695E+01 -1.71228E-02 0.0 0.0 460.59 0.0 0.0 0.0 0.0 0.0 0.0
    0.0 7833.35 /
0V NALOOP
1D  1, 5, 19, 8, 20, 6, 16, 5, 31, 3, 3, 7, 19/
2D    3/
100D  2850, .019934, .02222, 1.9361, 7.5804, 14.5832,
  35607.0, 74.4153, 1.5, 0.0, 0.0, 70/
101D  -1,  0,  .314,  .273,  0,  .437,  0.0,  0.0,  .194/
102D  4.8585, 4.0234, 0.305, 4.572, 7.6172, 3.0582, 6.8527, 7.3624/
103D  39.5507, -32.0256, 0.0, 47.1703/
104D  13.259, 0.8, -90./
110D  6, 1.2897, -0.061907, 0.17327, -0.57294, 0.033762,
```

```
  0.13865/
105D  .001, 4.6E-5,2R/
111D  1, 1, 6894.76, 19.54,2R, 2.286E08/
112D  139.6, 1116.0, 2.12, 26927.0, 6.0, 3.066/
120D  0, 1.5, 1.5, 1.0541, .8357, 4.605, 1.0068, 90., 90.,-90. /
121D  0, 3.5, 4.2,  1.0541,   .8357, 4.605, 1.0068, 90., 90.,-90. /
122D  139.6, 1116.0, 1.8612, 26927.0, 6.0, 3.0, 4.5, 12.0/
1001D 1, 4, 3, 4, 4, 2, 1/
1101D  0.4002, 36.1859, 0.889, 0.0127,
  10.0501, 46.1719, 2R, 20.7134, 6.9086, 9.44, 4R, 5.4087,
  0.0, -24.3443, -26.9663, -0.351, -32.2414, -46.88, -45.043, 0.0, 2R/
  $ PUMP TO IHX $
1102D  1.8161, 26.2311, 0.5842, 0.0127,
  27.854, 34.2896, 0.0, 4R, -33.636, 0.0/
  $ IHX,  J = 3  $
1103D  132.54, 7.8639, 0.03686, 0.0127,
  -90.0, 20R/
1104D  1.1243, 20.9702, 0.5842, 0.0127,
   16.53, 66.94, 2R, 22.487, 0.0, 0.0/
1105D  1.3883, 26.8225, 0.5842, 0.0127,
  -1.3593, -9.24, 4R, -9.08, 0.0, -31.9, -90.0, 6R, 0.0, 2R/
1002D  0.02825, 2850, 90024.9/
1201D  1.1, 250.546, 0.5842, 0.0127,
  -8.18495, 0.0, 4R, -30.77520, -27.19762, -0.6, 18R, -0.32844,
  0.0, 22.93075, 43.73177, 39.36707, 0.0/
1202D 0.56, 34.442, 0.4318, 0.0127,
  0.0, 44.7836, 0.0/
1203D  0.65, 24.689, 0.4318, 0.0127,
  0.0, 3R/
1204D  1.42, 32.918, 0.5842, 0.0127,
  45.1185, 3R, 39.0419, 0.0, 3R/
1205D  1.2, 126.492, 0.5842, 0.0127,
  -69.85, 2R, -2.0746, 5.34, 10R, 2.1462, 0.0, 3R, 18.9839,
  0.0/
1003D  73332.7, 0.0, 82737.0, 0.0, 330948.0, 0.0/
0V OLDATA
2D 99/
3D 99/
STOP
0V TRNDAT
1001D 0, 0.1, 1180.0/
1002D 0, 0.1, 1180.0/
1003D 0, 0, 21.946, 10.912, 0.0, 0.2002, 0.0, 0.0,10R, 76.45/
3001D     1.01E 07, 0.0, 1.01E 07, 9999./
5001D 1, 6, 6.0E-07/
5002D  0.915582, 0.91763,5R,  0.901424,5R,
    0.95, 0.999 /
5003D  8.145E-05, 7.554E-04, 6.438E-04, 1.287E-03, 5.583E-04,
     1.732E-04 /
5004D 0.0129, 0.0308, 0.132, 0.335, 1.34, 3.27/
5005D 0., 0., -6., 2., -6., 9999. /
5006D 1.0, 0.0, 0.5, 200.0, 0.25, 400.0, 0.25, 9999.0 /
5101D 1.0,0.0, .959,1.0, .892,2.031, .813,4.125, .715,10.0,
  .637,20.31, .564,41.25, .514,70.17, .481,100.0, .451,142.5,
  .420,203.1, .365,412.5, .301,1000.0 /
5102D 1.0,0.0, .959,1.0, .892,2.031, .813,4.125, .715,10.0,
  .637,20.31, .564,41.25, .514,70.17, .481,100.0, .451,142.5,
  .420,203.1, .365,412.5, .301,1000.0 /
5103D 1.0,0.0, .959,1.0, .892,2.031, .813,4.125, .715,10.0,
  .637,20.31, .564,41.25, .514,70.17, .481,100.0, .451,142.5,
```

```
   .420,203.1,  .365,412.5,  .301,1000.0 /
5104D 1.0,0.0,  .959,1.0,  .892,2.031,  .813,4.125,  .715,10.0,
   .637,20.31,  .564,41.25,  .514,70.17,  .481,100.0,  .451,142.5,
   .420,203.1,  .365,412.5,  .301,1000.0 /
5105D 1.0,0.0,  .959,1.0,  .892,2.031,  .813,4.125,  .715,10.0,
   .637,20.31,  .564,41.25,  .514,70.17,  .481,100.0,  .451,142.5,
   .420,203.1,  .365,412.5,  .301,1000.0 /
5106D 1.0,0.0,  .959,1.0,  .892,2.031,  .813,4.125,  .715,10.0,
   .637,20.31,  .564,41.25,  .514,70.17,  .481,100.0,  .451,142.5,
   .420,203.1,  .365,412.5,  .301,1000.0 /
5107D 1.0,0.0,  .964,1.0,  .905,2.031,  .837,4.125,  .751,10.0,
   .682,20.31,  .618,41.25,  .573,70.17,  .544,100.0,  .515,142.5,
   .488,203.1,  .433,412.5,  .364,1000.0 /
5108D 1.0,0.0,  .964,1.0,  .909,2.031,  .844,4.125,  .761,10.0,
   .696,20.31,  .634,41.25,  .591,70.17,  .562,100.0,  .535,142.5,
   .508,203.1,  .454,412.5,  .383,1000.0 /
5109D 1.0,0.0,  .964,1.0,  .909,2.031,  .844,4.125,  .761,10.0,
   .696,20.31,  .634,41.25,  .591,70.17,  .562,100.0,  .535,142.5,
   .508,203.1,  .454,412.5,  .383,1000.0 /
5110D 1.0,0.0,  .964,1.0,  .909,2.031,  .844,4.125,  .761,10.0,
   .696,20.31,  .634,41.25,  .591,70.17,  .562,100.0,  .535,142.5,
   .508,203.1,  .454,412.5,  .383,1000.0 /
5111D 1.0,0.0,  .964,1.0,  .909,2.031,  .844,4.125,  .761,10.0,
   .696,20.31,  .634,41.25,  .591,70.17,  .562,100.0,  .535,142.5,
   .508,203.1,  .454,412.5,  .383,1000.0 /
5112D 1.0,0.0, 0.5,200.0, 0.25,1000.0 /
6001D 2, 1, 9999./
6002D 1, 0., 0./
9001D 360.0, 2.0, 0.00001, 999.0, 0.25, 5., 1.0,120., 2.0,
    9999.0, 5R /
9002D 0.001, 0.001, 0.01, 0.01, 0.01, 0.001, 0.001 /
9003D 0.01, 3R/
9004D 1, 1, 0, 1, 1 /
9005D 0, 0, 0, 0, 1 /
9006D 1, 5R/
9007D  0., 0., 9999.0, 0.75 /
9008D 1, 4R/
STOP
END
```

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2. "USA Standard FORTRAN," ANSI X3.9-1966, United States of America Standards Institute, New York.

3. "ANS Standard Recommended Programming Practices to Facilitate the Interchange of Digital Computer Programs," ANS STD.3-1971, American Nuclear Society.

4. "Guidelines for the Documentation of Digital Computer Programs," ANSI Standard N413-1974.

5. "Flow Chart Symbols and Their Usage in Information Processing," ANSI Standard X3.5-1968.

6. "Computer Coding, Documentation and Distribution," RDT Standard F 1-4, Unapproved Preliminaray Draft, January 30, 1975.

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APPENDIX A

CONVERSION FACTORS

Quantity	Dimension*	SI Units	Engineering Units	Multiply No. in engineering unit by the following to convert to SI units
Length	L	m	ft	0.3048
Mass	M	kg	lb	0.4536
Temperature	K	K	R or F	1/1.8
Area	L^2	m^2	ft^2	0.09290
Volume	L^3	m^3	ft^3	0.02832
Velocity	LT^{-1}	m/s	ft/s	0.3048
Density	ML^{-3}	kg/m^3	lb/ft^3	16.02
Volumetric Flow	L^3T^{-1}	m^3/s	ft^3/s	0.02832
Momentum	MLT^{-1}	kg m/s	lb ft/s	0.13825
Force	MLT^{-2}	$kg\,m/s^2$ or N	lb_f	4.448
Work, Energy	ML^2T^{-2}	N m or J	Btu	1055
Pressure	$ML^{-1}T^{-2}$	N/m^2 or Pa	psi	6895
Power	ML^2T^{-3}	J/s or W	Btu/hr	0.2931
Dynamic Viscosity	$ML^{-1}T^{-1}$	$N\,s/m^2$ or Pl	lb/hr ft	4.134×10^{-4}
Heat Flux	MT^{-3}	W/m^2	Btu/hr ft^2	3.155
Thermal Conductivity	$MLT^{-3}K^{-1}$	W/mK	Btu/hr ft F	1.731
Heat Capacity	$ML^2T^{-2}K^{-1}$	J/k	Btu/F	1899
Specific Heat Capacity	$L^2T^{-2}K^{-1}$	J/kg K	Btu/lb F	4187
Specific Enthalpy	L^2T^{-2}	J/kg	Btu/lb	2325.9
Thermal Conductance	$M\,T^{-3}K^{-1}$	W/m^2K	Btu/hr ft^2F	5.678

*M denotes mass, L-length, T-time and K-temperature

APPENDIX B

SUBROUTINE CROSS-REFERENCE TABLE

In the first column of the following table is a list of all the routines used in SSC-L. All the routines which reference the first column entry are listed in the columns which follow it. This cross reference table should be a useful guide in the design of an overlay structure, as well as, a traceback aid for program debugging.

ROUTINE	CALLED BY
ACCM3T	STGN3T
ALFA1A	
ALFA5S	FUEL5S STEM5S
ALFA5T	FUEL5T STEM5T
ALFA7A	DENS7D
ALOG	DOPP5T EAVG3S EAVG3T HX3S HX3T IHX1S PRET1T SATT1S TUBE3T VAVG3S VAVG3T VJ1T
ALOG10	EVAP2S HYDR1S IHX1S PIPE1S PIPE2S PLOT9T PUMP1S PUMP2S SPHT2S SVPS1P VISC1N
ANUS1U	IHX1S IHX1T PIPE1T PIPE2T
APPL5T	REAC5T
BLKDAT	
BLKDTR	
BREK1T	VESL1T
BREK2T	FLOW2T
CALC1R	INIT9R
CALC3R	INIT9R
CALC7R	INIT9R
CALC8R	INIT9R
CDINPT	GENRD
CHEX9R	MAIN9R
COEF5T	FUEL5T
COEF6T	COOL6T
COFS3T	HX3T PIPE3T
COND1K	CORE6S FNUS6C HNAF3S HNAF3T IHX1T PIPE1T PIPE2T PROP6T
COND7K	HNA3S HNA3T HWS3S IHX1T PIPE1T PIPE2T PROP6T
CONL3K	HWFC3S HWFC3T HWNB3S HWNB3T
CONV3K	HWFB3S HWFB3T HWSC3S HWSC3T
COOL6S	MAIN9S

```
*                                                                                                                                  *
* COOL6T  * DRIV9T                                                                                                                 *
*         *                                                                                                                        *
* CORE6S  * OPTN6S                                                                                                                 *
*         *                                                                                                                        *
* CORE6T  * COOL6T                                                                                                                 *
*         *                                                                                                                        *
* CPL3C   * HWFC3S  HWFC3T  HWNB3S  HWNB3T                                                                                         *
*         *                                                                                                                        *
* CPV3C   * HWFB3S  HWFB3T  HWSC3S  HWSC3T                                                                                         *
*         *                                                                                                                        *
* CRDR9R  * MAIN9R                                                                                                                 *
*         *                                                                                                                        *
* CVAL1S  * LOOP1S                                                                                                                 *
*         *                                                                                                                        *
* CVAL1T  * PDFG1T                                                                                                                 *
*         *                                                                                                                        *
* DATE    * SSCDAT                                                                                                                 *
*         *                                                                                                                        *
* DCODNC  * CDINPT                                                                                                                 *
*         *                                                                                                                        *
* DEFN1T  * FLOW1T  INIT1T                                                                                                         *
*         *                                                                                                                        *
* DEFN2T  * FLOW2T  INIT2T                                                                                                         *
*         *                                                                                                                        *
* DELP3D  * DRSP3D  INFS3T                                                                                                         *
*         *                                                                                                                        *
* DENL3D  * DRLH3D  DRLP3D  HWNB3S  HWNB3T  WSTE3S  WSTE3T                                                                         *
*         *                                                                                                                        *
* DENS1D  * BREK1T  BREK2T  COEF6T  CORE6S  CORE6T  CVAL1T  DOPP5T  EVAP2T  FLOW6T  GVSL1T  HYDR1T  IHX1T   INIT1T  INIT2T  INIT5T  *
*         * LPLN6S  LPLN6T  OPTN6S  PINT1S  PIPE1T  PIPE2T  PIPW1T  PIPW2T  PROP5T  RES1T   RES2T   SPHT2T  TANK2T  TUBE3T  UPLN6S  *
*         * UPLN6T  VOID5T                                                                                                         *
*         *                                                                                                                        *
* DENS7D  * PRET1T  TUBE3T                                                                                                         *
*         *                                                                                                                        *
* DENV3D  * CONV3K  DPFT3S  DRVH3D  DRVP3D  DSTV3D  HWNB3S  HWNB3T  PRES3P  VISV3N  WSTE3S  WSTE3T                                 *
*         *                                                                                                                        *
* DEVP3D  * DRSP3D  INFS3T                                                                                                         *
*         *                                                                                                                        *
* DOPP5T  * REAC5T                                                                                                                 *
*         *                                                                                                                        *
* DPAC3S  * DPFG3S                                                                                                                 *
*         *                                                                                                                        *
* DPAC3T  * DPFG3T                                                                                                                 *
*         *                                                                                                                        *
* DPFG3S  * HX3S    PIPE3S                                                                                                         *
*         *                                                                                                                        *
* DPFG3T  * HX3T    PIPE3T                                                                                                         *
*         *                                                                                                                        *
* DPFT3S  * HX3S    PIPE3S                                                                                                         *
*         *                                                                                                                        *
* DPFT3T  * PIPE3T                                                                                                                 *
*         *                                                                                                                        *
* DRFP3D  * DRSP3D                                                                                                                 *
*         *                                                                                                                        *
* DRGP3D  * DRSP3D                                                                                                                 *
*         *                                                                                                                        *
* DRHO1R  * UPLN6T                                                                                                                 *
*         *                                                                                                                        *
* DRIV1T  * DRIV9T                                                                                                                 *
```

DRIV9T	MAIN9T
DRLH3D	ACCM3T
DRLP3D	ACCM3T
DRSH3D	ACCM3T DRSP3D
DRSP3D	ACCM3T
DRVH3D	ACCM3T
DRVP3D	ACCM3T
DSTL3D	DRFP3D DRSH3D DRSP3D EAVG3S EAVG3T PLOP3T TPMP3S TPMP3T VAVG3S VAVG3T VOID3V WSTE3S WSTE3T XCRT3S XCRT3T
DSTV3D	DPAC3S DPFT3T DRGP3D DRSH3D DRSP3D EAVG3S EAVG3T HWFB3S HWFB3T HX3T PLOP3T TPMP3S TPMP3T VOID3V WSTE3S WSTE3T XCRT3S XCRT3T
EAVG3S	HXND3S HX3S
EAVG3T	HX3T PIPE3T TUBE3T
ELV3H	HX3S TUBE3T VOID3V VOL3S WSTE3S WSTE3T XCRT3S XCRT3T
ENAVG	TUBE3T
END1S	LOOP1S
END1T	LOOP1T
END2S	LOOP2S
END2T	LOOP2T
END9U	SSC
ENTH1H	COOL6S COOL6T CORE6T HXND3S HX3S IHX1S IHX1T INIT6T INTF3T LOOP1S LOOP1T LOOP2S LPLN6S LPLN6T PBAL9S PRET1T RES1T RES2T TEMP1T TUBE3T UPLN6S UPLN6T
ENTL3H	
ENTV3H	HWFB3S HWFB3T
EQIV1T	DRIV1T FLOW1T INIT1T
EQIV2T	DRIV1T FLOW2T INIT2T
ERRMSG	CDINPT GENRD
ERR3M	CONL3K CONV3K CPL3C CPV3C DENL3D DENV3D DRVH3D DRVP3D ENTL3H PRES3P PSAT3P TMPL3T TMPV3T VISL3N VISV3N
ERR3R	CALC3R VRFY3R
ERR3S	FEED3S HXND3S HX3S INSL3S VOL3S WFLO3S
ERR3T	ACCM3T FSEG3T HX3T STGN3T TUBE3T
ERR9R	CHEX9R CRDR9R INIT9R READ1R READ3R READ7R READ8R READ9R

```
*                *                                                                                                                                    *
* ERR9T          * READ9T   VRFY9T                                                                                                                    *
*                *                                                                                                                                    *
* ESTL3H         * ACCM3T   CONL3K   CPL3C    DENL3D   DPFG3S   DRFP3D   DRSH3D   DRSP3D   DSTL3D   EAVG3S   EAVG3T   ELV3H    ENTL3H   HWNB3S   HWNB3T  *
*                * HWS3S    HX3S     INFS3T   INSL3S   PLOP3T   TMPL3T   TPMP3S   TPMP3T   TSAT3T   VAVG3S   VAVG3T   VISL3N   VOID3V   VOL3S    WSTE3S  *
*                * WSTE3T                                                                                                                             *
*                *                                                                                                                                    *
* ESTV3H         * ACCM3T   CONV3K   CPV3C    DENV3D   DPFT3S   DRGP3D   DRSH3D   DRSP3D   DRVH3D   DRVP3D   DSTV3D   EAVG3S   EAVG3T   ELV3H    HWNB3S  *
*                * HWNB3T   HWS3S    HWS3T    HX3S     INSL3S   PLOP3T   TMPV3T   TPMP3S   TPMP3T   VISV3N   WFLO3S   WSTE3S   WSTE3T                    *
*                *                                                                                                                                    *
* EVAP2S         * LOOP2S                                                                                                                             *
*                *                                                                                                                                    *
* EVAP2T         * PDFG2T                                                                                                                             *
*                *                                                                                                                                    *
* FEED3S         * INSL3S                                                                                                                             *
*                *                                                                                                                                    *
* FEED3T         * INFS3T   PSFW3T                                                                                                                    *
*                *                                                                                                                                    *
* FLOW1T         * DRIV1T                                                                                                                             *
*                *                                                                                                                                    *
* FLOW2T         * DRIV1T                                                                                                                             *
*                *                                                                                                                                    *
* FLOW6T         * COOL6T                                                                                                                             *
*                *                                                                                                                                    *
* FNUS6C         * CORE6S   PROP6T                                                                                                                    *
*                *                                                                                                                                    *
* FRAD5S         * FUEL5S                                                                                                                             *
*                *                                                                                                                                    *
* FRAD5T         * FUEL5T                                                                                                                             *
*                *                                                                                                                                    *
* FRIC           * EVAP2T   HYDR1T   PIPW1T   PIPW2T   SPHT2T                                                                                         *
*                *                                                                                                                                    *
* FRIC3S         * DPFG3S                                                                                                                             *
*                *                                                                                                                                    *
* FRIC3T         * DPFG3T                                                                                                                             *
*                *                                                                                                                                    *
* FRIC6C         * COEF6T   CORE6S   FLOW6T   UPLN6S                                                                                                *
*                *                                                                                                                                    *
* FSEG3T         * STGN3T                                                                                                                             *
*                *                                                                                                                                    *
* FUEL5S         * MAIN9S                                                                                                                             *
*                *                                                                                                                                    *
* FUEL5T         * DRIV9T                                                                                                                             *
*                *                                                                                                                                    *
* FUNC1T         * FLOW1T                                                                                                                             *
*                *                                                                                                                                    *
* FUNC2T         * FLOW2T                                                                                                                             *
*                *                                                                                                                                    *
* GAMA5S         * TEMP5S                                                                                                                             *
*                *                                                                                                                                    *
* GAMA5T         * COEF5T                                                                                                                             *
*                *                                                                                                                                    *
* GENRD          * CRDR9R   READ1R   READ3R   READ7R   READ8R   READ9R   READ9T                                                                         *
*                *                                                                                                                                    *
* GETN9R         *                                                                                                                                    *
*                *                                                                                                                                    *
* GPNT9R         * CALC1R   CALC3R   CALC7R   CALC8R   INIT3R   READ1R   READ7R   TRAN9R   TYPE5R                                                       *
*                *                                                                                                                                    *
* GROW5T         * REAC5T                                                                                                                             *
*                *                                                                                                                                    *
```

```
* GRO5S    * FUEL5S
*          *
* GVSL1T   * FLOW1T
*          *
* HCAP1C   * CORE6T  FNUS6C  HNAF3S  HNAF3T  IHX1T   LPLN6T  PIPE1T  PIPE2T  PROP6T  UPLN6S  UPLN6T
*          *
* HCAP7C   * IHX1T   PIPE1T  PIPE2T  TUBE3T
*          *
* HEAD1T   * PUMP1T
*          *
* HEAD2T   * PUMP2T
*          *
* HNAF3S   * HNA3S
*          *
* HNAF3T   * HNA3T
*          *
* HNA3S    * HXND3S
*          *
* HNA3T    * TUBE3T
*          *
* HWFB3S   * HWS3S
*          *
* HWFB3T   * HWS3T
*          *
* HWFC3S   * HWS3S
*          *
* HWFC3T   * HWS3T
*          *
* HWNB3S   * HWS3S
*          *
* HWNB3T   * HWS3T
*          *
* HWSC3S   * HWS3S
*          *
* HWSC3T   * HWS3T
*          *
* HWS3S    * HXND3S
*          *
* HWS3T    * TUBE3T
*          *
* HXND3S   * HX3S
*          *
* HX3S     * STGN3S
*          *
* HX3T     * FSEG3T
*          *
* HYDR1S   * LOOP1S
*          *
* HYDR1T   * PDFG1T  PDFG2T  WRIT1T
*          *
* ICS1VU   * PSTB3T  SFLO3T  STMP3T
*          *
* IHX1S    * PBAL9S
*          *
* IHX1T    * LOOP1T  LOOP2T
*          *
* IKFS3T   * FSEG3T  STGN3T
*          *
* INFS3T   * FSEG3T
*          *
```

INIT1T	INIT9T
INIT2T	INIT1T
INIT3R	CALC3R
INIT3S	HX3S PIPE3S PUMP3S
INIT3T	INIT9T
INIT5T	INIT9T
INIT6T	INIT9T
INIT9R	MAIN9R
INIT9T	MAIN9T
INIT9U	SSC
INSL3S	INIT3S
INTERP	CDINPT
INTF3T	DRIV1T INIT3T STGN3T
INTG1T	DRIV1T INIT1T
INTNDG	CDINPT DCODNC GENRD NAMEWD
ISETHM	CDINPT
ISTOP	GENRD
ITERP	CDINPT ERRMSG
ITRPCK	CDINPT GENRD
LEAK5T	FUEL5T
LIST1R	VRFY1R
LIST3R	VRFY3R
LIST7R	VRFY7R
LIST8R	VRFY8R
LIST9R	VRFY9R
LIST9T	VRFY9T
LOOP1S	MAIN9S
LOOP1T	DRIV9T
LOOP2S	MAIN9S
LOOP2T	DRIV9T

```
* LPLN6S   * OPTN6S
* LPLN6T   * COOL6T
* MAIN9R   * SSC
* MAIN9S   * SSC
* MAIN9T   * SSC
* MAXD5T   * DRIV9T
* NAMEWD   * CDINPT
* NFS1U    * BREK1T  BREK2T  CVAL1S  CVAL1T  END1S   END1T   END2S   END2T   EVAP2S  EVAP2T  GVSL1T  HYDR1S  HYDR1T  IHX1T   INIT1T
*          * INIT2T  LOOP1S  LOOP1T  LOOP2S  LOOP2T  PIPE1S  PIPE1T  PIPE2S  PIPE2T  PIPW1T  PIPW2T  PRET1T  PRNT1T  PRNT9S  PUMP1S
*          * PUMP2S  RES1S   RES1T   RES2S   RES2T   RITE1S  RITE2S  RSET1T  RSET2T  SPHT2S  SPHT2T  TANK2S  TANK2T
* NKEY3R   * VRFY3R
* NNBLNK   * CDINPT  GENRD   ISTOP
* NSKIP    * CDINPT
* OPTN6S   * COOL6S
* OVFL9U   * CALC7R  FUEL5S  INIT6T  NKEY3R  READ3R  READ7R  TRAN9R  TYPE5R  VRFY3R  VRFY7R
* PAGE9U   * CHEX9R  INIT9U  PRNT6T  PRNT9T  READ9T  REST9R  REST9T  SAVE9R  SAVE9S  SAVE9T  VRFY9T
* PBAL9S   * MAIN9S
* PCHK9R   * VRFY1R  VRFY7R
* PDFG1T   * FLOW1T
* PDFG2T   * FLOW2T
* PINT1S   * MAIN9S
* PINT9R   * MAIN9R
* PIPE1S   * LOOP1S
* PIPE1T   * LOOP1T
* PIPE2S   * LOOP2S
* PIPE2T   * LOOP2T
* PIPE3S   * STGN3S
* PIPE3T   * FSEG3T
* PIPW1T   * PDFG1T  WRIT1T
* PIPW2T   * PDFG2T  WRIT2T
* PLOP3T   * IKFS3T  STGN3T  TUBE3T
```

```
* PLOS1T   * FLOW1T                                                                                                                      *
*          *                                                                                                                             *
* PLOS2T   * FLOW2T                                                                                                                      *
*          *                                                                                                                             *
* POLY     * ACCM3T  CONL3K  CONV3K  DELP3D  DENL3D  DEVP3D  DRFP3D  DRGP3D  DRLH3D  DRLP3D  DRVH3D  DRVP3D  DSTL3D  ENTV3H  ESTL3H  *
*          * ESTV3H  FEED3S  FEED3T  INFS3T  INSL3S  PRNT9S  PSFW3T  TMPL3T  TMPV3T  VISL3N  VISV3N                                  *
*          *                                                                                                                             *
* POW5T    * FUEL5T                                                                                                                      *
*          *                                                                                                                             *
* POW6T    * COOL6T                                                                                                                      *
*          *                                                                                                                             *
* PPNT9R   * CALC1R  CALC3R  CALC7R  CALC8R  INIT3R  READ1R  READ7R  TRAN9R  TYPE5R                                                      *
*          *                                                                                                                             *
* PRES1S   * LOOP1S                                                                                                                      *
*          *                                                                                                                             *
* PRES1T   * FLOW1T                                                                                                                      *
*          *                                                                                                                             *
* PRES2S   * LOOP2S                                                                                                                      *
*          *                                                                                                                             *
* PRES2T   * FLOW2T                                                                                                                      *
*          *                                                                                                                             *
* PRES3P   *                                                                                                                             *
*          *                                                                                                                             *
* PRET1T   * INIT9T                                                                                                                      *
*          *                                                                                                                             *
* PREX5S   * PRE5S                                                                                                                       *
*          *                                                                                                                             *
* PRE5S    * FUEL5S                                                                                                                      *
*          *                                                                                                                             *
* PRE5T    * FUEL5T                                                                                                                      *
*          *                                                                                                                             *
* PRMT5T   * POW5T                                                                                                                       *
*          *                                                                                                                             *
* PRNT1T   * PRNT9T                                                                                                                      *
*          *                                                                                                                             *
* PRNT3S   * PBAL9S                                                                                                                      *
*          *                                                                                                                             *
* PRNT3T   * PRNT9T  STGN3T                                                                                                              *
*          *                                                                                                                             *
* PRNT5S   * FUEL5S                                                                                                                      *
*          *                                                                                                                             *
* PRNT5T   * PRNT9T                                                                                                                      *
*          *                                                                                                                             *
* PRNT6T   * PRNT9T                                                                                                                      *
*          *                                                                                                                             *
* PRNT9S   * MAIN9S                                                                                                                      *
*          *                                                                                                                             *
* PRNT9T   * COOL6T  DRIV1T  DRIV9T                                                                                                      *
*          *                                                                                                                             *
* PROP6T   * COOL6T                                                                                                                      *
*          *                                                                                                                             *
* PSAT3P   * HWNB3S  HWNB3T                                                                                                              *
*          *                                                                                                                             *
* PSFW3T   * PLOP3T                                                                                                                      *
*          *                                                                                                                             *
* PSTB3T   * INFS3T  PLOP3T  STGN3T                                                                                                      *
*          *                                                                                                                             *
* PUMP1S   * LOOP1S                                                                                                                      *
*          *                                                                                                                             *
* PUMP1T   * FLOW1T                                                                                                                      *
```

```
*          *
* PUMP2S   * LOOP2S
*          *
* PUMP2T   * FLOW2T
*          *
* PUMP3S   * STGN3S
*          *
* PUMP3T   * FSEG3T
*          *
* PUT5S    * FUEL5S
*          *
* PUT5T    * FUEL5T
*          *
* REAC5T   * POW5T
*          *
* READHM   * CDINPT
*          *
* READ1R   * CRDR9R
*          *
* READ3R   * CRDR9R
*          *
* READ7R   * CRDR9R
*          *
* READ8R   * CRDR9R
*          *
* READ9R   * CRDR9R
*          *
* READ9T   * INIT9T
*          *
* REPEAT   * CDINPT
*          *
* REPT9R   * TYPE5R
*          *
* REST9R   * CRDR9R
*          *
* REST9T   * MAIN9T
*          *
* REST9U   * REST9R  REST9T
*          *
* RES1S    * LOOP1S
*          *
* RES1T    * FLOW1T
*          *
* RES2S    * LOOP2S
*          *
* RES2T    * FLOW2T
*          *
* RITE1S   * LOOP1S
*          *
* RITE1T   * INIT1T
*          *
* RITE2S   * LOOP2S
*          *
* ROOT1U   * PUMP1S  PUMP2S
*          *
* RSET1T   * INIT1T
*          *
* RSET2T   * INIT2T
*          *
* SATT1S   * CORE6S  CORE6T  PRNT6T  VOID5T
```

SAVE9R	INIT9R
SAVE9S	MAIN9S
SAVE9T	DRIV9T
SAVE9U	SAVE9R SAVE9S SAVE9T
SECOND	DRIV9T OPTN6S PAGE9U PRNT9T
SETFMT	READHM
SFLO3S	STGN3S
SFLO3T	PRNT3T TUBE3T
SIMP1U	EVAP2S EVAP2T HYDR1S HYDR1T PIPW1T PIPW2T SPHT2S SPHT2T
SOLV3T	ACCM3T
SPAC9U	CNTDMP CRDR9R READ1R SETS9T
SPHT2S	LOOP2S
SPHT2T	PDFG2T
SSC	
SSCDAT	INIT9U
SSCTIM	PAGE9U
STEM5S	FUEL5S
STEM5T	FUEL5T
STEN3S	HWNB3S HWNB3T
STGN3S	PBAL9S
STGN3T	DRIV9T
STMP3S	HX3S STGN3S
STMP3T	TUBE3T
STOR1T	DRIV1T
SVPS1P	
TANK2S	LOOP2S
TANK2T	FLOW2T
TEMP1T	CORE6S CORE6T END1T END2T HXND3S HX3S IHX1S IHX1T INIT6T LOOP1T LOOP2T PBAL9S PIPE1T PIPE2T TUBE3T UPLN6S
TEMP5S	FUEL5S

TEMP5T	FUEL5T
TFUN5T	FUEL5T
TIME	SETD9T SSCTIM
TMPL3T	ENTL3H TSAT3T WSTE3S WSTE3T
TMPV3T	CONV3K VISV3N WSTE3S WSTE3T
TMSG3T	STGN3T
TORK1T	PUMP1T
TORK2T	PUMP2T
TPMP3S	DPFG3S
TPMP3T	DPFG3T
TRAN9R	READ7R
TSAT3T	ENTL3H HWFB3S HWFB3T HWS3S HWS3T PSAT3P STEN3S WSTE3S WSTE3T
TSAV5S	FUEL5S
TSAV5T	FUEL5T
TUBE3T	STGN3T
TYPE5R	INIT9R
UERTST	ICS1VU
UPLN6S	OPTN6S
UPLN6T	FLOW1T
VAVG3S	HXND3S HX3S
VAVG3T	HX3T PIPE3T TUBE3T
VESL1T	FLOW1T
VISC1N	COEF6T EVAP2T FLOW6T FRIC6C HNAF3S HNAF3T HYDR1T IHX1T PIPE1T PIPE2T PIPW1T PIPW2T SPHT2T
VISL3N	DPFG3S DPFG3T HWFC3S HWFC3T HWNB3S HWNB3T
VISV3N	DPFG3S DPFG3T HWFB3S HWFB3T HWNB3S HWNB3T HWSC3S HWSC3T
VJ1T	BREK1T BREK2T
VOID3V	WSTE3S WSTE3T
VOID5T	REAC5T
VOL3S	STGN3S
VRFY1R	CHEX9R

VRFY3R	CHEX9R
VRFY7R	CHEX9R
VRFY8R	CHEX9R
VRFY9R	CHEX9R
VRFY9T	INIT9T
WFLO3S	INSL3S
WGHT2T	INIT2T
WRIT1T	PRNT9T
WRIT2T	PRNT9T
WSTE3S	HXND3S HX3S PIPE3S PUMP3S WFLO3S
WSTE3T	ACCM3T EAVG3T HX3T IKFS3T INFS3T PIPE3T PUMP3T TUBE3T VAVG3T
XCRT3S	HX3S
XCRT3T	TUBE3T
XI1T	INIT1T
XI2T	INIT2T
XPAN5S	FUEL5S
XPAN5T	FUEL5T
YLD5T	PUT5T

APPENDIX C

SEGMENTED LOADER DIRECTIVES

The following set of segmented loader directives has been formulated for the CDC 7600 SEGLOAD utility. The tree structure illustrated is not as involved as that permitted by the code but was found to be sufficient for most of the problems analyzed to date.

```
         TREE     SSC-(BRCH9R,BRCH9S,BRCH9T)
BRCH9R   TREE     MAIN9R-(CRDR9R,SBRH9R,INIT9R)
SBRH9R   TREE     CHEX9R-(VRFY1R,VRFY3R,VRFY7R,VRFY8R,VRFY9R)
BRCH9S   TREE     MAIN9S-(PBAL9S,LOOP1S,LOOP2S,COOL6S,FUEL5S)
BRCH9T   TREE     MAIN9T-(INIT9T,SBRH9T)
SBRH9T   TREE     DRIV9T-(FUEL5T,COOL6T,LOOP1T,LOOP2T,DRIV1T,SSBR3T)
SSBR3T   TREE     STGN3T-(FSEG3T,TUBE3T,ACCM3T)
SSC      INCLUDE  BLKDAT
MAIN9R   INCLUDE  BLKDTR
SSC      GLOBAL   VD9V,QANT9I,TABLES,DATA1I,DATA1V,DATB1V,DATL1I
SSC      GLOBAL   DATM1I,DATX1I,DATX1V,DAT12V,DATM2I,DATA2I,DATA2V
SSC      GLOBAL   DATE2I,DATE2V,DATS2I,DATS2V,DATL2I,A1TCV,A1TCI
SSC      GLOBAL   A2TCV,A2TCI,GVSL1V,PREV2I,PREV2V,DATG3I,DATG3V
SSC      GLOBAL   DATP3V,DATI3I,DATI3V,DATS3I,DATS3V,BCWFLO,BCTEMP
SSC      GLOBAL   DATT3I,DATT3V,IHX3SI,IHX3SV,DAT25I,DAT25V,DAT15I
SSC      GLOBAL   DATA6I,DAT26V,DAT16V,DAT36I,DAT36V,DAIN6V,DAIN6I
SSC      GLOBAL   DATA8V,DATA8I,DATF6V,DATN6V,DATAC1,DATAC7,DATC9V
SSC      GLOBAL   DATC9I,DATA1P,DATA1L,DATL1P,DATL1L,DATX1P,DATX1L
SSC      GLOBAL   DAT12P,DAT12L,DATA2P,DATA2L,DATE2P,DATE2L,DATS2P
SSC      GLOBAL   DATS2L,DATL2P,DATL2L,BRKT1P,BRKT1L,BRKT2P,BRKT2L
SSC      GLOBAL   IT1,LT1,IT2,LT2,GVSL1P,GVSL1L,DTT12P
SSC      GLOBAL   DTT12L,DATG3P,DATG3L,DATI3P,DATI3L,DATS3P,DATS3L
SSC      GLOBAL   DATT3P,DATT3L,DAT25P,DAT25L,DAT15P,DAT15L,DATC5P
SSC      GLOBAL   DATC5L,DAT46P,DAT46L,DATC6P,DATC6L,DATA6P,DATA6L
SSC      GLOBAL   DAT26P,DAT26L,DATC7P,DATC7L,DAT16P,DAT16L,DAT36P
SSC      GLOBAL   DAT36L,INC16P,INC16L,INC26P,INC26L,INC36P,INC36L
SSC      GLOBAL   DAT56P,DAT56L,DATR5P,DATR5L,LOCL1P,LOCL1L,DATA9
SSC      GLOBAL   UNIT9U,PNTR3I,SCR12V,SCR12P,SCR12L
MAIN9R   GLOBAL   DATAC4,DATAC5,DATAC6,DATAC8,DATR3I,DATR3V,DATR3P
MAIN9R   GLOBAL   DATR3L,BNDS1R,BNDS3R,BNDS7R,BNDS8R,BNDS9R,SCRH9I
MAIN9T   GLOBAL   TLUP1V,TLUP1I,TFLO1V,TFLO1I,TFUL5V,TFUL5I,TCUL6V
MAIN9T   GLOBAL   TCUL6I,INTG9V,INTG9I,TIME9V,RV,DATD5V,DATD5I
MAIN9T   GLOBAL   DATT6V,DVOG6V,SCRH1V,SCRH1I,SCRH1P,SCRH1L,SCRH3P
MAIN9T   GLOBAL   SCRH3L,SCRH5V,SCRH5I,SCRH5P,SCRH6V,SCRH6P,CORE
MAIN9T   GLOBAL   PLOT,STOR9
DRIV9T   GLOBAL   FIX6T,STOTAB
         END
```