NUREG/IA-0068
ICSP-CO-TURFW-T

International Agreement Report

Assessment of the "One Feedwater Pump Trip Transient" in Cofrentes Nuclear Power Plant With TRAC-BF1

Prepared by
F. Castrillo, Hidroelectrica Española
A. G. Navarro, I. Gallego, Union Iberoamericana De Tecnologia

Hidroelectrica Española
Hermosilla, 3
28001-Madrid
Spain

Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

April 1992

Prepared as part of
The Agreement on Research Participation and Technical Exchange
under the International Thermal-Hydraulic Code Assessment
and Application Program (ICAP)

Published by
U.S. Nuclear Regulatory Commission

Available from

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 37082
Washington, D.C. 20013-7082

and

National Technical Information Service
Springfield, VA 22161

NUREG/IA-0068
ICSP-CO-TURFW-T

International Agreement Report

Assessment of the "One Feedwater Pump Trip Transient" in Cofrentes Nuclear Power Plant With TRAC-BF1

Prepared by
F. Castillo, Hidroelectrica Española
A. G. Navarro, I. Gallego, Union Iberoamericana De Tecnologia

Hidroelectrica Española
Hermosilla, 3
28001-Madrid
Spain

Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

April 1992

Prepared as part of
The Agreement on Research Participation and Technical Exchange
under the International Thermal-Hydraulic Code Assessment
and Application Program (ICAP)

Published by
U.S. Nuclear Regulatory Commission

NOTICE

This report documents work performed under the sponsorship of the Consejo De Seguridad Nuclear of Spain. The information in this report has been provided to the USNRC under the terms of an information exchange agreement between the United States and Spain (Technical Exchange and Cooperation Agreement Between the United States Nuclear Regulatory Commission and the Consejo De Seguridad Nuclear of Spain in the field of reactor safety research and development, November 1985). Spain has consented to the publication of this report as a USNRC document in order that it may receive the widest possible circulation among the reactor safety community. Neither the United States Government nor Spain or any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability of responsibility for any third party's use, or the results of such use, or any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

FOREWORD

This report has been prepared by Hidroelectrica Española in the framework of the ICAP-UNESA Project.

The report represents one of the assessment calculations submitted in fulfilment of the bilateral agreement for cooperation in thermal-hydraulic activities between the Consejo de Seguridad Nuclear of Spain (CSN) and the United States Nuclear Regulatory Comission (NRC), in the form of Spanish contribution to the International Code Assessment and Applications Program (ICAP) of the US-NRC, whose main purpose is the validation of the TRAC and RELAP system codes.

The Consejo de Seguridad Nuclear has promoted a coordinated Spanish Nuclear Industry effort (ICAP-SPAIN) aiming to satisfy the requirements of this agreement and to improve the quality of the technical support groups at the Spanish Utilities, Spanish Research Establishments, Regulatory Staff and Engineering Companies, for Safety purposes.

This ICAP-SPAIN national program includes agreements between CSN and each of the following organizations:

- Unidad Eléctrica (UNESA)
- Union Iberoamericana de Tecnologia Eléctrica (UITESA)
- Empresa Nacional del Uranio (ENUSA)
- TECNATOM
- LOFT-ESPAÑA

The program is executed by 12 working groups and a generic code review group, and is coordinated by the "Comité de Coordinacion". This comitee has aroved the distribution of this document for ICAP purposes.

TABLE OF CONTENTS

FIGURES

TABLES

EXECUTIVE SUMMARY.-

This report presents the results of the assessment of TRAC-BF1 (G1-J1) code with the model of C.N. Cofrentes for simulation of the transient originated by the manual trip of one FW pump

C.N. Cofrentes is a General Electric designed BWR/6 plant, with a nominal core thermal power of 2894 Mwt, in commertial operation since 1985, owned and operated by Hidroelectrica Española S.A. The plant incorporates all the characteristics of BWR/6 reactors, with two turbine driven FW pumps

The objective of this assessment is to generate a Cofrentes model for TRAC-BF1 and compare code results with plant recorded data during the start-up test transient of "one feedwater pump trip" with the plant at nominal conditions.

The model has been developped from plant drawings and documentation, and a documented and validated RETRAN model.

Principal characteristics of the model include a 4 rings-8 levels vessel, two recirculation loops and one representative steam line; control systems and trips were also modelled.

A reference/nominal steady state situation was then adjusted by connecting submodels of portions of the system (vessel, recirculation loops, steam lines) previously tuned to the desired conditions. In the same way separated models for each of the control systems (feedwater/level, recirculation, pressure) were developped.

The point kinetic option was selected for core neutronic feedback, as considered adequate enough for this kind of mild operational transients. Reactivity coefficients were obtained from perturbations on the 3D simulator, around the initial steady state situation.

The transient selected to be reproduced with TRAC-BF1 was the "ONE FW PUMP TRIP" start-up test, performed to verify the capability of the plant to avoid reactor trip by reducing power to a level consistent with the capacity of the remaining operating pump.

Simulation of this operational transient with TRAC-BF1 will asses the performance of the code/model features related to dynamic level tracking, core neutronic feedback, recirculation and jet pumps performance in normal operating conditions, and check models generated for the control systems

A 150 seconds transient was run, this time including all the important phenomena occurring in the system.

Sensed level was the most critical plant variable to reproduce. Consideration of the water level shift between regions inside and outside the dryer skirt, due to pressure drop across the dryer, led to a good simulation of level behaviour as sensed in the plant.

Other variables measured: FW, steam, recirculation and core flow, as well as power and pressure were accurately reproduced by the code. Some additional tuning of FW control system settings and steam lines model would probably improve results for those variables that, in the second portion of the transient, behave slightly different to measurements (FW flow and dome pressure)

As a conclusion of this assessment a model of C.N. Cofrentes has been developped for TRAC-BF1 that fairly reproduces operational transient behaviour of the plant. A special purpose code was generated to obtain reactivity coefficients, as required by TRAC-BF1, from the 3D simulator. A complete validation of this model will require additional assessment with measurements from other transients that activates other portions and features of the code/model.

1.- INTRODUCTION

Hidroelectrica Española (HE) joined ICAP as a member of the UNESA group in order to simulate two transients of C.N.Cofrentes with TRAC-BF1 code and compare simulation results with data recorded at the plant.

The code information package, including tape with source program of G1J1 version, was received and implemented on a SIEMENS 7590-F computer. Some adaptation was needed on the source received (CDC version) to make it compilable; test cases were run, with results slightly different to those provided as reference in some of them. Later, on August 1989, the IBM version, as converted by Pennsylvania State University, was released to HE representatives by INEL. Implementation of this version is currently in progress.

Due to the above mentioned problems, the model and cases described in this report were developed using the TRAC-BF1 G1J1 version implemented in a CONVEX computer owned by UITESA. This version has been vectorized , achieving a reduction in the CPU time consumption of about 70%. The graphics option has been implemented for this computer and an interactive graphic system has been developped as a user friendly tool to plot output data

2.- PLANT DESCRIPTION

Cofrentes Nuclear Power Plant, ownwed and operated by Hidroeléctrica Española S.A., has a BWR/6 reactor (Mark III containment), designed by General Electric, with a rated thermal power of 2894 Mwt.

Located 50 Km from Valencia (Spain), Cofrentes comercial operation started in 1985 and is presently running its fith cycle.

Design features of the Nuclear Supply Steam System (NSSS) include two loop recirculation system, driven by two centrifugal pumps, feeding a total of 20 jet pumps, with a flow control valve in each loop. Feed-water is supplied by two turbine-driven pumps. Four main steam lines supply the main turbine with the steam generated in the reactor, each line equipped with isolation valves (MSIV), safety/relief valves (SRV) and turbine stop and control valves (TSV and TCV). Six bypass valves blowdown steam to the condenser from a common header connected to the four steam lines, with a nominal capacity of 35% rated steam flow.

The core consists of 624 fuel elements (8x8) with an active length of 150 in. and 145 control rods. Core power is monitored by 33 vertical strings, each holding 4 Local Power Range Monitors (LPRM), arranged in a uniform pattern throughout the core. Four Average Power Range Monitors (APRM) measure bulk power, each one averaging 24 LPRM signals.

NSSS instrumentation of interest for the transients analized in this report and related to the Control systems and Reactor Protection System (RPS) are briefly described: Dp transducers are used to measure flow in the recirculation, steam and feedwater lines; water level in the vessel downcomer is also measured by a Dp transducer, pressure signals are avaliable from sensors located in the steam dome and in the averaging manifold in steam lines at the entrance of TSV's

During start-up tests a special program for collecting plant signals was carried out. Prior to each significant transient test, a set of signals considered relevant for later analysis and simulation of the transient was defined. The Emergency Response and Information System (ERIS) was used as Data Adquisition System for sampling and recording selected signals.

3.- TEST DESCRIPTION.-

This transient, identified as Start-up test PPN-23C, was carried out on February 1985 with the plant operating at 95% thermal power and 94% core flow

The transient was initiated by manual trip of one feed-water pump, and the objective of the test was to verify the capability of the plant to avoid scram on low water level.

When one feed-water pump is tripped, water level starts decreasing and feed-water controller speeds-up the other pump to restore downcommer inventory; however, design capacity of one pump allows a maximum flow of 85 % of rated, consequently level will keep on dropping and eventually would reach low level (L3) setpoint, in about 15 seconds, and reactor will be scrammed if no action is taken. Cofrentes incorporates an automatic action that lowers power to a level consistent with the capacity of the remaining feed-water pump, this is acomplished by reducing core flow to a new steady state along the original control rod line in the operating map.

When level passes through the low water level alarm (L4), after a single feed-water pump trip, a "Recirculation Runback" is commanded to move both Recirculation flow control valves to a pre-stablished position. This originates a fast core flow reduction that means an increase of voids in the core and a subsequent power decrease. A new steady state is reached 50 seconds after initiation of the transient.

Figures 3.1 to 3.7 present plots of measured variables for the 150 seconds of interest, including 10 seconds previous to the initiation of the transient.

FIGURE 3.1.- MEASURED VESSEL LEVEL

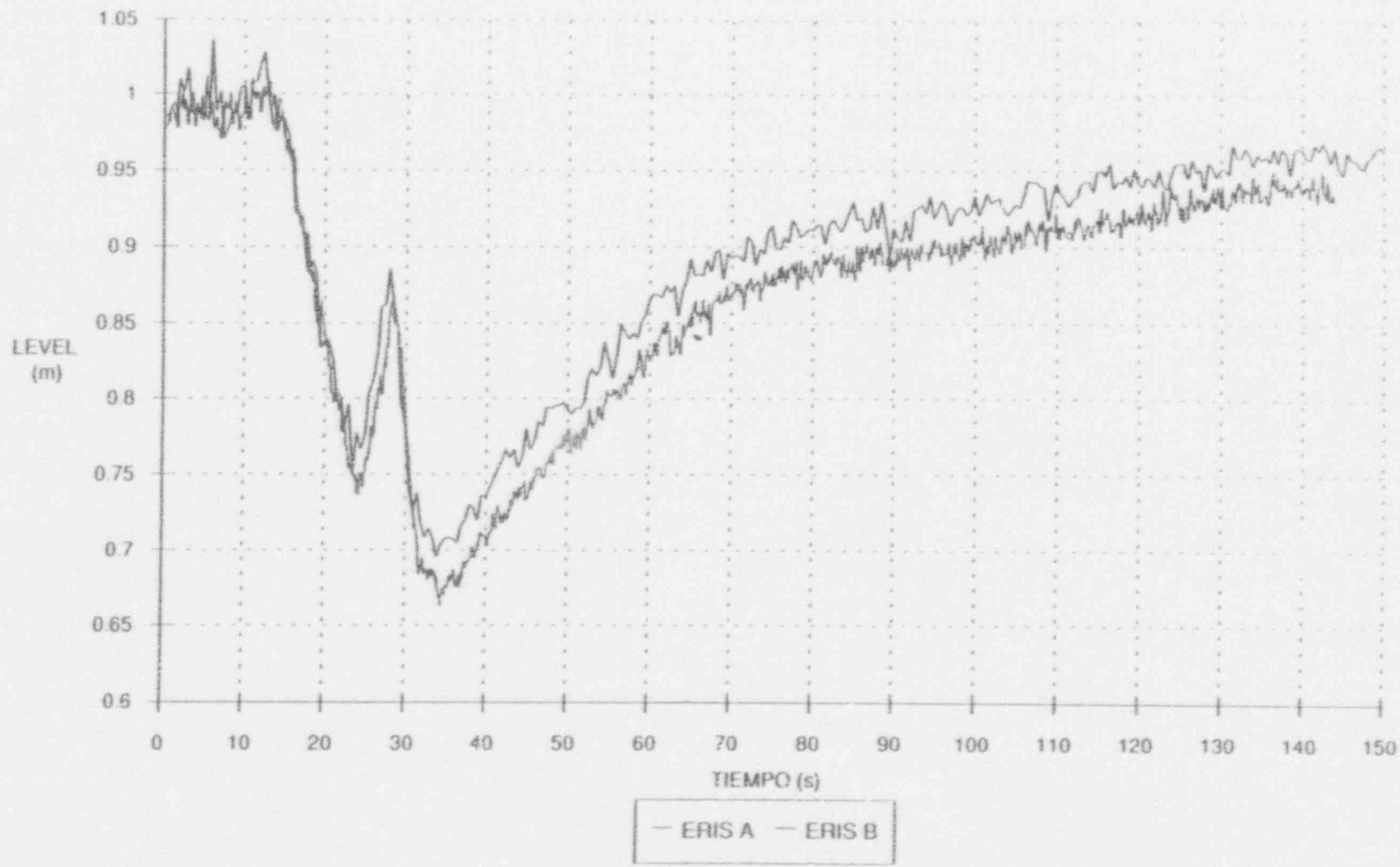


FIGURE 3.2.- MEASURED F.W. FLOW

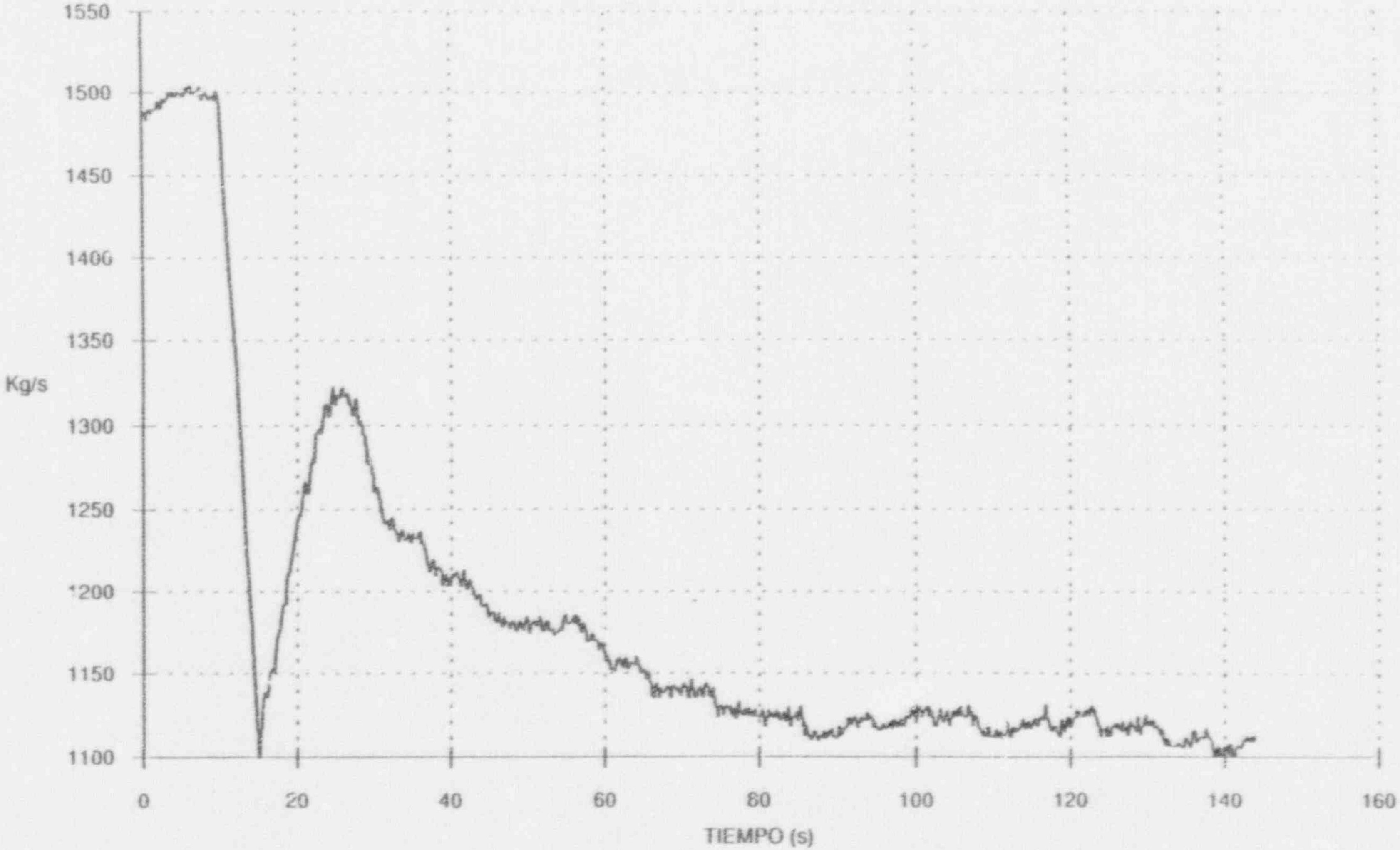


FIGURE 3.3.- MEASURED STEAM FLOW

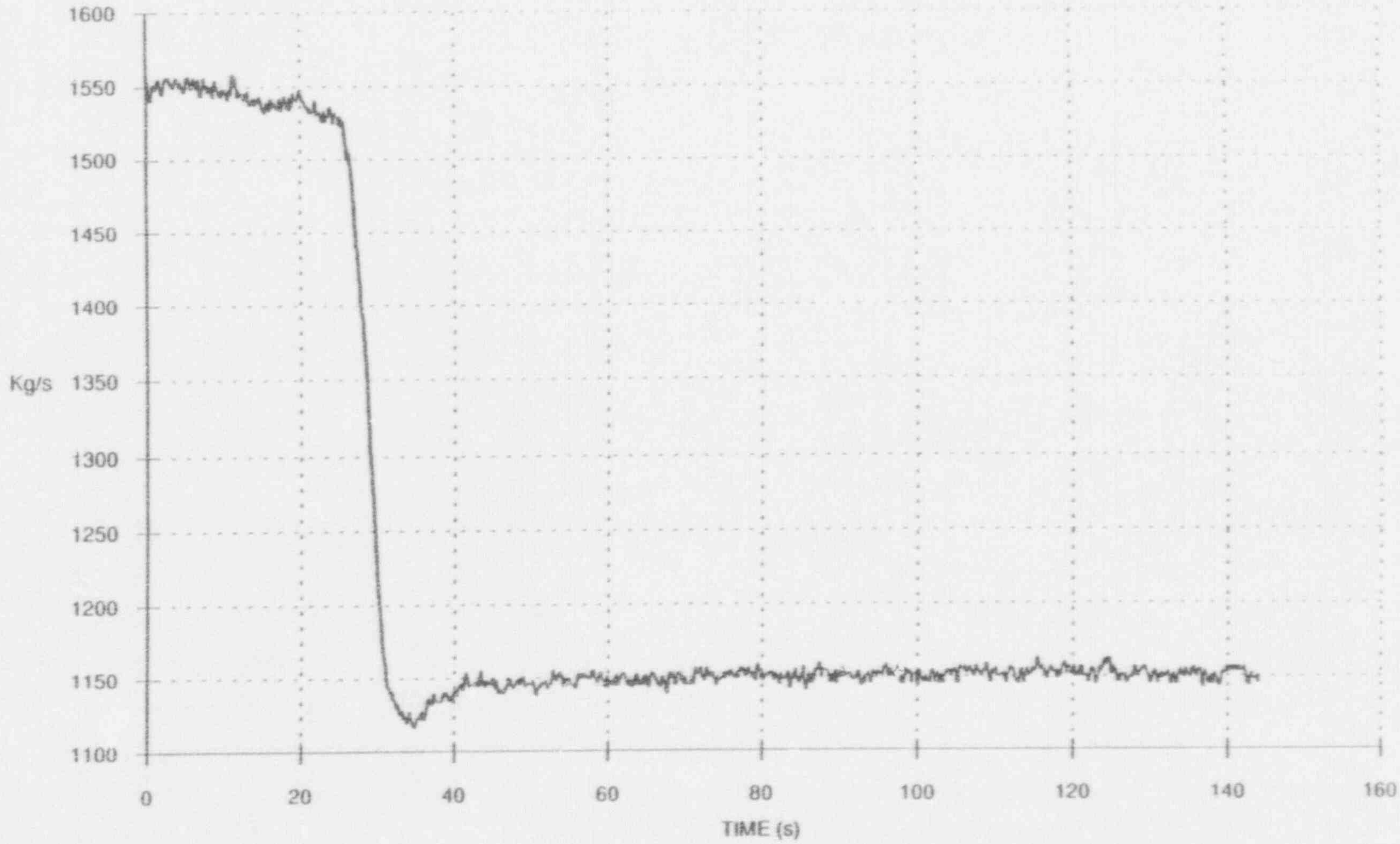


FIGURE 3.4.- MEASURED RECIRCULATION FLOW

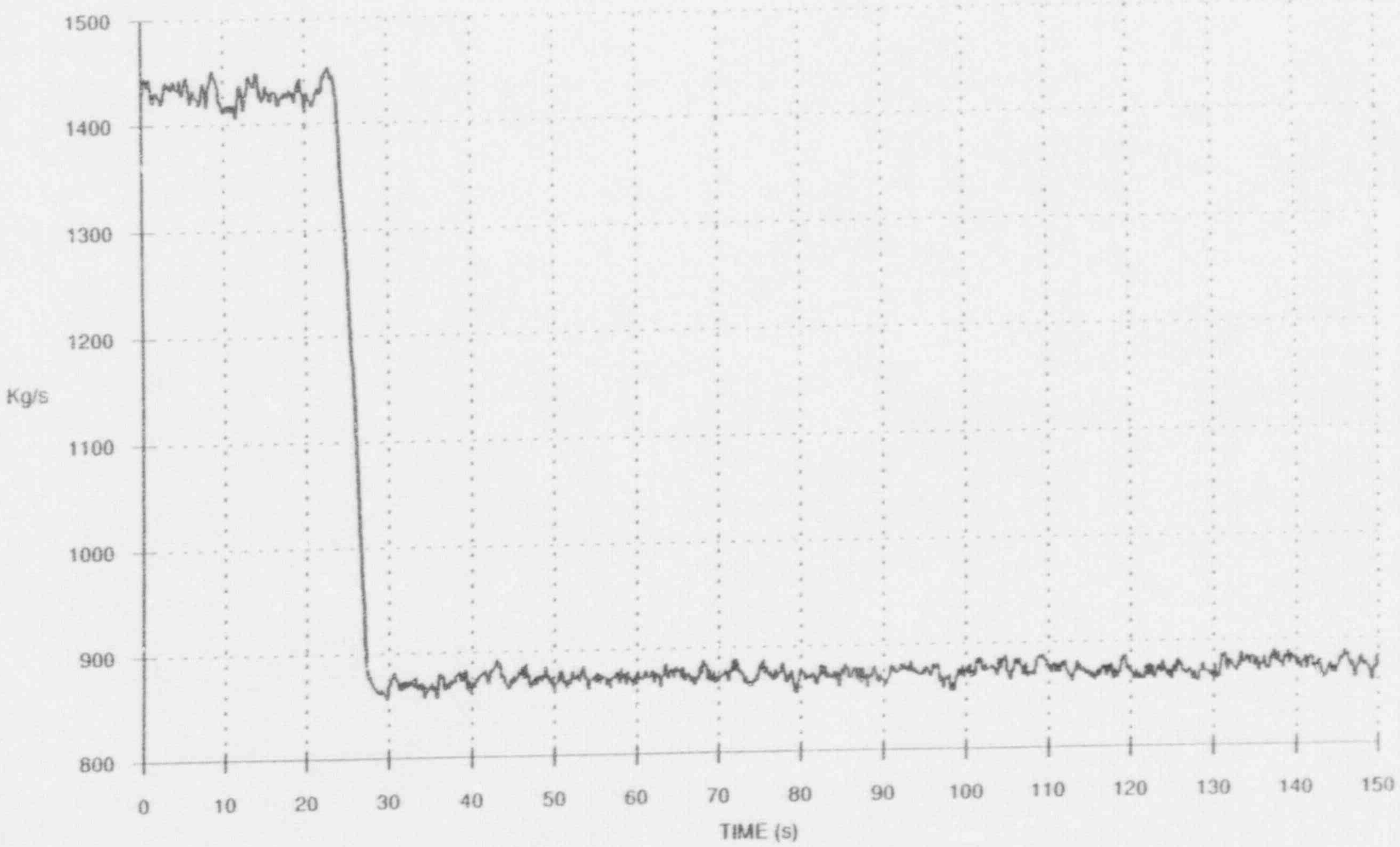


FIGURE 3.5.- MEASURED CORE FLOW/2

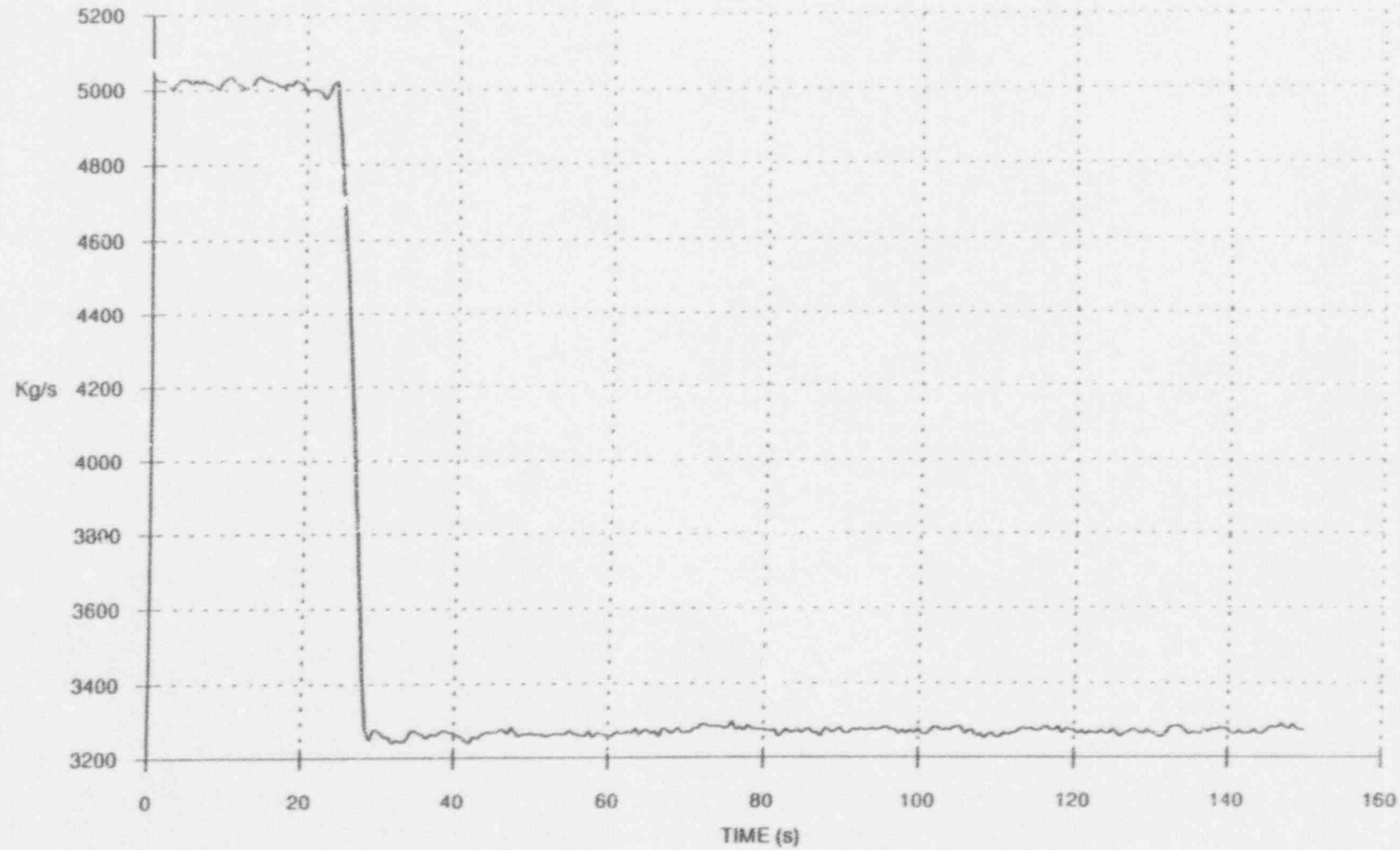


FIGURE 3.6 - MEASURED POWER (APRM)

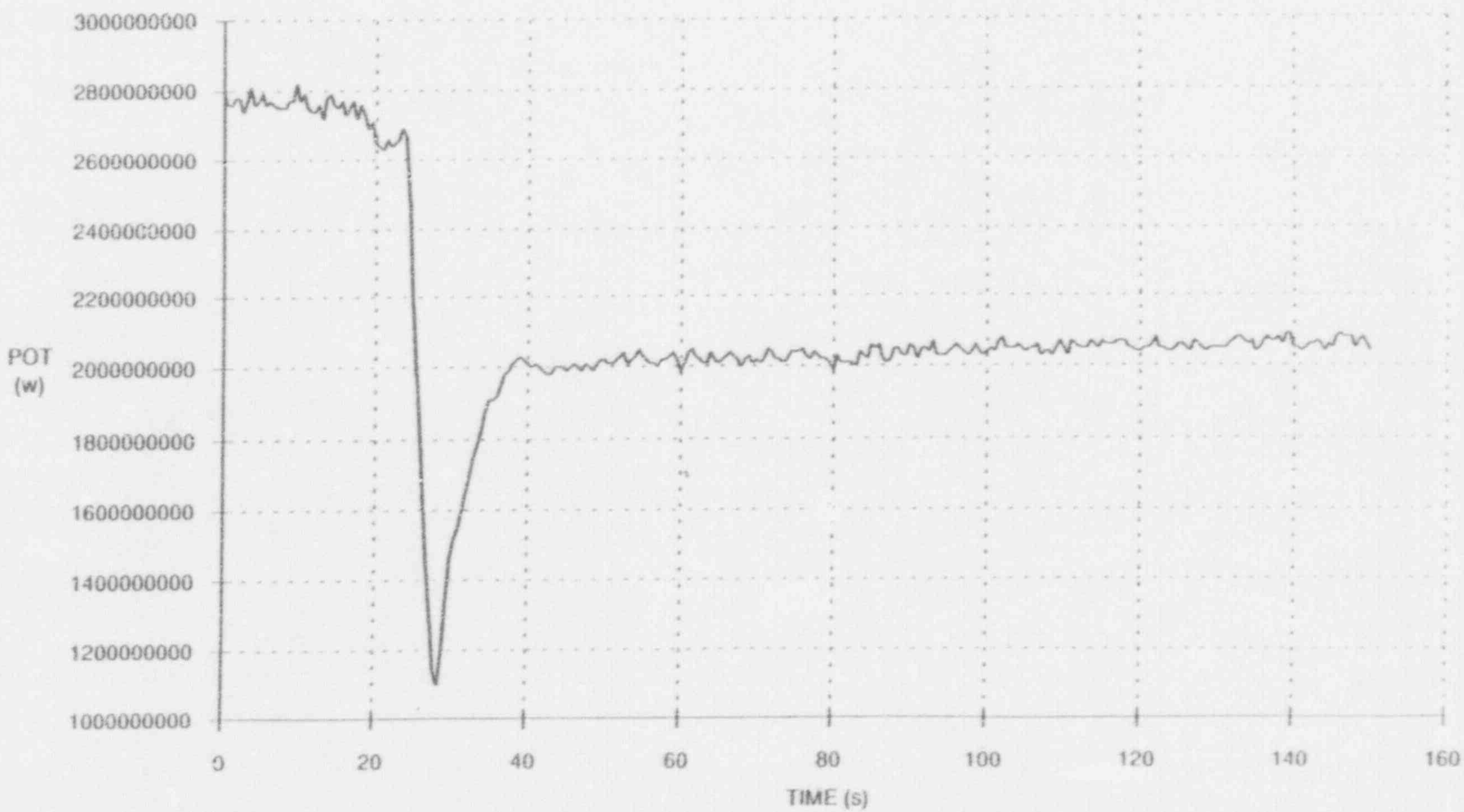
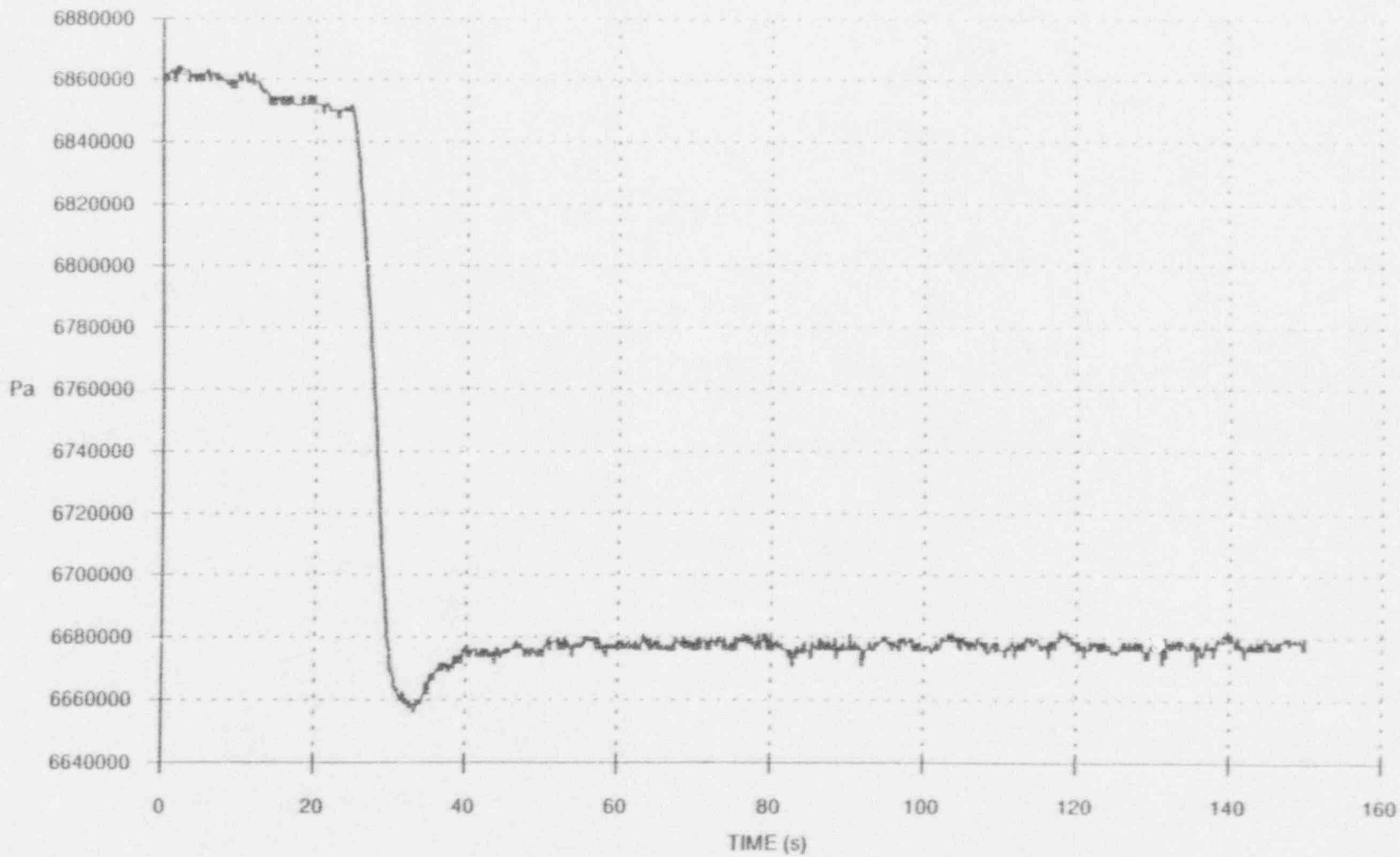


FIGURE 3.7 - MEASURED DOME PRESSURE



4.- MODEL DESCRIPTION.-

Figure 4.1 shows the Cofrentes model which includes reactor vessel and core, recirculation loops, steam lines from vessel to turbine valves, and control systems. Input data were mainly obtained from a documented RETRAN model.

The main components of the model are discussed in the following sections.

4.1.- VESSEL.-

Using the VESSEL component of TRAC-BF1, 4 rings and 8 axial levels were considered to model the reactor vessel. The three inner rings represent the volume inside the core shroud, with the core in levels 3 and 4, and the outer ring models the downcomer. As illustrated in Figure 4.1, levels 1 and 2 represent the core inlet plenum, with jet pumps discharge located in bottom of level 2 (ring 4); core exit plenum is represented by level 5 (rings 1,2,3).

For the type of transient being analized, it would be enough one single ring to model the core region, with one average bundle (CHAN component) to represent the fuel elements. However, three rings were considered to allow for future accident analysis (LOCA, ATWS), in which upper plenum 2D/3D effects, when spray is activated, are important to simulate the distribution of coolant over the fuel bundles.

The 624 fuel elements have been divided into three groups:

- high power
- average power
- low power (including peripheral elements)

connected to the lower and upper plenum in each core ring, as illustrated in Figure 4.2.

No metal structures were modeled as the time of interest in the transients to be analized is relatively small (150 sec. maximum), and temperature change in the vessel is not relevant

Separators and dryer are modelled in the axial level 6 using the perfect Separator option, after some failed attempts to use the mechanistic model; stand pipes are also included in this level.

Vessel connections to other components include feedwater inlet, modelled as a fill, gover ed by the level control system, discharging in the downcomer via a leak path (level 5, ring 4). Steam outlet is located in level 7, ring 4. Outlets to Recirculation loops from lower downcomer are located in level 2 (ring 4). Recirculation flow mixes in the jet pump (component external to vessel) with driven flow from downcomer level 4, to discharge into lower plenum.

Channel components representing fuel bundles are connected to lower and upper plena, with leakage flow discharging to the bypass flow region (levels 3-4, rings 1-2-3)

ECCS injections have been also modelled, using the leak path feature, although they are not used in the transient.

4.2.- RECIRCULATION SYSTEM.-

Both Recirculation loops have been modelled, each being divided into three components:

- PUMP 11-21, representing the suction pipe, from vessel downcomer, and centrifugal pump

- VALVE 12-22, representing the flow control valve and discharge pipe up to jet pump inlet

- JETP 15-25, modelling the 10 jet pumps connected to each loop.

Flow control valve area is defined by the Recirculation control system.

Recirculation discharge piping consists of one main raiser that divides into ten branches to feed the corresponding jet pumps; these branches have been lumped into one single line, on the basis of maintaining steady state pressure drop.

The JETP component of TRAC-BF1 has been used to model the 10 jet pumps connected to each loop.

4.3.- MAIN STEAM LINES.-

One single equivalent line has been used to model the four parallel steam pipes, with 5 main components:

- TEE 80, models pipes from vessel exit to MSIVs, relief valves are connected to this component althoug not actuated during the transient
- VALVE 81, represents MSIVs and associated pipe
- TEE 82 represents pipes from MSIVs to turbine control/stop valves, and branching to bypass valves that discharge to main condenser.
- Turbine control and stop valves, modelled by VALVE 83, with position governed by pressure control system; they discharge to BREAK 92, which represents pressure boundary condition at turbine inlet.
- Bypass valves are modelled by VALVE 70 with boundary condition represented by BREAK 73

4.4.- FUEL ELEMENTS.-

The 624 fuel elements of the core have been divided into three groups (Figure 4.2), corresponding to the three inner rings of the vessel model:

80 central high power
436 central average power
108 peripheral low power

The CHAN component of TRAC-BF1 has been used to model the characteristics of the fuel bundles. 11 axial nodes have been selected, with active length between nodes 3 to 10, and one group to represent the 8x8 fuel rods

Leakage flow to the bypass region surrounding fuel channels has been considered by means of a leak path from the second axial node of the channels to vessel level 3.

4.5.- CORE POWER AND REACTIVITY FEEDBACK.-

Reactivity feedback has been modelled using the point kinetic option, with void and Doppler coefficients and scram curve obtained from perturbations on the 3D simulator, performed around the steady state situation of the core

A common axial power distribution is defined for the three types of fuel channel/bundles modelled.

4.6.- CONTROL SYSTEMS AND TRIPS.-

The three control systems typical of boiling water reactors are included in the model, as well as trips associated to Reactor Protection System and other automatic actions.

4.6.1.- Pressure control system.-

This system governs turbine and bypass steam flow, as a function of pressure upstream turbine control valve.

Figure 4.3 illustrates the scheme of the model developped. Special attention was paid to the proper representation of turbine control valve characteristic, to reproduce actual behaviour in terms of steam flow versus position

No adjustment of the bypass portion of the system has been made for this transient.

4.6.2.- Feedwater control system.-

Based on a level error signal and mismatch between steam and feedwater flows, this system controls the amount of feedwater entering the vessel.

Downcomer water level, as computed by TRAC, is corrected based on dryer [illegible]ssure drop, to obtain downcomer water level as measured in the p[illegible]. Sensors and controllers are modelled by available control blocks following the actual system design (Figure 4.4). A special logic was developped to reproduce coastdown of one pump and to obtain a smooth transition on total feedwater flow when the remaining available pump speeds-up in response to controller demand.

4.6.3.- Recirculation flow control system.-

As the plant is operated in manual mode, only the portion of the system representing this function has been considered.

The output of the system determines Recirculation control valve position, which has been translated into valve area by a separate calculation, using a specific model of the valve to reproduce the Cv versus position curve as given by the manufacturer.

One of the objectives of the test analyzed in this report was to verify the behaviour of the recirculation runback. A logic has been incorporated to the model that switches the manual valve position demand to a fixed position (26% open) corresponding to a core flow demand of 53.15% when low level alarm is detected, provided one feedwater pump is tripped (Figure 4.5).

FIGURE 4.1.- C.N. COFRENTES MODEL FOR TRAC-BF1

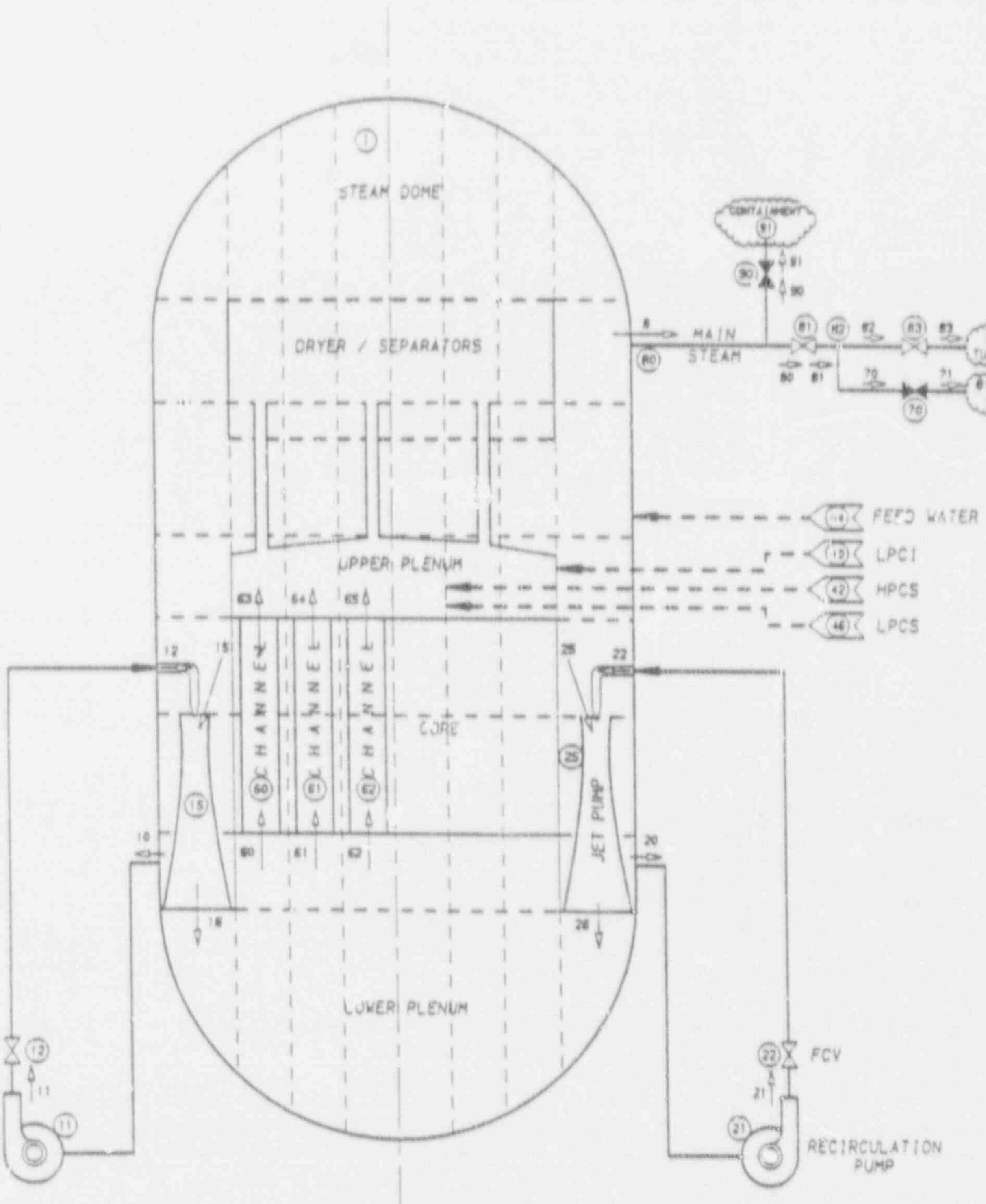


FIGURE 4.2.- CORE CHANNELS DISTRIBUTION

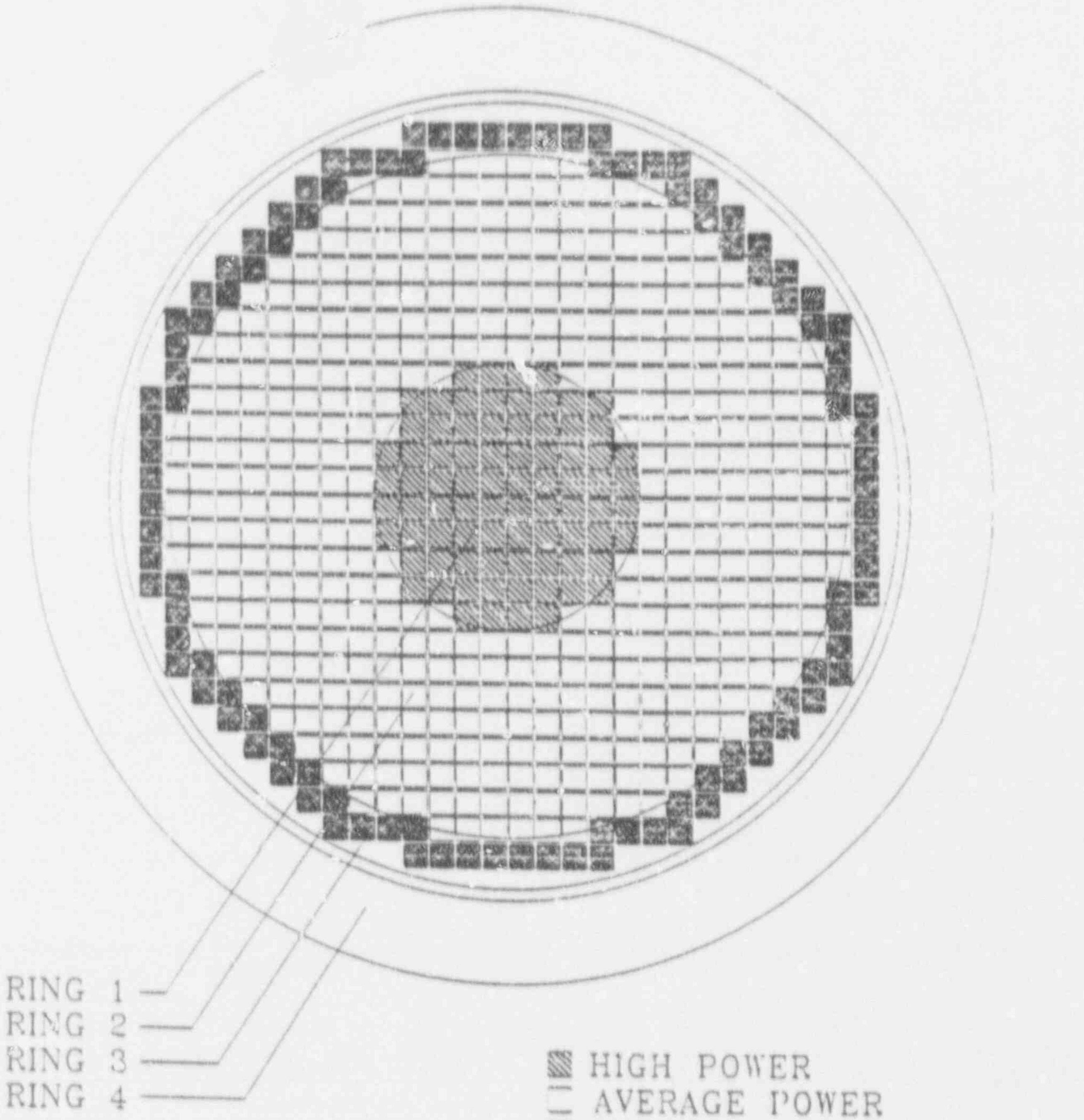


FIGURE 4.3. PRESSURE CONTROL SYSTEM

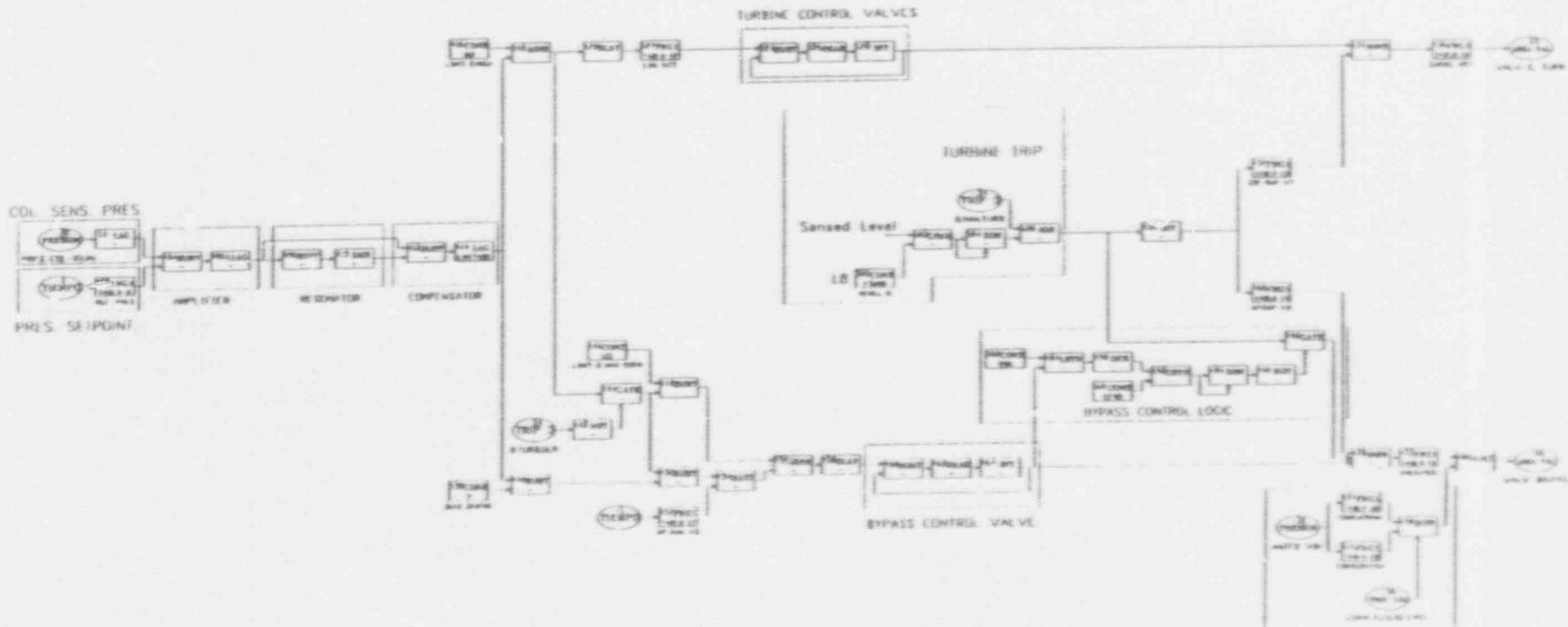


FIGURE 4.4. LEVEL/FW. CONTROL SYSTEM

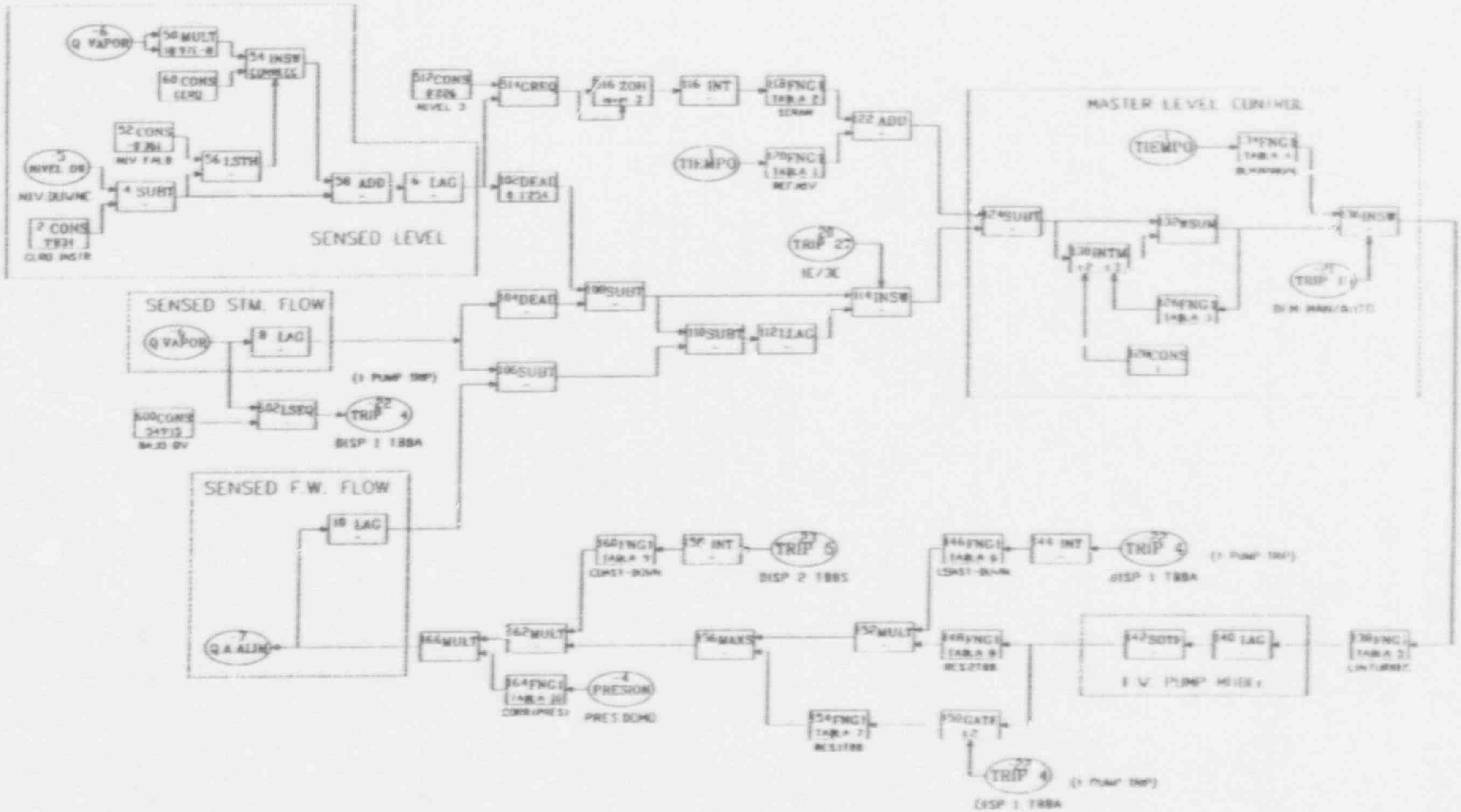
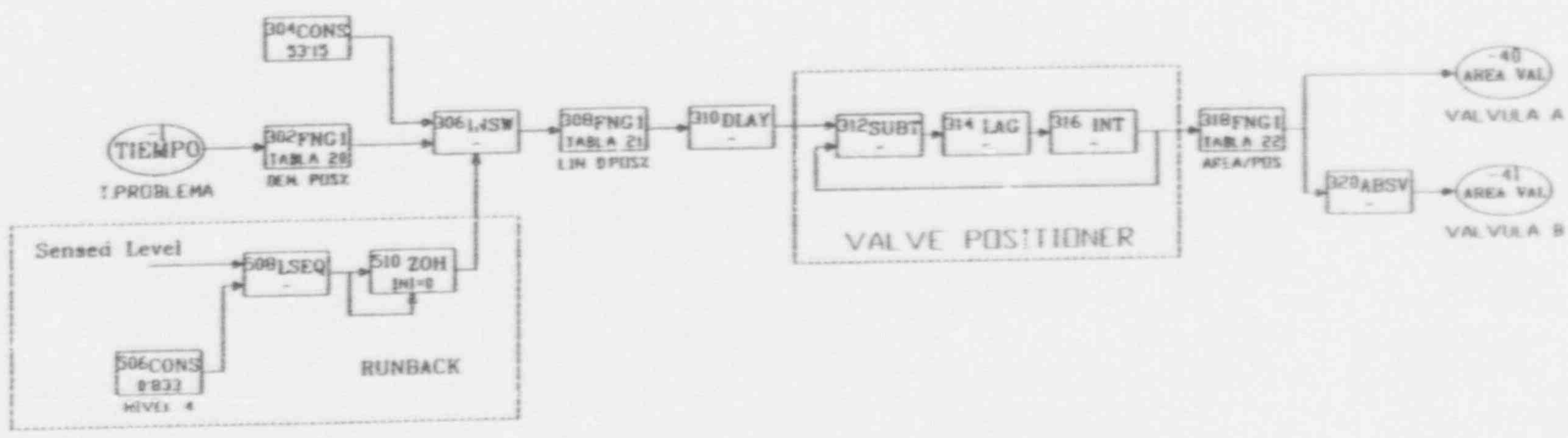


FIGURE 4.5. RECIRCULATION CONTROL SYSTEM



5.- STEADY STATE.-

A nominal steady state of the system (Table 5.1) was defined as a reference or base line condition

Flow split to the three modelled channels and bypass were calculated by a steady state analysis of the core with FIBWR code.

To adjust a steady state situation, with TRAC-BF1, for a model as that described for Cofrentes, is a hard task to perform if one has to deal with the whole system and too many variables and parameters to control. The approach followed was to adjust separately pieces or submodels with the proper boundary conditions, and assemble them one by one to build up the entire model.

Partial models were adjusted for channel, jet pumps, steam lines, recirculation loop, vessel and each of the control system

The final steady state reached is presented in Table 5.1 for the most significant variables, where comparison with target values is also included.

A null transient, from the steady-state reached, was run, with the reactivity feedback mechanism activated, to verify stability of steady state conditions.

Table 5.1.- Reference Steady State condition

Variable	Reference	TRAC
Core flow (Kg/s)	10646	10642
Recirculation flow, 1 loop (Kg/s)	1550	1550
Steam flow (Kg/s)	1569	1565
Feedwater flow (Kg/s)	1569	1565
Dome pressure (Pa)	7.17E6	7.17E6
Steam collector pressure (Pa)	6.765E6	6.764E6
Water level, from downc. bottom (m)	10.71	10.71
Core support plate pres. drop (Pa)	0.17E6	0.169E6
Core bypass flow (Kg/s)	1127.5	1129

6.- TRANSIENT RESULTS AND COMPARISON WITH PLANT MEASUREMENTS.-

The initial conditions prior to initiation fo the transient, as measured in the plant on February the 2nd, 1985, were:

Core Power	2750 Mwt.	(95%)
Core flow	10080 Kg/s	(94%)
Dome pressure	6.86 Mpa	
Vessel level	100 cm	(ref. to 0 instr.)
FW flow	1500 Kg/s	

From the reference steady state, the model was conducted to a new one corresponding to the above conditions, by adjusting the necessary control systems setpoints, and letting it run a 100 sec. null transient to verify stability.

Using the EXTRACT feature of TRAC, the model input file was updated to the test initial condition.

It was necessary to run 30 sec. of null transient previously to initiation of the event because the EXTRACT function only updates thermal hydraulic variables, but not those corresponding to control blocks. Availability of this feature to update control blocks, when a EXTRACT is performed, would be a helpful improvement to the code.

Figures 6.1 to 6.7 show plots comparison of calculated and measured values for the most relevant variables.

The most critical variable to reproduce has been the sensed level. Several runs with different approaches to model sensed level were considered unsatisfactory. It was found that a very accurate simulation of sensed level evolution was achieved by taking into account the difference in water levels inside and outside the dryer skirt, due to the pressure drop across the dryer, as a function of steam flow through dryer.

The initiating event: manual trip of 1 FW pump, was activated at t = 10 sec.

FW flow quickly reduces and causes drop of downcomer water level, reaching low water level alarm (L4 = 0.7823 m.) at t = 22.5 sec.(12.5 sec. after transient initiation), this activates the Recirculation runback logic that commands partial closure of flow control valves (FCVs) to 26% open position.

Partial closure of Recirculation FVCs reduces core flow to 60% in about 3 seconds (Figure 6.5), consequently void content of the core increases and, due to the negative void reactivity coefficient, fission power decreases as shown in Figure 6.6, where a very good agreement in core power response can be observed for both the initial low power spike and further evolution to a new stable power level.

Downcomer water level behaviour can be seen in Figure 6.1, where the effect of core flow reduction is well reproduced by the temporary increase before the minimum value at t = 30 sec. is reached . As the level control system reacts to level drop, FW flow demand increases and the remaining operating pump accelerates to deliver its maximum capacity. Figure 6.2 shows a good agreement in FW response during coastdown of tripped pump and first portion of acceleration of the other, differences between calculated and measured responses are observed for the second portion of the transient, where FW flow accomodates to the new steady state; it is believed that these differences could be reduced with further adjustment of parameters of the level control system.

Figure 6.3 shows the evolution of steam flow which exhibits an initial bias that is maintained in the new steady state, and is attributed to the poor accuracy of the instrumentation.

Sensed dome pressure is presented in Figure 6.7, both calculated and measured traces present the same decreasing slope, consequent to power reduction and accomodation to the new core conditions. A constant shift is observed after this reduction that could be accomodated with a better refinement of the model for steam lines, nevertheless the relative error is less than 1%.

FIGUPE 6 1.- SENSED WATER LEVEL

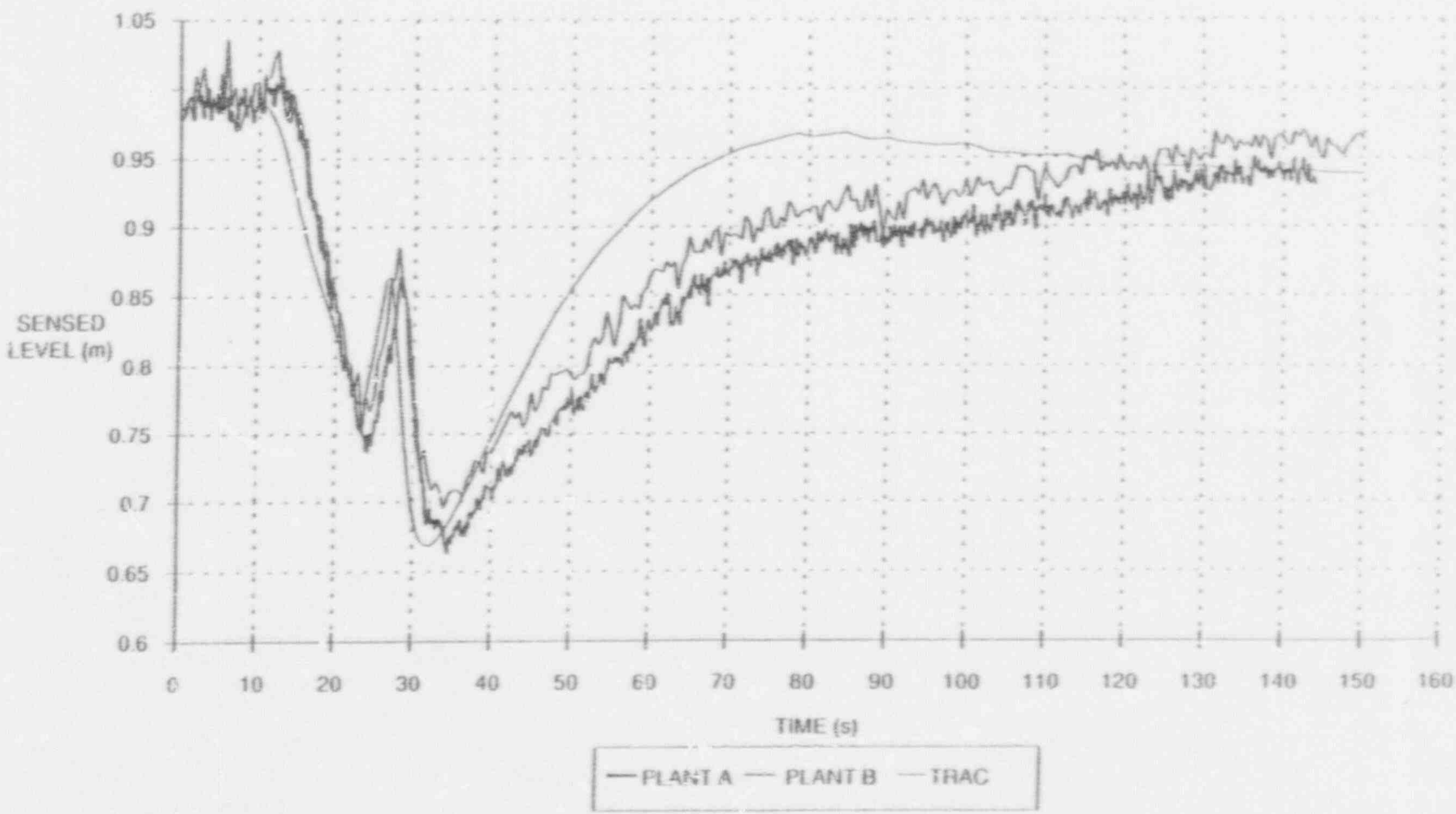
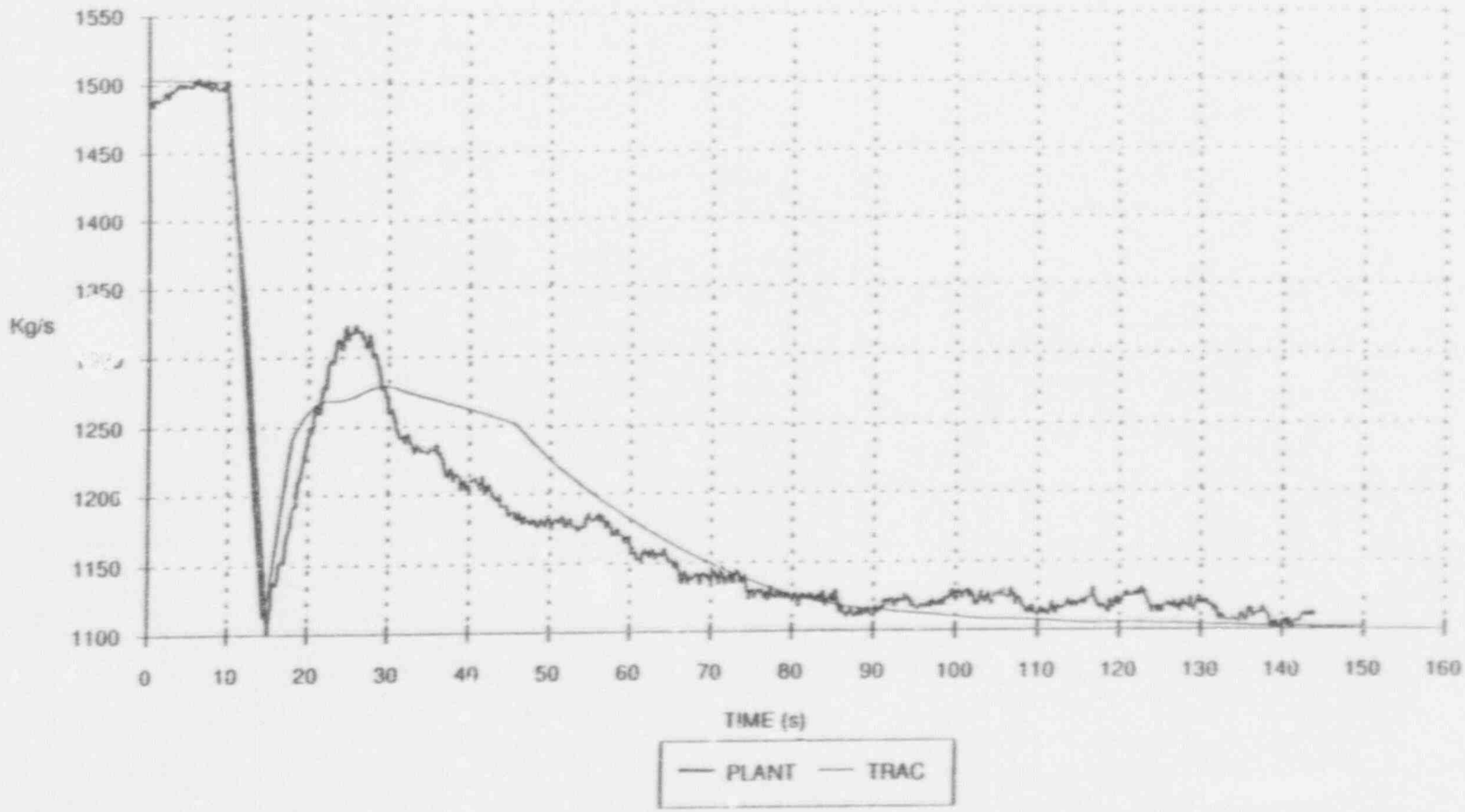


FIGURE 6.2.- TOTAL FEEDWATER FLOW



6-5

FIGURE 6.3.- STEAM FLOW

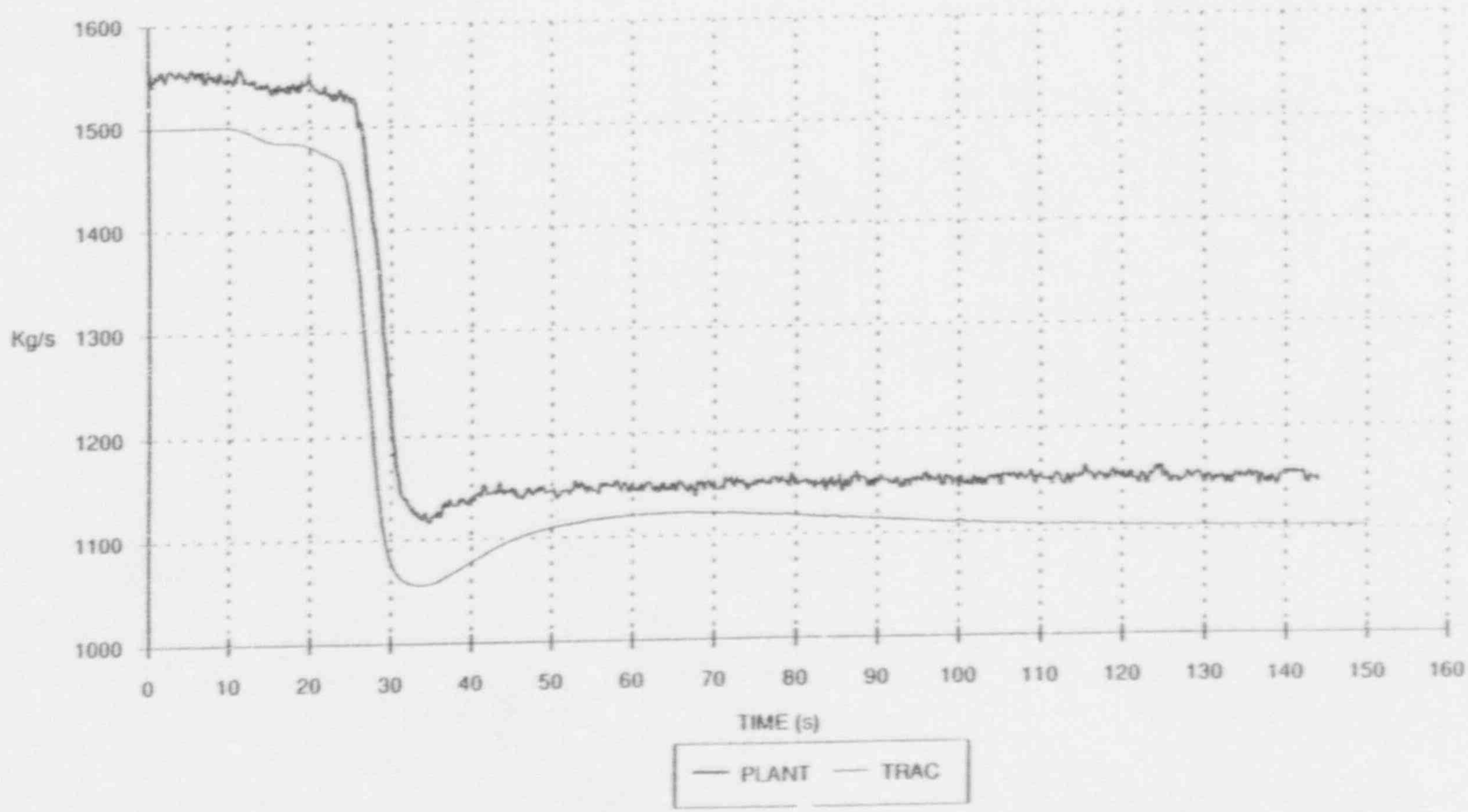


FIGURE 6.4.- RECIRCULATION FLOW (1 LOOP)

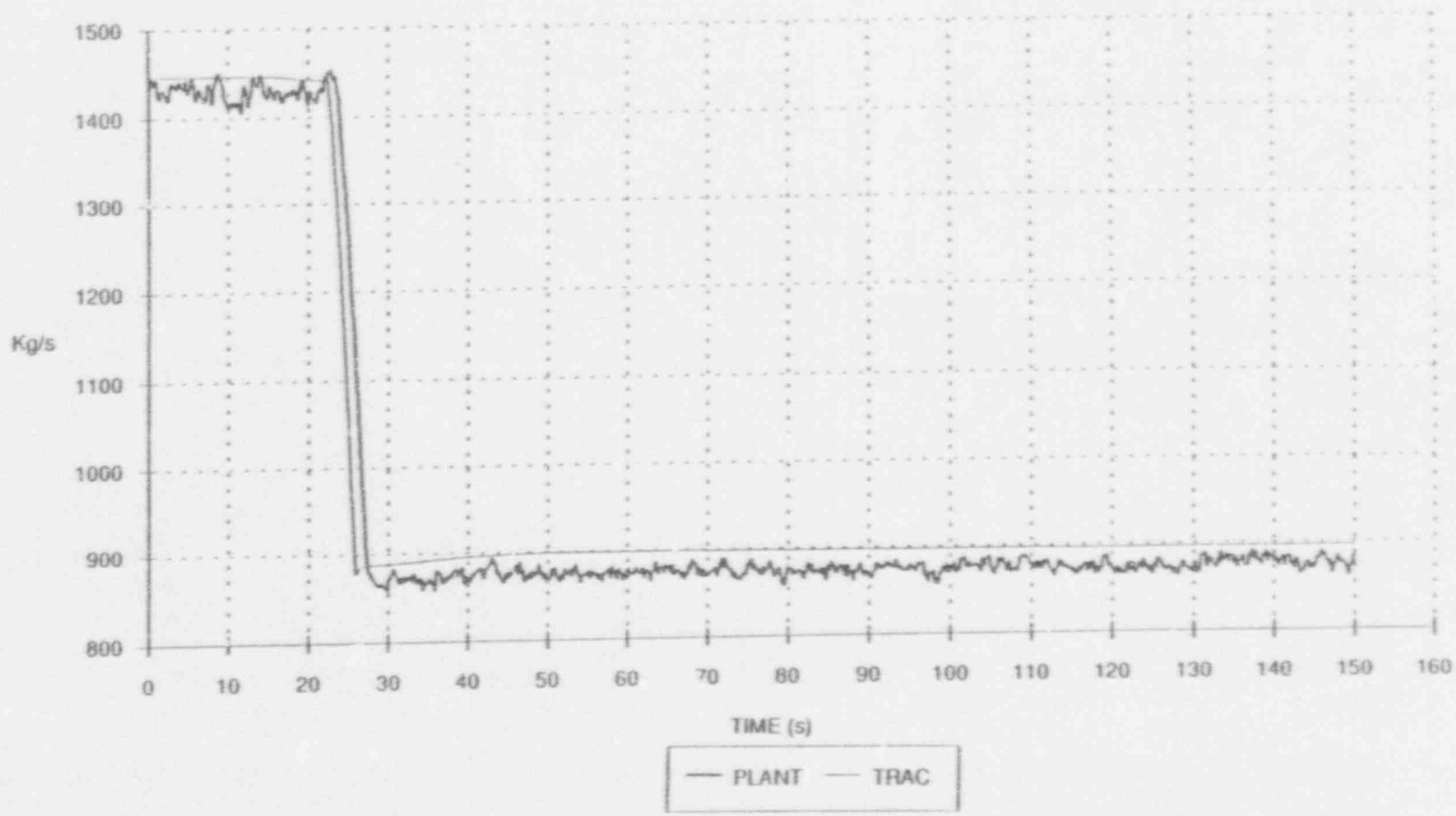


FIGURE 6.5.- CORE FLOW /2

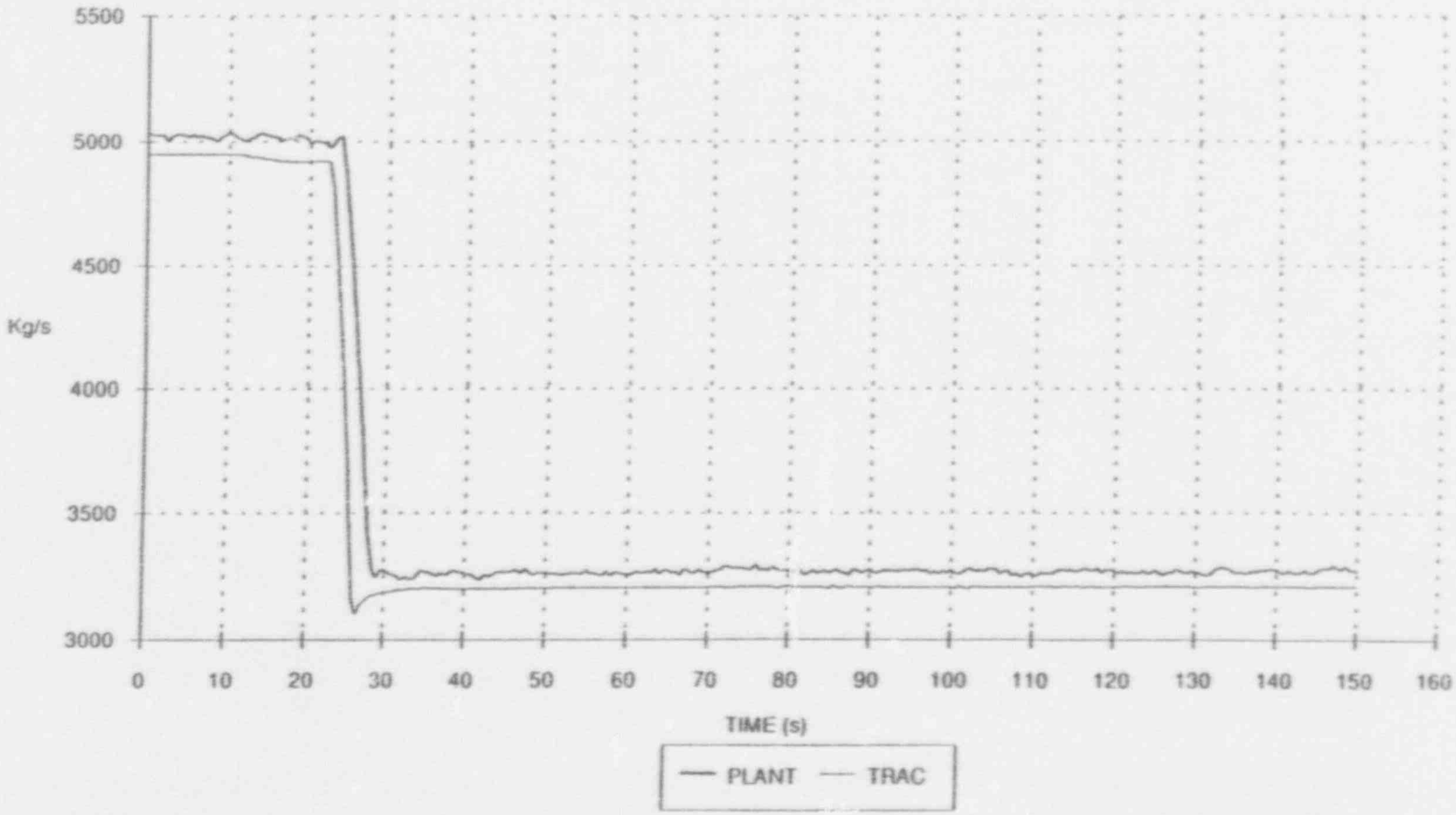


FIGURE 6.6.- CORE POWER

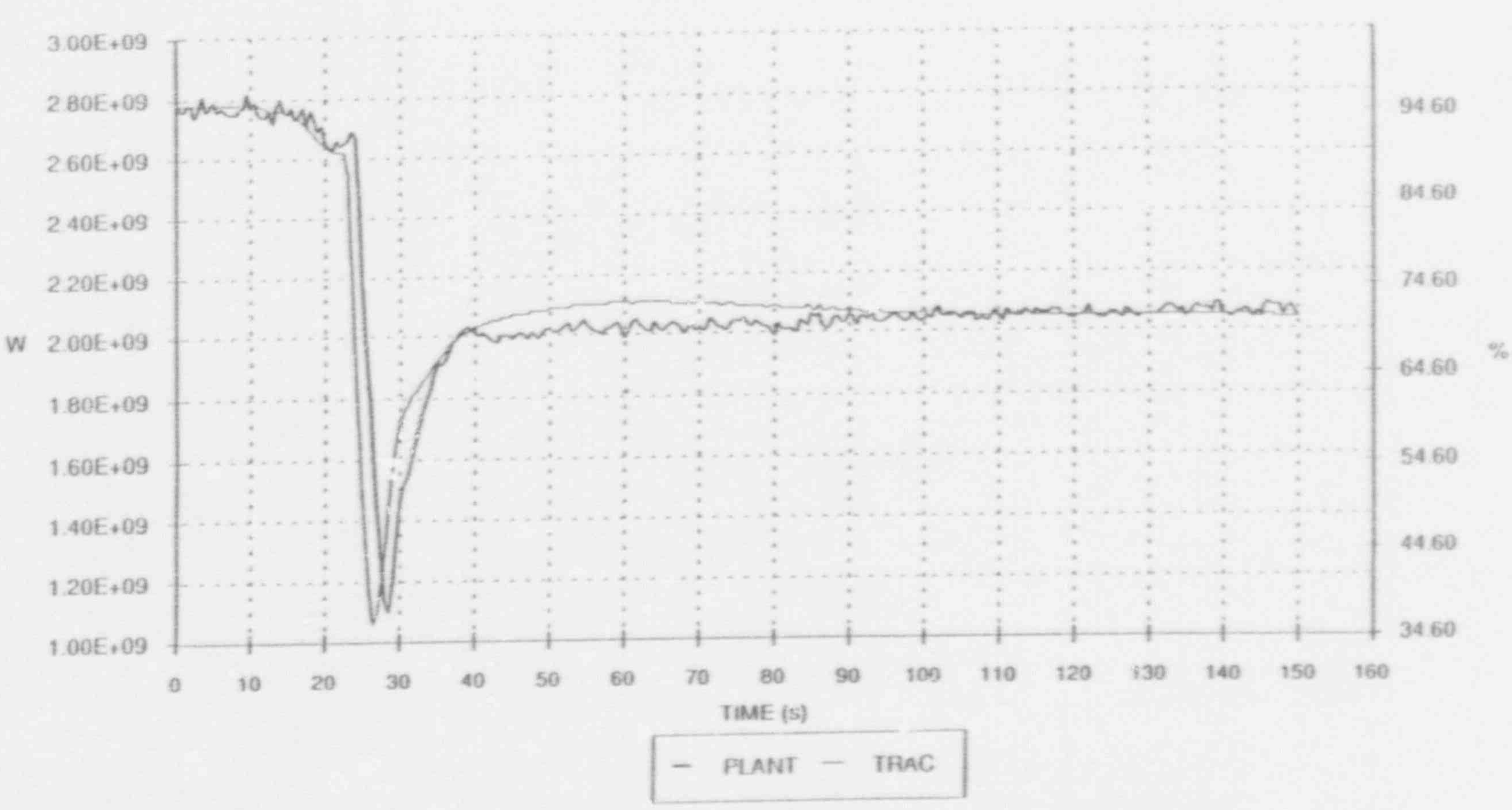
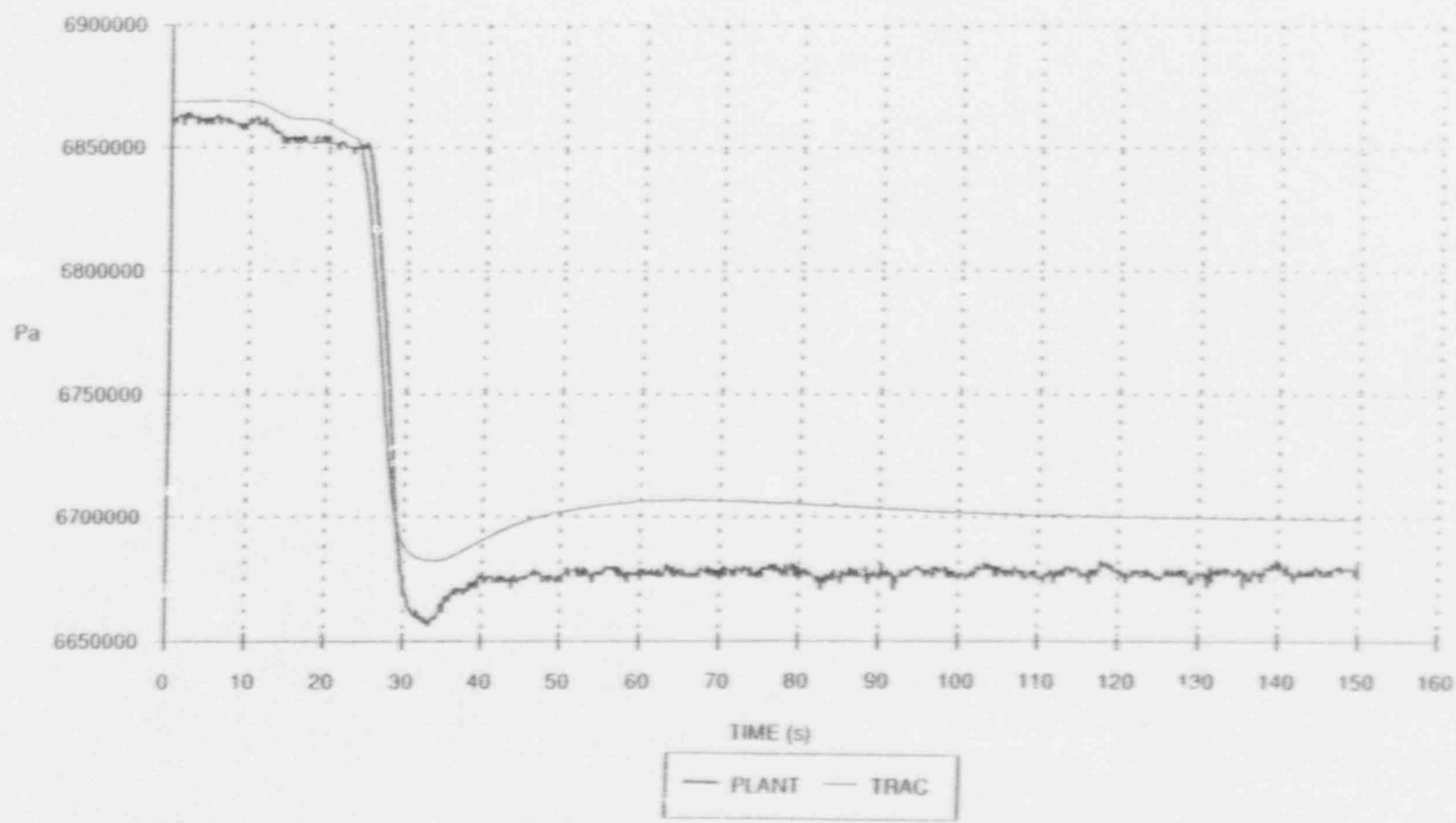


FIGURE 6.7.- DOME PRESSURE



7.- RUN STATISTICS.-

All TRAC runs were made on a CONVEX-C120 vectorial computer owned by UITESA.

Figure 7.1 is a plot of CPU time versus transient time (RT) and Figure 7.2 plots time step size (DT) versus transient time.

Required calculation of "grind time" for this transient, with a total number of 128 cells, for the 23 components of the model, is as follows:

CPU	(total execution time)	= 11401 s.
C	(total number of volumes)	= 128
DT	(total number of time steps)	= 5008
RT	(transient time)	= 150

$$(CPU \times 10^3)/(C \times DT) = 17.79$$

FIGURE 7.1 - CPU TIME vs. TRANSIENT TIME

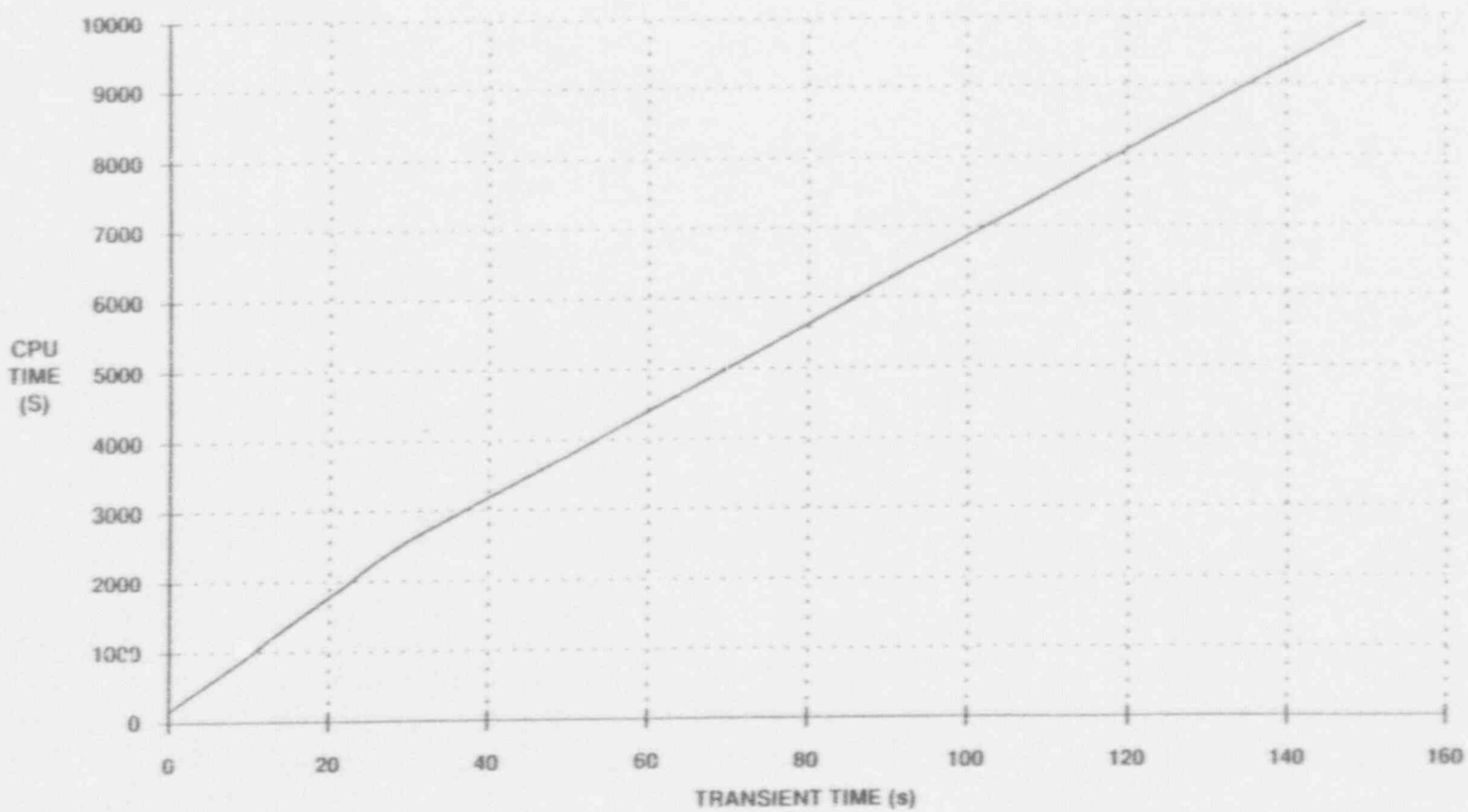
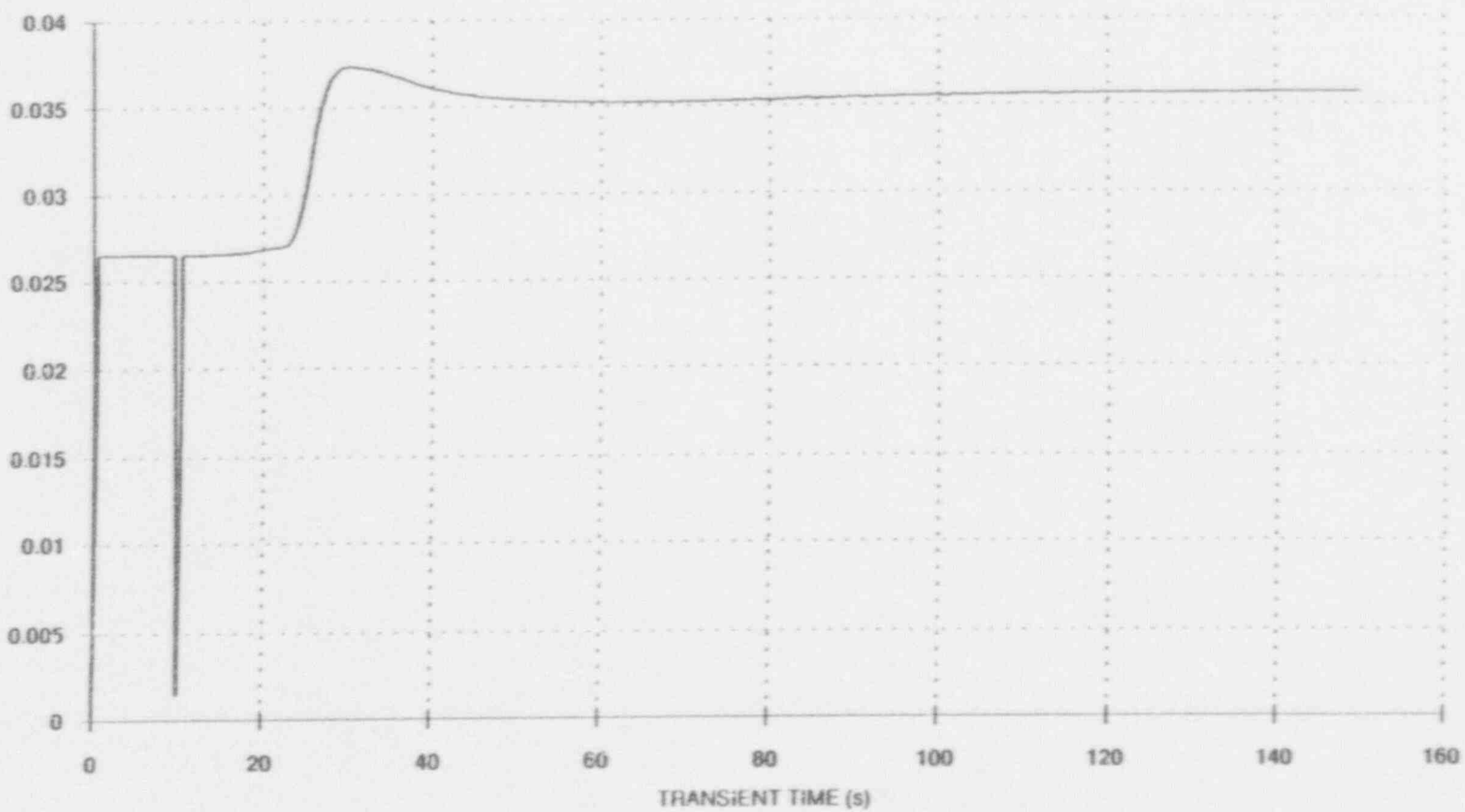


FIGURE 7.2.- TIME STEP SIZE vs. TRANSIENT TIME



8.- CONCLUSIONS.

A model of C.N. Cofrentes for TRAC-BF1 has been developped and proved to be adequate for operational transient analysis.

The start-up test of "Trip of One Feedwater Pump" has been reproduced with this model an results have been compared with plant measured data.

A good agreement between calculated results and measured test data has been achieved. Point kinetics option is fairly adequate for this type of operational transients.

Control systems models closely simulate the response of plant contollers. Further improvements/adjustments of feedwater controls could better aproximate behaviour of feedwater flow.

Attempts to use the mechanistic model for the separators, have led to non satisfactory results.

The EXTRACT feature of TRAC should be improved with the capability to update variable status of control blocks.

APPENDIX I

TRAC Major Edit for the Reference Steady State

at Nominal conditions: 100% core power/ 100% core flow

```
Digital Equipment Corporation - VAX/VMS Version V5

DECNET

XXESTACIONARIO100
```

```
1
  TRAC-BF1/ ( 1)       01/09/87 DEVELOPED AT INEL BY THE THERMAL HYDRAULICS CODE DEVELOPMENT BRANCH    #*G1J1                    PAGE    23
                                EXECUTED ON :  8-Nov-89       TIME : 10:33:18
  BWR/5 TRANSI       -< DISPARO DE TURBOBOMBA DE AGUA DE ALIMENTACION

                             ***************************
                             *                         *
                             *    TRAC MAJOR EDIT    8 *
                             *                         *
                             *    AT TIME STEP =   281 *
                             ***************************

0    TIME = 6.49375E+00 SEC.    DELT = 2.61780E-02 SEC.    TIME STEPS =  281.    NUMBER OF HYDRODYNAMIC SOLUTION ITERATIONS =      1
0      TIME STEP COURANT LIMITED BY COMPONENT   62,FACE   0, TO  2.618E-02 SEC
0      TIME STEP SELECTION MODE =    4
0      TIME STEP LIMITED BY COURANT CONDITION
0      AVERAGE OUTER ITERATION COUNT OVER THE LAST   1E TIME STEPS WAS  1.0CE+0C
0      TOTAL NUMBER OF TIMES THAT EACH COMPONENT WAS THE LAST TO CONVERGE SINCE THE LAST EDIT -
       TRAC COMP SEQUENCE NUMBER    1 -  10        0    0    0    0    0    0    0    0    0    0
       TRAC COMP SEQUENCE NUMBER   11 -  20        0    0    0   18    0    0    0    0    0    0
       TRAC COMP SEQUENCE NUMBER   21 -  23        0    0    0
0      THE LAST MINIMUM NUMBER OF OUTER ITERATIONS WAS   1 AT STEP  280, LIMITED BY COMPONENT 80, WITH DELTA-P/P =   4.59E-04
0      THE LAST MAXIMUM NUMBER OF OUTER ITERATIONS WAS   1 AT STEP  280, LIMITED BY COMPONENT 80, WITH DELTA-P/P =   4.59E-04
```

```
0     JOB TIME = 7.587E+02      TRAC EXECUTION TIME = 7.587E+02

0************   TIME =    6.49375    DELT = 1.61780E-02    NSTEP =   281    ************
   TRIP INFORMATION (SET TRIPS)
                                       NO TRIP SET POINT YET REACHED

0************   TIME =    6.49375    DELT = 2.61780E-02    NSTEP =   281    ************
   POWER INFORMATION

     TOTAL REACTOR POWER = 2.894E+09
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # # # #


 -***- FILL      40++LPCI PUMP                          NSTEP=   281 TIME=    6.49375    DELT= 2.61780E-02 ******
0     JUNI =  0
                        CELL  1     LEAK FLOW RATE=  0.000E+00 KG/S        LEAK MASS FLUX=  0.000E+00 KG/M2-S

       PRESSURE      VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP       LIQ DEN      VAP DEN   DELTA-P TOT     ICHOKE  ICCF
 CELL     (PA)                    (M/S)       (M/S)        (K)         (K)         (K)        (KG/M3)      (KG/M3)      (PA)
   1    1.500E+06  0.000000        0.          0.       470.683     323.000     470.683       988.7        7.441    -0.1500E+07      0 0     0 0

     MASS FLOW RATE =    0.0000E+00          TOTAL MASS IN  =    0.0000E+00
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # # # #


 -***- FILL      42++HPCS PUMP                          NSTEP=   281 TIME=    6.49375    DELT= 2.61780E-02 ******
0     JUNI =  0
                        CELL  1     LEAK FLOW RATE=  0.000E+00 KG/S        LEAK MASS FLUX=  0.000E+00 KG/M2-S

       PRESSURE      VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP       LIQ DEN      VAP DEN   DELTA-P TOT     ICHOKE  ICCF
 CELL     (PA)                    (M/S)       (M/S)        (K)         (K)         (K)        (KG/M3)      (KG/M3)      (PA)
   1    1.500E+06  0.000000        0.          0.       470.683     323.000     470.683       988.7        7.441    -0.1500E+07      0 0     0 0

     MASS FLOW RATE =    0.0000E+00          TOTAL MASS IN  =    0.0000E+00
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # # # #


 -***- FILL      44++   FEEDWATER  FILL                 NSTEP=   281 TIME=    6.49375    DELT= 2.61780E-02 ******
0     JUNI =  0
                        CELL  1     LEAK FLOW RATE=  1.565E+03 KG/S        LEAK MASS FLUX=  6.426E+03 KG/M2-S

       PRESSURE      VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP       LIQ DEN      VAP DEN   DELTA-P TOT     ICHOKE  ICCF
 CELL     (PA)                    (M/S)       (M/S)        (K)         (K)         (K)        (KG/M3)      (KG/M3)      (PA)
   1    7.200E+06  0.000000     7.549       7.549       560.925     488.550     560.925       851.2       37.69     -0.7200E+07      0 0     0 0

     MASS FLOW RATE =    0.0000E+00          TOTAL MASS IN  =    1.0176E+04
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
```

-*** FILL 46**LPCS PUMP NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 *****

0 JUN1 = 0

CELL 1 LEAK FLOW RATE= 0.000E+00 KG/S LEAK MASS FLUX= 0.000E+00 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	1.500E+06	0.000000	0.	0.	470.683	323.000	470.683	988.7	7.441	-0.1500E+07	0 0	0 0

MASS FLOW RATE = 0.0000E+00 TO (MASS IN = 0.0000E+00

0# # # # # EDIT= 8 #

-***- PUMP 11**BOMBA DE RECIRCULACION NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******

0 JUN1 = 10 JUN2 = 11

TRIP	OMEGA	RHO	VOL. FLOW	MASS FLOW	VAPOR FRAC	SMOM	HEAD	DELTA - P	TORQUE	TORUM
0	1.555E+02	7.581E+02	2.045E+00	1.550E+03	3.559E-18	2.441E+03	2.441E+03	1.8450E+06	2.874E+04	0.000E+00

CELL 1 FLOW RATE IN = 1.550E+03 KG/S MASS FLUX IN = 9.413E+03 KG/M2-S

CELL 4 FLOW RATE OUT = 1.550E+03 KG/S MASS FLUX OUT = 9.413E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.177E+06	0.000000	12.42	13.43	560.709	551.038	560.709	758.1	37.55	0.7354E+05	0 0	0 0
2	7.198E+06	0.000000	12.42	13.11	560.910	551.045	560.910	758.1	37.68	-0.2118E+05	0 0	0 0
3	7.218E+06	0.000000	12.42	13.12	561.096	551.052	561.096	758.1	37.79	-0.1976E+05	0 0	0 0
4	9.063E+06	0.000000	12.42	12.42	577.024	551.668	577.024	759.6	43.18	-0.1845E+07	0 0	0 0
5			12.39	13.14						2648.	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REYGAS	REYLIQ
1	0.7543E-07	0.3771E-07	0.	-0.4880E-12	-0.7506E-16	-0.034	24.9	1.08	0.161E-07	0.439E
2	0.1614E-07	0.8071E-08	0.	-0.1066E-12	-0.2860E-17	-0.035	4.93	1.06	0.598E-09	0.439E
3	0.5769E-09	0.2884E-09	0.	-0.3884E-14	-0.2002E-18	-0.036	4.23	1.06	0.402E-10	0.439E
4	0.1597E-10	0.7983E-11	0.	-0.2941E-15	-0.1617E-19	-0.101	0.	1.00	0.150E-11	0.440E
5							4.51	1.06		

0 TOTAL COMPONENT WATER MASS = 2.5702E+03 KG. TOTAL COMPONENT WATER ENERGY = 3.1248E+09 J.

PERCENT MASS CONTINUITY ERROR = 7.9339E-10 LOST MASS= 2.0392E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = 1.0123E-03

0# # # # # EDIT= 8 #

-***- VALVE 12** VALVULA CONTROL RECIRCULACION NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******

0 JUN1 = 11 JUN2 = 12

CELL 1 FLOW RATE IN = 1.550E+03 KG/S MASS FLUX IN = 9.413E+03 KG/M2-S

CELL 4 FLOW RATE OUT = 1.550E+03 KG/S MASS FLUX OUT = 6.244E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	9.061E+06	0.000000	12.39	13.14	577.003	551.665	577.003	759.6	49.16	0.	0 0	0 0
2	8.700E+06	0.000000	28.95	29.88	574.106	551.545	574.106	759.3	46.85	0.3602E+06	0 0	0 0
3	8.643E+06	0.000000	12.40	13.28	573.635	551.526	573.635	759.2	46.49	0.5746E+05	0 0	0 0
4	8.499E+06	0.000000	12.40	13.27	572.443	551.477	572.443	759.1	45.58	0.1441E+06	0 0	0 0

5   8.2.5   8.827   0.5784E-05   0.0   0.0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) — INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REYGAS	REYLIQ
1	0.7443E-12	0.3722E-12	0.	-0.1370E-16	-0.1314E-20	-0.101	0.	1.06	0.867E-13	0.524E
2	0.9942E-13	0.4971E-13	0.	-0.1603E-17	-0.6723E-22	-0.088	4.60	1.03	0.	0.524E
3	0.	0.	0.	0.	0.	-0.086	4.72	1.07	0.963E-16	0.440E
4	0.	0.	0.	0.	0.	-0.081	4.13	1.07	0.179E-17	0.254E
5							7.68	1.07		

VALVE AREA = 7.050927E-02   PERCENT OPEN = 42.81073

VALVE HYDRAULIC DIAMETER = 1.961E-01

0 TOTAL COMPONENT WATER MASS = 4.2789E+03 KG.   TOTAL COMPONENT WATER ENERGY = 5.2024E+09 J.
PERCENT MASS CONTINUITY ERROR = 3.6571E-10   LOST MASS= 1.5649E-08 KG.   PERCENT MASS FLOW THRU(TURNOVER) = 1.2016E-03

0# # # # # EDIT= 8 #

-***- TEE   15**BOMBA DE CHORRO   NSTEP= 281 TIME= 6.49375   DELT= 2.61780E-02 ******
0 JUN1 = 15   JUN2 = 16   JUN3 = 12
0 * THIS TEE IS A JET PUMP *

EFFECTIVE VALUES			APPLICABLE VALUES		
M RATIO	N RATIO	ETA	M RATIO	N RATIO	ETA
2.4327E+00	1.1311E-01	2.7534E-01	2.4327E+00	1.2441E-01	3.0265E-01

PRIMARY TUBE

CELL 1   FLOW RATE IN = 3.771E+03 KG/S   MASS FLUX IN = 2.507E+04 KG/M2-S
CELL 3   FLOW RATE OUT = 5.321E+03 KG/S   MASS FLUX OUT = 5.805E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.756E+06	0.000000	33.07	34.28	556.616	550.903	556.616	757.7	25.10	0.4612E+06	0 0	0-1
2	7.325E+06	0.000000	38.50	39.26	562.102	551.090	562.102	758.2	28.42	-0.5591E+06	0 0	0 0
3	7.358E+06	0.000000	7.657	8.104	562.405	551.100	562.405	758.2	28.62	-0.3248E+05	0 0	0 0
4			7.656	8.114						-0.1588E+05	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) — INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REYGAS	REYLIQ
1	0.1464E-07	0.7318E-08	0.	-0.5495E-13	-0.7257E-17	-0.020	40.4	1.04	0.195E-08	0.401E
2	0.6713E-08	0.3356E-08	0.	-0.4977E-13	-0.1811E-17	-0.040	113.	1.02	0.297E-09	0.440E
3	0.8788E-09	0.4394E-09	0.	-0.6599E-14	-0.2602E-18	-0.041	15.3	1.06	0.203E-10	0.202E
4							12.1	1.06		

SIDE TUBE

CELL 2   FLOW RATE OUT = -1.550E+03 KG/S   MASS FLUX OUT = -6.244E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	8.425E+06	0.000000	-63.82	-64.87	571.830	551.453	571.830	759.1	45.12	-0.1669E+07	0 0	0 0
2	8.442E+06	0.000000	-8.226	-8.742	571.967	551.458	571.967	759.1	45.22	-0.1645E+05	0 0	0 0

3   -8.225   -8.827   0.   0 0   0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) — INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.	0.	0.	0.	0.	-0.078	19.2	1.02	0.367E-18	0.337E
2	0.	0.	0.	0.	0.	-0.079	7.64	1.06	0.	0.113E
3							0.	1.07		

0 TOTAL COMPONENT WATER MASS = 2.1016E+03 KG. TOTAL COMPONENT WATER ENERGY = 2.5551E+09 J.
PERCENT MASS CONTINUITY ERROR = 2.6102E-09 LOST MASS= 5.4856E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = -2.8916E-04

0# # # # EDIT= 8 #

-***- PUMP 21++BOMBA DE RECIRCULACION NSTEP= 281 TIME= 6.49375 DELT= 2.6780E-02 ******

0 JUN1 = 20 JUN2 = 21

TRIP	OMEGA	RHO	VOL. FLOW	MASS FLOW	VAPOR FRAC	SMOM	HEAD	DELTA-P	TORQUE	TORQM
0	1.555E+02	7.581E+02	2.045E+00	1.550E+03	3.558E-18	2.441E+03	2.441E+03	1.[illegible]0E+06	2.874E+04	0.000E+00

CELL 1 FLOW RATE IN = 1.550E+03 KG/S MASS FLUX IN = 9.413E+03 KG/M2-S
CELL 4 FLOW RATE OUT = 1.550E+03 KG/S MASS FLUX OUT = 9.413E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.177E+06	0.000000	12.42	13.4[illegible]	560.709	551.038	560.709	758.1	37.55	0.7354E+05	0 0	0 0
2	7.198E+06	0.000000	12.42	13.1[illegible]	560.910	551.045	560.910	758.1	[illegible].68	-0.2118E+05	0 0	0 0
3	7.218E+06	0.000000	12.42	13.12	561.096	551.052	561.096	758.1	3[illegible].39	-0.1976E+05	0 0	0 0
4	9.063E+06	0.000000	12.42	12.42	577.024	551.666	577.024	759.6	4[illegible].18	-0.1845E+07	0 0	0 0
5			12.39	13.14						2648.	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) — INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.7543E-07	0.3771E-07	0.	-0.4880E-12	-0.7506E-16	-0.034	24.9	1.08	0.161E-07	0.439E
2	0.1614E-07	0.8071E-08	0.	-0.1066E-12	-0.2860E-17	-0.035	4.93	1.06	0.598E-09	0.439E
3	0.5769E-09	0.2884E-09	0.	-0.3884E-14	-0.2002E-18	-0.036	4.23	1.06	0.402E-10	0.42
4	0.1597E-10	0.7964E-11	0.	-0.2941E-15	-0.1617E-19	-0.101	0.	1.00	0.150E-11	0.44
5							4.51	1.06		

0 TOTAL COMPONENT WATER MASS = 2.5702E+03 KG. TOTAL COMPONENT WATER ENERGY = 3.[illegible]4E+09 J.
PERCENT MASS CONTINUITY ERROR = 7.8548E-10 LOST MASS= 2.0446E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = 1.0123E-03

0# # # # # EDIT= 8 #

-***- VALVE 22++ VALVULA CONTROL RECIRCULACION NSTEP= 281 TIME= 6.49375 DELT= 2.6780E-02 ******

0 JUN1 = 21 JUN2 = 22

CELL 1 FLOW RATE IN = 1.550E+03 KG/S MASS FLUX IN = 9.413E+03 KG/M2-S
CELL 4 FLOW RATE OUT = 1.550E+03 KG/S MASS FLUX OUT = 6.244E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF

1	9.061E+06	0.000000	12.39	13.14	577.003	551.665	577.003	759.4	45.31	0.	0.0	0.0
2	8.700E+06	0.000000	28.95	29.88	574.106	551.545	574.106	759.3	46.85	0.3602E+06	0.0	0.0
3	8.643E+06	0.000000	12.40	13.28	573.635	551.526	573.635	759.2	46.49	0.5746E+05	0.0	0.0
4	8.499E+06	0.000000	12.40	13.27	572.443	551.477	572.443	759.1	45.58	0.1441E+06	0.0	0.0
5			8.225	8.827						0.5.04E+05	0.0	0.0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.7453E-12	0.3726E-12	0.	-0.1371E-16	-0.1315E-20	-0.101	0.	1.06	0.666E-13	0.524E
2	0.9841E-13	0.4920E-13	0.	-0.1587E-17	-0.6655E-22	-0.088	4.60	1.[illegible]	0.	0.524E
3	0.	0.	0.	0.	0.	-0.08E	4.72	1	0.252E-15	0.440E
4	0.	0.	0.	0.	0.	-0.081	4.16	1.0[illegible]	0.327E-17	0.254E
5							7.68	1.07		

VALVE AREA = 7.050927E-02 PERCENT OPEN = 42.81073

VALVE HYDRAULIC DIAMETER = 1.961E-01

0 TOTAL COMPONENT WATER MASS = 4.2789E+03 KG. TOTAL COMPONENT WATER ENERGY = 5.2024E+09 J.
PERCENT MASS CONTINUITY ERROR = 3.6559E-10 LOST MASS= 1.5643E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = 1.2016E-03

0# # # # # EDIT= 8 #

-***- TEE 25**BOMBA DE CHORRO NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 25 JUN2 = 26 JUN3 = 22
0 * THIS TEE IS A JET PUMP *

EFFECTIVE VALUES M RATIO	N RATIO	ETA	APPLICABLE VALUES M RATIO	N RATIO	ETA
2.4327E+00	1.1319E-01	2.7534E-01	2.4327E+00	1.2441E-01	3.0265E-01

PRIMARY TUBE

CELL 1 FLOW RATE IN = 3.771E+03 KG/S MASS FLUX IN = 2.507E+04 KG/M2-S
CELL 3 FLOW RATE OUT = 5.321E+03 KG/S MASS FLUX OUT = 5.805E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.756E+06	0.000000	33.07	34.28	556.616	550.903	556.616	757.7	35.10	0.4612E+06	0 0	0-1
2	7.325E+06	0.000000	38.50	39.26	562.102	551.090	562.102	758.2	38.42	-0.5691E+06	0 0	0 0
3	7.358E+06	0.000000	7.657	8.104	562.405	551.100	562.405	758.2	38.62	-0.7248E+05	0 0	0 0
4			7.656	8.114						-0.1588E+05	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY (--)	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.1464E-07	0.7318E-08	0.	-0.5495E-13	-0.7257E-17	-0.020	10.4	1.04	0.195E-08	0.401E
2	0.6713E-08	0.3356E-08	0.	-0.4977E-13	-0.1811E-17	-0.040	113.	1.0[illegible]	0.297E-09	0.440E
3	0.8788E-09	0.4394E-09	0.	-0.6639E-14	-0.2602E-18	-0.041	15.3	1.0[illegible]	0.203E-10	0.202E
4							12.1	1.[illegible]		

SIDE TUBE

CELL 2 FLOW RATE OUT = -1.550E+03 KG/S MASS FLUX OUT = -6.244E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	[illegible]	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	8.425E+06	0.000000	-63.82	-64.82	571.830	551.453	571.[illegible]	[illegible]	5.12	-0.1669E+07	0 0	0 0
2	8.442E+06	0.000000	-8.226	-8.74[illegible]	571.967	551.458	571.[illegible]	[illegible]	5.22	-0.1645E+05	0 0	0 0
3			-8.225	-8.827						0.	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) ... ACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THE QUA	[illegible] (M3-S)	SLIP	REVGAS	REVLIQ
1	0.	0.	0.	0.	0.	-0.078	19.2	1.02	0.287E-16	0.337E
2	0.	0.	0.	0.	0.	-0.079	7.64	1.06	0.	0.113E
3							0.	1.07		

0 TOTAL COMPONENT WATER MASS = 2.1016E+03 KG. TOTAL COMPONENT WATER ENERGY = 2.5551E+09 J.
PERCENT MASS CONTINUITY ERROR = 2.6157E-09 LOST MASS= 5.4971E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = -2.8932E-04

0# # # # # EDIT= 8 #

-###- CHAN 60++ SCB CANALES PERIFERICOS NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 *-****
6 MAXIMUM SURFACE TEMPERATURE = 5.673103E+02, WHICH IS IN ROD GROUP 1, CELL 6
0 JUN1 = 60 JUN2 = 63

CELL 1 FLOW RATE IN = 1.158E+03 KG/S MASS FLUX IN = 6.400E+03 KG/M2-S
CELL 11 FLOW RATE OUT = 1.099E+03 KG/S MASS FLUX OUT = 1.286E+03 KG/M2-S

CELL 2 LEAK FLOW RATE= 5.935E+01 KG/S LEAK MASS FLUX= 2.748E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.253E+06	0.000000	8.440	8.883	561.428	551.066	561.428	758.1	38.00	0.9907E+05	0 0	0-2
2	7.251E+06	0.000000	1.447	1.604	561.409	551.083	561.409	758.1	37.99	2095.	0 0	0 0
3	7.247E+06	0.000000	1.373	1.490	561.372	552.803	561.372	754.6	37.96	3933.	0 0	0 0
4	7.242E+06	0.000000	1.379	1.498	561.323	555.449	561.323	749.1	37.93	5189.	0 0	0 0
5	7.237E+06	0.037132	1.389	1.900	561.274	558.323	561.274	743.0	37.90	5186.	0 0	0 0
6	7.232E+06	0.129163	1.452	1.198	561.227	559.883	561.226	739.6	37.87	4963.	0 0	0 0
7	7.227E+06	0.239952	1.601	1.917	561.181	560.681	561.179	737.8	37.85	4870.	0 0	0 0
8	7.222E+06	0.330522	1.817	2.371	561.136	561.000	561.134	737.1	37.82	4773.	0 0	0 0
9	7.218E+06	0.397737	2.039	2.728	561.092	561.098	561.089	736.9	37.79	4691.	0 0	0 0
10	7.213E+06	0.429324	2.242	3.033	561.052	561.100	561.048	736.9	37.77	4188.	0 0	0 0
11	7.210E+06	0.440340	2.357	3.054	561.020	561.029	561.018	737.0	37.75	3426.	0 0	0 0
12			2.970	3.690						4982.	0 0	0-1

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFF. (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.1664E-07	0.8321E-08	0.	-0.1158E-12	-0.2519E-16	-0.037	9.67	1.05	0.133E-09	0.111E
2	0.3052E-08	0.1526E-08	0.	-0.2115E-13	-0.5920E-17	-0.037	26.5	1.11	0.418E-11	0.143E
3	0.9302E-09	0.4651E-09	0.	-0.5349E-14	-0.4444E-18	-0.031	79.6	1.09	0.371E-12	0.140E
4	0.1126E-09	0.5631E-10	0.	-0.4438E-15	-0.3451E-19	-0.021	79.5	1.09	0.485E-13	0.141E
5	0.6365E+06	0.1927E+06	3.437	1.781	0.3540E-01	-0.009	317.	1.37	0.149E+04	0.140E
6	0.1608E+07	0.2880E+06	9.572	8.122	0.4646E-01	0.003	0.124E+04	0.825	0.521E+04	0.136E
7	0.4526E+07	0.8365E+06	14.36	12.84	0.3802E-01	0.018	0.256E+04	1.20	0.133E+05	0.133E
8	0.8976E+07	0.1766E+07	14.09	13.27	0.3090E-01	0.032	0.337E+04	1.31	0.218E+05	0.132E
9	0.1393E+08	0.2852E+07	12.09	12.14	0.2261E-01	0.044	0.352E+04	1.34	0.296E+05	0.132E
10	0.9695E+07	0.1916E+07	3.840	4.144	0.1426E-01	0.049	0.329E+04	1.35	0.338E+05	0.134E
11	0.1604E+08	0.3380E+07	0.	0.8966E-0	0.1891E-03	0.049	0.573E+04	1.30	0.383E+05	0.153E
12							0.407E+04	1.24		

0 CONVECTIVE CELL AVERAGE QUANTITIES FOR INNER CHAN WALL USED FOR WALL ENERGY TRANSFER TO CHAN FLUID (+ NEG. HTC IS OK; SEE MANU

CELL	TSURF (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENERGY (J/J)
1	551.278	0.2095E+05	0.	0.3934E+05	0.	0.	0.3934E+05	0.5747E-05
2	551.904	0.1292E+05	0.	0.1058E+06	0.	0.	0.1053E+06	0.1587E-04
3	553.178	0.1287E+05	0.	0.1286E+0U	0.	0.	0.1286E+06	0.7171E-05
4	555.033	0.1274E+05	0.	-0.1504E+06	0.	0.	-0.1504E+06	-0.7847E-05
5	557.031	0.1251E+05	0.	-0.4588E+06	0.	0.	-0.4588E+06	-0.2466E-04
6	558.403	0.1219E+05	0.	-0.5121E+06	0.	0.	-0.5121E+06	-0.3002E-04
7	559.294	0.1200E+05	0.	-0.4919E+06	0.	0.	-0.4919E+06	-0.3117E-04
8	559.951	0.1393E+05	0.	-0.3978E+06	0.	0.	-0.3978E+06	-0.3050E-04
9	560.246	0.1559E+05	0.	-0.3771E+06	0.	0.	-0.3771E+06	-0.3032E-04
10	560.288	0.1652E+05	0.	-0.1912E+06	0.	0.	-0.1912E+06	-0.3204E-04
11	560.319	0.1818E+05	0.	-0.2573E+06	9.	p.	-0.2573E+06	-0.2754E-04

0 WALL COARSE MESH CONDUCTION INFORMATION (MODES USE ABOVE CELL FLUID PROPERTIES EXCEPT LAST ONE; HT-COEFF. ARE AVERAGE

(......... INSIDE WALL CONDUCTION DATA.......)(.....				OUTSIDE WALL CONDUCTION DATA.....)			WALL RADIAL NODE TEMPERATURES (K)	
MESH #	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	<INSIDE	
1	1.20	0.429E+05	0.	1.20	0.598E+04	0.	551.175	552.068
2	1.20	0.134E+05	0.	1.20	0.598E+04	0.	551.381	552.164
3	1.20	0.128E+05	0.	1.20	0.598E+04	0.	552.426	552.651
4	1.20	0.128E+05	0.	1.20	0.598E+04	0.	553.930	553.353
5	1.20	0.127E+05	0.	1.20	0.598E+04	0.	556.137	554.383
6	1.20	0.124E+05	0.	1.20	0.598E+04	0.	557.925	555.220
7	1.20	0.121E+05	0.	1.20	0.598E+04	0.	558.881	555.667
8	1.20	0.132E+05	0.	1.20	0.731E+04	0.	559.707	556.573
9	1.20	0.149E+05	0.	1.20	0.876E+04	0.	560.196	557.769
10	1.20	0.1F3E+05	0.	1.20	0.876E+04	0.	5F0.295	557.807
11	1.20	0.167E+05	0.	1.20	0.876E+04	0.	560.280	557.801
12	1.20	0.198E+05	0.	1.20	0.876E+04	0.	560.358	557.830

ROD HEAT TRANSFER FOR GROUP NUM= 1

CONVECTIVE CELL AVERAGE QUANTITIES USED FOR ROD ENERGY TRANSFER TO CHAN FLUID

CELL	TSUR-LIQ (K)	TSUR-VAP (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENER (J/J)
1	558.754	558.750	0.128E+05	0.100E-09	0.763E+05	0.	0.	0.763E+05	0.425E-05
2	563.0?2	562.90?	0.149E+05	0.100E-09	0.114E+0?	0.	0.	0.114E+06	0.594E-05
3	565.684	565.654	0.199E+05	0.100E-09	0.147E+0E	0.	0	0.147E+06	0.789E-05
4	566.634	566.629	0.238E+05	0.100E-09	0.161E+0E	0.	0.	0.161E+06	0.943E-05
5	567.114	567.112	0.267E+05	0.100E-09	0.172E+0E	0.	0.	0.172E+06	0.109E-04
6	567.198	567.198	0.273E+05	0.100E-09	0.169E+0E	0.	0.	0.169E+06	0.130E-04
7	566.509	566.500	0.258E+05	0.100E-09	0.140E+0E	0.	0.	0.140E+06	0.112E-04
8	565.124	565.100	0.232E+05	0.100E-09	0.935E+05	0.	0.	0.935E+05	0.157E-04

0 ROD COARSE MESH CONDUCTION INFORMATION (MODE, TRIP AND TCHF USED ABOVE MESH FLUID PROPERTIES FOR ALL BUT TOP MESH)

MESH #	MESH HT-MODE	CHF TRIP	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	TCHF;TMIN (K)	RADIAL NODE TEMPERATURES (K) <CENTER								
1	1.20	0	0.128E+05	0.	0.600	597.646	592.068	586.497	580.917	575.324	569.684	559.332	557.942	556.649
2	2.02	0	0.132E+05	0.	595.375	635.565	625.178	614.861	604.583	594.340	584.069	565.615	563.147	560.851
3	2.42	0	0.177E+05	0.	600.070	688.213	670.528	653.212	636.033	619.042	602.136	572.561	568.625	564.957
4	2.42	0	0.221E+05	0.	595.932	707.432	687.060	667.029	647.277	627.795	608.464	574.955	570.502	566.352
5	2.42	0	0.254E+05	0.	599.297	716.125	694.484	673.231	652.299	631.678	611.241	575.961	571.275	566.907
6	2.42	0	0.271E+05	0.	601.315	724.335	701.470	679.040	656.975	635.262	613.769	576.801	571.894	567.318
7	2.42	0	0.267E+05	0.	602.839	702.678	689.065	668.802	648.825	629.125	609.582	575.757	571.2E5	567.077

8	2.42	0	0.249E+05	0	604.064	670.340 565.922	655.5[illegible]	640.933	626.435	612.056	597.705	572.421	569.057
9	2.42	0	0.226E+05	0.	604.566	625.053 564.277	616.659	603.303	599.960	591.625	583.248	568.*63	566.350

0 TOTAL COMPONENT WATER MASS = 2.9242E+03 KG TOTAL COMPONENT WATER ENERGY = 3.7043E+09 J
PERCENT MASS CONTINUITY ERROR = 6.1873E-06 LOST MASS= 1.8093E-04 KG. PERCENT MASS FLOW THRU(TURNOVER) = -2.0391E-03

0* * * * * EDIT= 8 *

-***- CHAN 61** 436 CANALES INTERMEDIOS NSTEP= 281 TIME= 6.49375 DELT= 2.6178E-02 ******
0 MAXIMUM SURFACE TEMPERATURE = 5.772382E+02, WHICH IS IN ROD GROUP 1, CELL 5
0 JUN1 = 61 JUN2 = 64

CELL 1 FLOW RATE IN = 7.712E+03 KG/S MASS FLUX IN = 5.912E+03 KG/M2-S
CELL 11 FLOW RATE OUT = 7.118E+03 KG/S MASS FLUX OUT = 2.064E+03 KG/M2-S

CELL 2 LEAK FLOW RATE= 5.940E+02 KG/S LEAK MASS FLUX= 6.812E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.319E+06	0.000000	7.797	8.272	562.047	551.085	562.047	758.2	38.39	0.3411E+05	0 0	0-[illegible]
2	7.316E+06	0.000000	2.386	2.613	562.014	551.111	562.014	756.1	36.37	3476.	0 0	0
3	7.310E+06	0.000000	2.202	2.345	561.958	555.102	561.958	749.9	38.33	6014.	0 0	0 0
4	7.303E+06	0.153312	2.226	2.166	561.895	558.735	561.895	742.2	38.29	6693.	0 0	0 0
5	7.296E+06	0.358398	2.629	3.102	561.830	561.016	561.828	737.2	38.25	70?2.	0 0	0 0
6	7.288E+06	0.525501	3.407	4.214	561.755	561.595	561.753	7[illegible]9	38.21	7961.	0 0	0 0
7	7.278E+06	0.632190	4.458	5.605	561.664	561.791	561.660	7[illegible]	38.15	9710.	0 0	0 0
8	7.267E+06	0.692971	5.523	7.275	561.554	561.931	561.547	735.1	38.08	0.1170E+05	0 0	0 0
9	7.254E+06	0.731772	6.367	8.803	561.432	561.892	561.421	735.2	38.01	0.1292E+05	0 0	0 0
10	7.240E+06	0.763037	7.034	10.15	561.307	561.764	561.281	735.5	37.93	0.1328E+05	0 0	0 0
11	7.228E+06	0.769752	7.858	10.36	561.186	561.331	561.164	736.4	37.85	0.1289E+05	0 0	0 0
12			9.972	12.81						0.2292E+05	0 0	0-1

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.2343E-06	0.1172E-06	0.	-0.1729E-11	-0.9295E-16	-0.039	9.14	1.06	0.605E-09	0.147E
2	0.5949E-07	0.2974E-07	0.	-0.4365E-12	-0.3017E-16	-0.039	22.3	1.10	0.315E-10	0.232E
3	0.3200E-07	0.1600E-07	0.	-0.1476E-12	-0.3020E-17	-0.025	80.4	1.07	0.558E-11	0.225E
4	0.9147E+07	0.1634E+07	57.36	77.92	0.9144E-01	0.001	641.	1.42	0.126E+05	0.210E
5	0.7041E+08	0.1476E+08	207.0	168.4	0.8495E-01	0.031	0.377E+04	1.18	0.342E+05	0.198E
6	0.1089E+09	0.4192E+08	245.3	233.5	0.8044E-01	0.066	0.362E+04	1.24	0.673E+05	0.191E
7	0.1478E+09	0.5287E+08	255.7	268.2	0.7389E-01	0.104	0.228E+04	1.26	0.106E+06	0.188E
8	0.3448E+09	0.4461E+08	155.1	242.1	0.6621E-01	0.138	0.167E+04	1.32	0.145E+06	0.187E
9	0.4249E+09	0.4299E+08	82.24	213.0	0.5305E-01	0.*68	0.136E-04	1.38	0.180E+06	0.184E
10	0.1947E+09	0.2017E+08	15.36	74.62	0.3559E-01	0.188	0.114E+04	1.44	0.203E+06	0.181E
11	0.9361E+08	0.3130E+08	0.1889E-01	8.678	0.2585E-02	0.183	0.178E+07	1.32	0.231E+06	0.210E
12							0.504E+07	1.28		

0 CONVECTIVE CELL AVERAGE QUANTITIES FOR INNER CHAN WALL USED FOR WALL ENERGY TRANSFER TO CHAN FLUID (A NEG. HTC IS OK; SEE MANU

CELL	TSURF (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENERGY (J/J)
1	551.203	0.2594E+05	0.	0.1097E+06	0.	0.	0.1097E+06	0.3968E-05
2	552.567	0.1877E+05	0.	0.1101E+07	0.	0.	0.1101E+07	0.5123E-04
3	5[illegible]5.169	0.2025E+05	0.	0.1468E+06	0.	0.	0.1468E+06	0.2021E-05
4	557.754	0.1584E+05	0.	-0.1708E+07	0.	0.	-0.1708E+07	-0.2547E-04
5	559.880	0.1789E+05	0.	-0.2329E+07	0.	0.	-0.2329E+07	-0.4395E-04
6	560.864	0.2384E+05	0.	-0.1996E+07	0.	0.	-0.1996E+07	-0.4827E-04
7	561.340	0.2885E+05	0.	-0.1553E+07	0.	0.	-0.1553E+07	-0.4399E-04

8	561.667	0.3448E+05	0.	-0.9975E+06	0.	0.	0.9975E+06	0.3508E-04
9	561.744	0.3983E+05	0.	-0.6738E+06	0.	0.	-0.6738E+06	0.2503E-04
10	561.567	0.4260E+05	0.	-0.4825E+06	0.	0.	-0.4825E+06	-0.3889E-04
11	561.334	-0.6106E+05	0.	-0.1500E+05	0.	0.	-0.1500E+05	-0.7749E-06

0 WALL COARSE MESH CONDUCTION INFORMATION (MODES USE ABOVE CELL FLUID PROPERTIES EXCEPT LAST ONE; HT-COEFF. ARE AVERAGE

(........ INSIDE WALL CONDUCTION DATA......)(..... OUTSIDE WALL CONDUCTION DATA.....)

MESH #	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	WALL RADIAL NODE TEMPERATURES (K) <INSIDE	
1	1.20	0.377E+05	0.	1.20	0.300E+04	0.	551.164	551.738
2	1.20	0.200E+05	0.	1.20	0.300E+04	0.	551.241	551.787
3	1.20	0.187E+05	0.	1.20	0.300E+04	0.	553.893	553.471
4	1.20	0.175E+05	0.	1.20	0.300E+04	0.	556.445	555.094
5	1.20	0.179E+05	0.	1.20	0.300E+04	0.	559.143	556.811
6	0.20	0.217E+05	0.	1.20	0.300E+04	0.	560.617	557.750
7	0.20	0.274E+05	0.	1.20	0.300E+04	0.	561.112	558.065
8	1.20	0.331E+05	0.	1.20	0.553E+04	0.	561.568	559.741
9	1.20	0.377E+05	0.	1.20	0.828E+04	0.	561.767	560.735
10	1.20	0.414E+05	0.	1.20	0.828E+04	0.	561.722	560.717
11	2.42	0.425E+05	0.	1.20	0.828E+04	0.	561.412	560.597
12	1.20	0.507E+05	0.	1.20	0.828E+04	0.	561.256	560.5[illegible]

ROD HEAT TRANSFER FOR GROUP NUM= 1

CONVECTIVE CELL AVERAGE QUANTITIES USED FOR ROD ENERGY TRANSFER TO CHAN FLUID

CELL	TSUR-LIQ (K)	TSUR-VAP (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENER (J/J)
1	567.200	567.000	0.239E+05	0.100E-09	0.289E+06	0.	0.	0.289E+06	0.397E-05
2	572.414	572.251	0.341E+05	0.100E-09	0.467E+06	0.	0.	0.467E+06	0.696E-05
3	575.780	575.780	0.419E+05	0.100E-09	0.619E+06	0.	0.	0.619E+06	0.117E-04
4	577.006	577.002	0.438E+05	0.100E-09	0.675E+06	0.	0.	0.675E+06	0.163E-04
5	577.217	577.218	0.461E+05	0.100E-09	0.712E+06	0.	0.	0.712E+06	0.202E-04
6	576.381	576.402	0.481E+05	0.100E-09	0.695E+06	0.	0.	0.695E+06	0.244E-04
7	573.793	573.824	0.484E+05	0.100E-09	0.576E+06	0.	0.	0.576E+06	0.214E-04
8	570.032	570.030	0.474E+05	0.100E-09	0.392E+06	0.	0.	0.392E+06	0.316E-04

0 ROD COARSE MESH CONDUCTION INFORMATION (MODE, TRIP AND TCHF USED ABOVE MESH FLUID PROPERTIES FOR ALL BUT TOP MESH)

MESH #	MESH HT-MODE	CHF TRIP	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	TCHF,TMIN (K)	RADIAL NODE TEMPERATURES (K) <CENTER							
1	2.02	0	0.221E+05	0.	600.490	747.680 564.292	720.653	693.241	668.359	642.991	617.979	575.266	569.588
2	2.42	0	0.289E+05	0.	601.713	924.438 569.708	868.061	814.153	762.485	712.976	665.275	589.134	579.099
3	2.42	0	0.391E+05	0.	602.332	1209.050 574.793	1098.562	995.730	899.956	810.893	727.706	605.682	589.756
4	2.42	0	0.425E+05	0.	605.048	1323.297 576.766	1189.468	1065.902	951.878	846.911	749.916	611.663	593.683
5	2.42	0	0.445E+05	0.	605.923	1376.454 577.238	1231.451	1097.989	975.321	862.898	759.510	613.945	595.039
6	2.42	0	0.473E+05	0.	605.165	1427.599 577.198	1271.633	1128.470	997.362	877.707	768.165	615.637	595.844
7	2.42	0	0.484E+05	0.	603.728	1330.773 575.606	1195.135	1069.977	954.571	848.420	750.417	610.858	592.696
8	2.42	0	0.487E+05	0.	601.909	1091.643 572.042	1004.148	921.912	844.496	771.682	702.860	598.543	584.870
9	2.42	0	0.473E+05	0.	602.892	848.425 568.017	805.195	763.489	723.148	684.130	646.176	583.936	575.707

0 TOTAL COMPONENT WATER MASS = 8.1061E+03 KG. TOTAL COMPONENT WATER ENERGY = 1.0618E+10 J.
PERCENT MASS CONTINUITY ERROR = 2.5254E-05 LOST MASS= 2.0471E-03 KG. PERCENT MASS FLOW THRU(TURNOVER) = -7.6417E-04

0# # # # # EDIT= 8 #

```
-***- CHAN     62** 80 CANALES CALIENTES                    NSTEP=   281 TIME=   6.49375    DELT= .61780E-02 ******
0        MAXIMUM SURFACE TEMPERATURE = 5.775008E+02, WHICH IS IN ROD GROUP   1, CELL   5
0    JUN1 = 62      JUN2 = 65

            CELL  1     FLOW RATE IN  =  1.404E+03 KG/S       MASS FLUX IN  =  5.864E+03 KG/M2-S
            CELL 11     FLOW RATE OUT =  1.294E+03 KG/S       MASS FLUX OUT =  2.045E+03 KG/M2-S

            CELL  2     LEAK FLOW RATE=  1.097E+02 KG/S       LEAK MASS FLUX=  6.856E+03 KG/M2-S
```

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.320E+06	0.000000	7.734	8.206	562.057	551.086	562.057	758.2	38.40	0.3364E+05	0 0	0-2
2	7.317E+06	0.000000	2.366	2.592	562.025	551.114	562,025	758.1	38.38	3441.	0 0	0 0
3	7.311E+06	0.000000	2.181	2.324	561.869	555.222	561.969	749.7	38.34	5941.	0 0	0 0
4	7.304E+06	0.162546	2.206	3.165	561.907	558.847	561.907	741.9	38.30	6591.	0 0	0 0
5	7.297E+06	0.371106	2.630	3.139	561.842	561.100	561.841	737.0	38.26	6943.	0 0	0 0
6	7.289E+06	0.537287	3.437	4.268	561.768	561.621	561.766	735.9	38.21	7936.	0 0	0 0
7	7.280E+06	0.641313	4.513	5.708	561.676	561.851	561.673	735.3	38.16	9736.	0 0	0 0
8	7.268E+06	0.701210	5.582	7.413	561.567	561.873	561.559	735.0	38.09	0.1170E+05	0 0	0 0
9	7.256E+06	0.758117	6.438	8.980	561.450	561.873	561.439	735.0	38.02	0.1238E+05	0 0	0 0
10	7.241E+06	0.770736	7.667	10.09	561.308	561.787	561.277	735.4	37.93	0.1511E+05	0 0	0 0
11	7.228E+06	0.777566	7.976	10.57	561.191	561.339	561.168	736.4	37.86	0.1238E+05	0 0	0 0
12			10.14	13.06						0.2348E+05	0 0	0-1

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.4657E-07	0.2329E-07	0.	-0.3439E-12	-0.1008E-15	-0.039	9.18	1.06	0.649E-09	0.146E
2	0.1175E-07	0.5875E-08	0.	-0.8629E-13	-0.3251E-16	-0.039	22.4	1.10	0.335E-10	0.230E
3	0.6373E-08	0.3186E-08	0.	-0.2893E-13	-0.3224E-17	-0.024	80.4	1.07	0.601E-11	0.223E
4	0.1863E+07	0.3348E+06	19.12	15.29	0.9251E-01	0.002	658.	1.43	0.134E+05	0.207E
5	0.1470E+08	0.3122E+07	39.46	32.12	0.8524E-01	0.033	0.389E+04	1.19	0.359E+05	0.195E
6	0.1992E+08	0.8717E+07	46.26	44.28	0.8128E-01	0.070	0.359E+04	1.24	0.699E+05	0.189E
7	0.3306E+08	0.9596E+07	46.36	50.20	0.7430E-01	0.108	0.223E+04	1.26	0.110E+06	0.186E
8	0.6849E+08	0.8062E+07	27.00	45.67	0.6725E-01	0.144	0.163E+04	1.33	0.150E+06	0.184E
9	0.8535E+08	0.7372E+07	9.821	39.73	0.5203E-01	0.181	0.130E+04	1.39	0.188E+06	0.175E
10	0.3708E+08	0.3640E+07	2.415	14.26	0.3671E-01	0.188	0.112E+07	1.32	0.206E+06	0.184E
11	0.1698E+08	0.5611E+07	0.1672E-02	1.603	0.2576E-02	0.190	0.301E+07	1.33	0.238E+06	0.206E
12							0.737E+07	1.29		

0 CONVECTIVE CELL AVERAGE QUANTITIES FOR INNER CHAN WALL USED FOR WALL ENERGY TRANSFER TO CHAN FLUID (A NEG. HTC IS OK; SEE MANU

CELL	TSURF (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENERGY (J/J)
1	551.259	0.2591E+05	0.	0.2941E+05	0.	0.	0.2941E+05	0.5799E-05
2	552.646	0.1866E+05	0.	0.2113E+06	0.	0.	0.2113E+06	0.5357E-04
3	555.230	0.3128E+05	0.	5069.	0.	0.	5069.	0.3801E-06
4	557.799	0.1578E+05	0.	-0.3477E+06	0.	0.	-0.3477E+06	-0.2851E-04
5	559.829	0.1824E+05	0.	-0.4876E+06	0.	0.	-0.4876E+[illegible]	-0.5101E-04
6	560.792	0.2417E+05	0.	-0.4214E+06	0.	0.	-0.42[illegible]E+06	-0.5667E-04
7	561.288	0.2937E+05	0.	-0.3618E+06	0.	0.	-0.3618E+06	-0.5694E-04
8	561.657	0.3491E+05	0.	-0.[illegible]27E+06	0.	0.	-0.2227E+06	-0.4353E-04
9	561.760	0.4008E+05	0.	-0.1792[illegible]06	0.	0.	-0.1792E+06	-0.3893E-0[illegible]
10	561.563	0.4312E+05	0.	-0.1018E+06	0.	0.	-0.1018E+06	-0.4571E-04
11	561.309	0.57[illegible]E+05	0.	-0.2600E+05	0.	0.	-0.2600E+05	-0.7488E-05

0 WALL COARSE MESH CONDUCTION INFORMATION (MODES USE ABOVE CELL FLUID PROPERTIES EXCEPT LAST ONE; HT-COEFF ARE AVERAGE

(........ INSIDE WALL CONDUCTION DATA.......)(..... OUTSIDE WALL CONDUCTION DATA.....)

MESH #	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	MESH HT-MODE	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	WALL RADIAL NODE TEMPERATURES (K) <INSIDE	
1	1.20	0.375E+05	0.	1.20	0.447E+04	0.	551.205	552.059
2	1.20	0.198E+05	0.	1.20	0.447E+04	0.	551.313	552.117

3	1.20	0.165E+05	0	1.20	0.447E+04	0.	553.979	553.554
4	1.20	0.173E+05	0	1.20	0.447E+04	0.	556.481	554.904
5	1.20	0.179E+05	[illegible]	1.20	0.447E+04	0.	559.117	556.328
6	0.20	0.219E+05	[illegible]	1.20	0.447E+04	0.	560.541	557.098
7	0.20	0.277E+05	[illegible]	1.20	0.447E+04	0.	561.043	557.370
8	0.20	0.336E+05	[illegible]	1.20	0.628E+04	0.	561.533	559.128
9	1.20	0.380E+05	[illegible]	1.20	0.825E+04	0.	561.781	560.391
10	1.20	0.419E+05	[illegible]	1.20	0.825E+04	0.	561.740	560.375
11	2.42	0.430E+05	0.	1.20	0.825E+04	0.	561.387	560.238
12	1.20	0.513E+05	0.	1.20	0.825E+04	0.	561.231	560.177

ROD HEAT TRANSFER FOR GROUP NUM= 1

CONVECTIVE CELL AVERAGE QUANTITIES USED FOR ROD ENERGY TRANSFER TO CHAN FLUID

CELL	TSUR-LIQ (K)	TSUR-VAP (K)	H-LIQ(CONV) (W/M**2-K)	H-VAP(CONV) (W/M**2-K)	QTOT(CONV) (W)	H-LIQ(RAD) (W/M**2-K)	H-VAP(RAD) (W/M**2-K)	QTOT(CONV+RAD) (W)	QTOT/FLUID ENER (J/J)
1	567.448	567.247	0.241E+05	0.100E-09	0.295E+06	0.	0.	0.295E+06	0.221E-04
2	572.654	572.494	0.347E+05	0.100E-09	0.479E+06	0.	0.	0.479E+06	0.393E-04
3	576.046	576.046	0.424E+05	0.100E-09	0.633E+06	0.	0.	0.633E+06	0.663E-04
4	577.277	577.274	0.442E+05	0.100E-09	0.692E+06	0.	0.	0.692E+06	0.930E-04
5	577.482	577.482	0.466E+05	0.100E-09	0.729E+06	0.	0.	0.729E+06	0.115E-03
6	576.648	576.669	0.486E+05	0.100E-09	0.713E+06	0.	0.	0.713E-03	0.139E-03
7	574.018	574.053	0.489E+05	0.100E-09	0.589E+06	0.	0.	0.589E+06	0.128E-03
8	570.182	570.177	0.480E+05	0.100E-09	0.403E+06	0.	0.	0.403E+06	0.181E-03

0 ROD COARSE MESH CONDUCTION INFORMATION (MODE, TRIP AND TCHF USED ABOVE MESH FLUID PROPERTIES FOR ALL BUT TOP MESH)

MESH #	MESH HT-MODE	CHF TRIP	H-LIQ (W/M2-K)	H-VAP (W/M2-K)	TCHF:TMIN (K)	RADIAL NODE TEMPERATURES (K) <CENTER								
1	2.02	0	0.223E+05	0.	600.778	752.911	725.082	697.906	671.293	645.227	619.546	575.790	569.975	564.550
2	2.42	0	0.293E+05	0.	601.566	934.972	876.726	821.097	767.843	716.878	637.837	589.836	579.560	569.943
3	2.42	0	0.396E+05	0.	602.468	1229.338	1114.740	1008.249	909.242	817.345	731.680	606.675	590.370	575.046
4	2.42	0	0.429E+05	0.	605.128	1347.767	1208.823	1080.724	962.737	854.346	754.408	612.778	594.371	577.046
5	2.42	0	0.450E+05	0.	605.899	1402.865	1252.272	1113.860	986.880	870.754	764.206	615.085	595.730	577.501
6	2.42	0	0.478E+05	0.	605.004	1455.940	1293.919	1145.391	1009.625	885.989	773.075	616.822	596.559	577.464
7	2.42	0	0.489E+05	0.	602.614	1355.555	1214.721	1084.963	965.538	855.918	754.937	611.969	593.376	575.874
8	2.42	0	0.492E+05	0.	602.466	1107.729	1017.107	932.059	852.121	777.059	706.234	599.370	585.369	572.231
9	2.42	0	0.478E+05	0.	602.536	856.418	811.823	768.842	727.310	687.181	648.187	584.427	576.000	568.123

0 TOTAL COMPONENT WATER MASS = 1.4627E+03 KG. TOTAL COMPONENT WATER ENERGY = 1.9192E+09 J.
PERCENT MASS CONTINUITY ERROR = 2.7036E-05 LOST MASS= 3.9549E-04 KG. PERCENT MASS FLOW THRU(TURNOVER) = 4.3956E-03

0* * * * * EDIT= 8 *

-***- TEE 80-- RAMA DE DESCARGA NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 8 JUN2 = 80 JUN3 = 90

PRIMARY TUBE

CELL 1 FLOW RATE IN = 1.565E+03 KG/S MASS FLUX IN = 1.565E+02 KG/M2-S
CELL 6 FLOW RATE OUT = 1.565E+03 KG/S MASS FLUX OUT = 1.660E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	7.132E+06	0.999998	5.044	4.166	560.283	560.283	559.767	738.5	37.41	0.3688E+05	0 0	0 0
2	7.01CE+06	0.999971	43.67	44.38	559.108	559.108	557.788	740.9	36.87	0.1224E+06	0 0	0 0
3	6.998E+06	0.999965	44.79	45.01	558.987	558.988	557.606	741.1	36.81	0.1246E+05	0 0	0 0
4	6.993E+06	0.999956	44.88	45.08	558.942	558.943	557.?73	741.2	36.78	4650.	0 0	0 0
5	6.991E+06	0.999949	44.83	45.11	558.926	558.926	557.586	741.3	36.76	1695.	0 0	0 0
6	6.326E+06	0.999924	178.9	180.2	552.232	552.484	545.521	753.8	33.93	0.6649E+06	0 0	0 0
7			49.93	48.85						-0.5697E+06	0 0	0 0

0

INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE)

INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.2459E+05	0.7023E+05	0.	-0.2418E-01	-0.2409	0.998	1.32	0.826	0.261E+08	184.
2	0.1936E+06	0.9681E+06	0.	-C.8491	-0.1688	0.995	33.1	1.02	0.476E+08	0.548E
3	0.#453E+05	0.2226E+06	0.	-0.2041	-0.1510	0.995	0.941	1.00	0.479E+08	0.680E
4	0.5702E+05	0.2851E+06	0.	-0.2591	-0.1203	0.995	0.710	1.00	0.479E+08	0.839E
5	0.5049E+05	0.2525E+06	0.	-0.2245	-0.9868E-01	0.995	0.462	1.00	0.898E+08	0.183E
6	0.1230E+05	0.2532E+06	0.	-1.077	-1.648	0.978	759.	1.01	0.874E+08	0.276E
7							1C7	0.978		

SIDE TUBE

CELL 1 FLOW RATE OUT = -9.920E-07 KG/S MASS FLUX OUT = -3.481E-06 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.993E+06	1.000000	-1.305	-0.1564E-05	558.938	558.938	558.562	741.2	36.56	431.2	0 0	0 0
2			-1.991	-0.7009E-07						414.6	0 0	0 0

0

INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE)

INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	4738.	23..	0.	-0.5785E-05	-0.1770E-01	0.526	0.144	0.120E-05	0.237	0.426E
2							0.219	0.352E-07		

0 TOTAL COMPONENT WATER MASS = 6.0102E+02 KG. TOTAL COM VENT WATER ENERGY = 1.5483E+09 J.
PERCENT MASS CONTINUITY ERROR = -6.7263E-03 LOST MASS= -4. 25E-02 KG. PERCENT MASS FLOW THRU(TURNOVER) = -5.1781E-03

0# # # # # EDIT= 8 # : # # #

-***- VALVE 81++ VALV. AISLAMIENTO VAPOR PRINCIPAL NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******

0 JUN1 = 80 JUN2 = 81

CELL 1 FLOW RATE IN = 1.565E+03 KG/S MASS FLUX IN = 1.660E+03 KG/M2-S
CELL 3 FLOW RATE OUT = 1.565E+03 KG/S MASS FLUX OUT = 1.660E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.896E+06	0.999891	49.93	48.85	557.999	557.574	556.519	744.0	36.23	0.	0 0	0 0
2	6.856E+06	0.999861	46.13	45.73	557.605	557.601	555.981	743.9	36.03	0.4012E+05	0 0	0 0
3	6.810E+06	0.999827	46.10	45.96	557.152	557.196	555.372	744.7	35.79	0.4594E+05	0 0	0 0
4			46.15	46.23						8970.	0 0	0 0

0

INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE)

INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFF) (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.1608E+06	0.8042E+06	0.	-0.8317	-0.5563E-01	0.993	0	0.978	0.497E+08	0.224E
2	0.1765E+06	0.8823E+06	0.	-0.9458	-0.5348E-01	0.992	5.94	0.991	0.480E+08	0.273E
3	0.2035E+06	0.9671E+06	0.	-1.128	-0.5112E-01	0.991	0.331	0.997	0.480E+08	0.341E
4							0.733E-01	1.00		

VALVE AREA = 9.425000E-01 PERCENT OPEN = 100.00000

0 TOTAL COMPONENT WATER MASS = 5.8900E+02 KG. TOTAL COMPONENT WATER ENERGY = 1.5157E+09 J.
PERCENT MASS CONTINUITY ERROR = 1.5947E-05 LOST MASS= 9.3928E-05 KG. PERCENT MASS FLOW THRU(TURNOVER) = -2.5341E-04

0# # # # # EDIT= 8 #

-***- TEE 82++ MSIV-TURBINA/BYPASS NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 81 JUN2 = 82 JUN3 = 70

PRIMARY TUBE

CELL 1 FLOW RATE IN = 1.565E+03 KG/S MASS FLUX IN = 1.660E+03 KG/M2-S
CELL 9 FLOW RATE OUT = 1.565E+03 KG/S MASS FLUX OUT = 1.235E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.801E+06	0.999764	46.15	46.23	557.063	557.071	555.609	744.9	35.67	0.	0 0	0 0
2	6.795E+06	0.999739	46.20	46.33	557.004	557.014	555.687	745.1	35.61	6011.	0 0	0 0
3	6.794E+06	0.999695	41.30	40.79	556.989	556.991	555.847	745.1	35.54	1485.	0 0	0 0
4	6.768E+06	0.999680	41.17	40.83	556.931	556.947	555.936	745.2	35.50	5784.	0 0	0 0
5	6.776E+06	0.999628	41.12	40.86	556.813	556.822	556.047	745.4	35.38	0.1195E+05	0 0	0 0
6	6.763E+06	0.999614	40.94	40.96	556.687	556.723	555.890	745.6	35.31	0.1273E+05	0 0	0 0
7	6.759E+06	0.999598	40.69	41.03	556.641	556.649	555.991	745.8	35.25	4561.	0 0	0 0
8	6.764E+06	0.999589	35.45	34.75	556.695	556.678	556.119	745.7	35.27	-5427.	0 0	0 0
9	6.763E+06	0.999582	35.08	34.73	556.685	556.683	556.146	745.7	35.26	995.3	0 0	0 0
10			35.04	34.74						665.3	0 0	0 0

0 INTER CIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFF. (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.4231E+06	0.2111E+07	0.	-2.019	-0.4088E-01	0.990	0.	1.00	0.480E+08	0.464E
2	0.2195E+06	0.1094E+07	0.	-0.9468	-0.3699E-01	0.990	0.412	1.00	0.451E+08	0.486E
3	0.4219E+06	0.2109E+07	0.	-1.445	-0.2931E-01	0.990	14.5	0.988	0.421E+08	0.537E
4	0.1450E+06	0.7205E+06	0.	-0.4707	-0.2795E-01	0.990	5.20	0.997	0.421E+08	0.561E
5	0.7520E+06	0.3283E+07	0.	-1.649	-0.1882E-01	0.990	2.28	0.994	0.420E+08	0.650E
6	0.1636E+06	0.7135E+06	0.	-0.3697	-0.2006E-01	0.989	0.985E-03	1.00	0.420E+08	0.671E
7	0.5810E+06	0.2164E+07	0.	-0.9214	-0.1362E-01	0.989	6.08	1.01	0.418E+08	0.704E
8	0.1165E+06	0.3798E+06	0.	-0.1451	-0.1067E-01	0.999	15.2	0.980	0.412E+08	0.715E
9	0.2118E+06	0.6384E+06	0.	-0.2265	-0.9165E-02	0.989	2.03	0.990	[illegible].411E+08	0.724E
10							1.23	0.992		

SIDE TUBE

CELL 2 FLOW RATE OUT = -3.649E-05 KG/S MASS FLUX OUT = -7.297E-05 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.762E+06	1.000000	-1.906	-0.1107E-04	556.680	556.680	555.960	745.7	35.29	69[illegible].3	0 0	0 0

2	6.761E+06	1.000000	-2.265	-0.1225E-04	556.668	556.668	555.971	745.7	35.28	1143	0 0	0 0
3			-0.5695E-02	-0.1423E-05						0.1171E-03	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.6403E+05	508.9	0.	-0.2407E-03	-0.7061E-02	0.445	0.140	0.581E-05	10.3	2.52
2	0.6208E+05	495.4	0.	-0.2272E-03	-0.7386E-02	0.489	0.945E-01	0.541E-05	5.08	1.04
3							0.417E-02	0.250E-03		

0 TOTAL COMPONENT WATER MASS = 1.9423E+03 KG. TOTAL COMPONENT WATER ENERGY = 4.8970E+09 J.
PERCENT MASS CONTINUITY ERROR = -7.9458E-07 LOST MASS= -1.54?E-05 KG. PERCENT MASS FLOW THRU(TURNOVER) = -2.4951E-05

0# # # # # EDIT= 8 #

-***- VALVE 83++ VALV. CONTROL DE TURBINA NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 82 JUN2 = 83

CELL 1 FLOW RATE IN = 1.565E+03 KG/S MASS FLUX IN = 1.235E+03 KG/M2-S
CELL 2 FLOW RATE OUT = 1.565E+03 KG/S MASS FLUX OUT = 1.235E+03 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.762E+06	0.999577	35.04	34.74	556.679	556.680	556.155	745.7	35.25	0.	0 0	0 0
2	6.762E+06	0.999577	35.04	34.89	556.679	556.679	556.175	745.7	35.24	6.222	0 0	0 0
3			35.11	34.75						7304.	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REVGAS	REVLIQ
1	0.1072E+06	0.3115E+06	0.	-0.1070	-0.8559E-02	0.989	0.	0.992	0.411E+08	0.730E
2	0.1072E+06	0.2976E+06	0.	-0.9847E-01	-0.7868E-02	0.989	0.160	0.996	0.411E+08	0.731E
3							2.30	0.990		

VALVE AREA = 1.261706E+00 PERCENT OPEN = 99.58214

VALVE HYDRAULIC DIAMETER = 6.324E-01

0 TOTAL COMPONENT WATER MASS = 9.0077E+01 KG. TOTAL COMPONENT WATER ENERGY = 2.3153E+08 J.
PERCENT MASS CONTINUITY ERROR = -1.9686E-07 LOST MASS= -1.7732E-07 KG. PERCENT MASS FLOW THRU(TURNOVER) = 7.1146E-04

0# # # # # EDIT= 8 #

-***- VALVE 90++ VALV. ALIVIO-SEGURIDAD NSTEP= 281 TIME= 6.493 DELT= 2.61780E-02 ******
0 JUN1 = 90 JUN2 = 91

CELL 1 FLOW RATE IN = -9.920E-07 KG/S MASS FLUX IN = -3.481E-06 KG/M2-S
CELL 5 FLOW RATE OUT = 7.758E-08 KG/S MASS FLUX OUT = 2.722E-07 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.992E+06	1.000000	-1.991	-0.7009E-07	558.934	558.934	558.580	741.2	36.55	0.	0 0	0 0
2	1.853E+05	1.000000	0.1000E-09	0.1000E-09	390.369	390.369	390.198	941.5	1.029	0.6807E+07	0 2	0 0
3	1.853E+05	1.000000	1.935	9.2343E-06	390.371	390.371	390.223	941.5	1.029	-10.55	0 1	0 0

4	1.653E+05	1.000000	3.911	0.5985E-06	390.377	390.377	397.934	941.5	1.008	37.77	0-1	0 0
5	1.654E+05	1.000000	3.831	0.3510E-06	390.389	390.389	395.407	941.5	1.015	-70.51	0-1	0 0
6			3.039	-0.1200E-09						-87.60	0 9	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REYGAS	REYLIQ
1	212.7	1.113	0.	-0.2519E-06	-0.5896	0.735	0.	0.352E-07	0.508E-02	0.365E
2	974.7	0.4844	0.	-0.3738E-07	-0.2261	0.647	0.	1.00	0.718E-03	0.201E
3	1684.	0.8729	0.	-0.5819E-07	-0.1041	0.605	0.193	0.121E-06	0.510E-02	0.171E
4	0.2267E-01	0.1134E-01	0.	0.3866E-07	0.6148E-09	0.688	0.290	0.206E-06	0.556E-02	0.136E
5	0.4375E-01	0.2187E-01	0.	0.4953E-07	0.4896E-09	0.398	0.302	0.116E-06	0.209E-02	0.166E
6							0.303	-0.395E-10		

VALVE AREA = 0.000000E+00 PERCENT OPEN = 0.00000

VALVE HYDRAULIC DIAMETER = 1.000E-05

0 TOTAL COMPONENT WATER MASS = 5.7281E+00 KG. TOTAL COMPONENT WATER ENERGY = 1.4570E+07 J.
PERCENT MASS CONTINUITY ERROR = 2.7311E-07 LOST MASS= 1.5644E-08 KG. PERCENT MASS FLOW THRU(TURNOVER) = 2.2093E-05

0# # # # # EDIT= 8 #

-***- VALVE 70++ VALVULA BYPASS TURBINA NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 70 JUN2 = 71

CELL 1 FLOW RATE IN = -3.649E-05 KG/S MASS FLUX IN = -7.297E-05 KG/M2-S
CELL 2 FLOW RATE OUT = 2.586E-04 KG/S MASS FLUX OUT = 5.172E-04 KG/M2-S

CELL	PRESSURE (PA)	VAPOR FRAC	LIQ VEL (M/S)	VAP VEL (M/S)	T SAT (K)	T LIQ (K)	T VAP (K)	LIQ DEN (KG/M3)	VAP DEN (KG/M3)	DELTA-P TOT (PA)	ICHOKE	ICCF
1	6.761E+06	0.999995	-0.5695E-02	-C.1423E-05	556.668	556.668	555.975	745.7	35.28	0.	0 0	0 0
2	6.600E+06	0.999991	0.1000E-09	0.1000E-09	555.050	555.050	553.164	748.9	34.59	0.1613E+06	0 0	0 0
3			0.8557E-02	0.1325E-04						-0.3476E-04	0 0	0 0

0 INTERFACIAL HEAT TRANSFER (+=FLASH,-=CONDENSE) INTERFACIAL FRICTION

CELL	LIQ HTC*A (W/K)	VAPOR HTC*A (W/K)	WALL MASS TRANSFER RATE (KG/S)	TOTAL MASS TRANSFER RATE (KG/S)	TOT.E/(+LIQ OR-VAP.E) (J/J)	THERMODYNAMIC QUALITY	SHEAR COEFFI (KG/M3-S)	SLIP	REYGAS	REYLIQ
1	6936.	63.26	0.	-0.2884E-04	-0.4608E-03	0.686	0.	0.250E-03	0.264	0.236E
2	0.1886E+05	209.7	0.	-0.2581E-03	-0.2431E-02	0.881	0.	1.00	2.44	0.607E
3							0.417E-02	0.155E-02		

VALVE AREA = 0.000000E+00 PERCENT OPEN = 0.0C000

VALVE HYDRAULIC DIAMETER = 1.000E-05

0 TOTAL COMPONENT WATER MASS = 3.4937E+01 J. TOTAL COMPONENT WATER ENERGY = 9.0134E+07 J.
PERCENT MASS CONTINUITY ERROR = -4.6750E-0_ LOST MASS= -1.6334E-05 KG. PERCENT MASS FLOW THRU(TURNOVER) = 5.5065E-03

0# # # # # EDIT= 8 #

-***- BREAK 92++ TURBINA NSTEP= 281 TIME= 6.49375 DELT= 2.61780E-02 ******
0 JUN1 = 83

```
     PRESSURE     VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP      LIQ DEN     VAP DEN   DELTA-P TOT    ICHOKE  ICCF
CELL    (PA)                   (M/S)       (M/S)        (K)         (K)         (K)       (KG/M3)     (KG/M3)       (PA)
  1    6.755E+06  1.000000   35.11        34.75     556.606     556.556     556.556       746.0       35.11          0.          0 0     0 0
0   MASS FLOW RATE =    1.5649E+03             TOTAL MASS OUT =    1.0162E+04
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # #


-***- BREAK    91++ ESCAPE VALVULAS ALIVIO                            NSTEP=    281 TIME=    6.49375    DELT= 2.61780E-02 ******
0     JUNI = 91
     PRESSURE     VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP      LIQ DEN     VAP DEN   DELTA-P TOT    ICHOKE  ICCF
CELL    (PA)                   (M/S)       (M/S)        (K)         (K)         (K)       (KG/M3)     (KG/M3)       (PA)
  1    1.855E+05  1.000000   3.039      -0.1200E-09 390.403     390.403     390.403       941.5       1.030          0.          0 0     0 0
0   MASS FLOW RATE =    7.7579E-08             TOTAL MASS OUT =   -8.3338E-07
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # #


-***- BREAK    73++  BYPASS TURBINA                                   NSTEP=    281 TIME=    6.49375    DELT= 2.61780E-02 ******
0     JUNI = 71
     PRESSURE     VAPOR FRAC  LIQ VEL     VAP VEL      T SAT       T LIQ       T VAP      LIQ DEN     VAP DEN   DELTA-P TOT    ICHOKE  ICCF
CELL    (PA)                   (M/S)       (M/S)        (K)         (K)         (K)       (KG/M3)     (KG/M3)       (PA)
  1    6.600E+06  1.000000  0.8557E-02  0.1325E-04 555.050     555.050     555.050       748.9       34.21          0.          0 0     0 0
0   MASS FLOW RATE =    2.5858E-04             TOTAL MASS OUT =    1.6930E-03
0# # # # # EDIT=      8 # # # # # # # # # # # # # # # # # # # # # # # # # # #


-***- VESSEL     1++    VASIJA  COFRENTES                             NSTEP=    281 TIME=    6.49375    DELT= 2.61780E-02 ******


     LEVEL   1    NSTEP=    281   TIME =    6.49375        DELT = 2.61780E-02

  CELL(RING,THETA) 1,( 1, 1)      2,( 2, 1)      3,( 3, 1)      4,( 4, 1)

PRESS(PA)         7.373194E+06   7.373171E+06   7.373180E+06   7.373528E+06
VOID FRAC         6.604957E-15   4.244815E-15   9.105277E-16   5.685020E-16
VV-Z(M/S)         3.048831E+00   3.039158E+00   1.503711E+00   0.000000E+00
VL-Z(M/S)         2.715953E+00   2.705297E+00   1.194237E+00   0.000000E+00
VV-R(M/S)        -3.587647E-01  -8.658021E-01  -5.040148E-01   0.000000E+00
VL-R(M/S)        -3.589042E-01  -6.965974E-01  -3.757366E-01   0.000000E+00
MV-Z(KG/S)        4.336537E-13   1.711981E-12   1.349732E-13   0.000000E+00
ML-Z(KG/S)        1.304176E+03   7.032315E+03   2.306086E+03   0.000000E+00
MV-R(KG/S)       -3.770601E-13  -4.816343E-13  -4.143485E-13   0.000000E+00
ML-R(KG/S)       -1.304176E+03  -8.336474E+03  -1.064252E+04   0.000000E+00
     ILEV                    0              0              0              0
     DZLEV        3.390000E+00   3.390000E+00   3.390000E+00   3.390000E+00
     VLEV         0.000000E+00   0.000000E+00   0.000000E+00   0.000000E+00
     ALPP         0.000000E+00   0.000000E+00   0.000000E+00   0.000000E+00
     ALPM         0.000000E+00   0.000000E+00   0.000000E+00   5.685020E-16
ICCFLN                       0              0              0              0
ICCFL                        0              0              0              0
TV(K)             5.625495E+02   5.625493E+02   5.625494E+02   5.625526E+02
TL(K)             5.510995E+02   5.510996E+02   5.511003E+02   5.511049E+02
TSAT              5.625495E+02   5.625493E+02   5.625494E+02   5.625526E+02
```

LEVEL 2 NSTEP= 281 TIME = 6.49375 DELT = 2.61780E-02

CELL(RING,THETA)	1,(1, 1)	2,(2, 1)	3,(3, 1)	4,(4, 1)
PRESS(PA)	7.353975E+06	7.353359E+06	7.352436E+06	7.250770E+06
VOID FRAC	8.335712E-15	5.662089E-15	2.406706E-15	7.051088E-15
VV-Z(M/S)	9.875813E+00	9.846397E+00	1.031026E+01	-8.425197E-01
VL-Z(M/S)	9.349855E+00	9.321171E+00	9.452999E+00	-6.837287E-01
VV-R(M/S)	-6.868105E-02	-2.727141E-01	0.000000E+00	0.000000E+00
VL-R(M/S)	-5.240330E-02	-2.068057E-01	0.000000E+00	0.000000E+00
MV-Z(KG/S)	1.563014E-14	8.020707E-14	8.263401E-15	-9.749249E-13
ML (KG/S)	4.542445E+01	2.608235E+02	6.185907E+01	-3.100543E+03
MV-R(KG/S)	-5.471588E-14	-1.753776E-13	0.000000E+00	0.000000E+00
ML-R(KG/S)	-1.448653E+02	-1.085859E+03	0.000000E+00	0.000000E+00
ILEV	0	0	0	0
DZLEV	1.570000E+00	1.570000E+00	1.570000E+00	1.570000E+00
VLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPP	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPM	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ICCFLN	0	0	0	0
ICCFL	0	0	0	9
TV(K)	5.623707E+02	5.623649E+02	5.623563E+02	5.614041E+02
TL(K)	5.510931E+02	5.510932E+02	5.510926E+02	5.510617E+02
TSAT	5.623707E+02	5.623649E+02	5.623563E+02	5.614041E+02

LEVEL 3 NSTEP= 281 TIME = 6.49375 DELT = 2.61780E-02

CELL(RING,THETA)	1,(1, 1)	2,(2, 1)	3,(3, 1)	4,(4, 1)
PRESS(PA)	7.230559E+06	7.230414E+06	7.229981E+06	7.234221E+06
VOID FRAC	5.611056E-15	4.291324E-15	4.856424E-15	5.105938E-15
VV-Z(M/S)	4.608144E-01	2.935048E-01	1.216493E+00	-1.136267E+00
VL-Z(M/S)	3.815353E-01	2.298800E-01	8.182597E-01	-9.686332E-01
VV-R(M/S)	8.348061E-02	3.05 527E-01	0.000000E+00	0.000000E+00
VL-R(M/S)	6.234895E-02	2.277721E-01	0.000000E+00	0.000000E+00
MV-Z(KG/S)	2.370811E-14	5.770724E-14	3.085696E-13	-8.687977E-14
ML-Z(KG/S)	6.966242E+01	2.099187E+02	8.516107E+02	-3.100501E+03
MV-R(KG/S)	3.223989E-14	2.106209E-13	0.000000E+00	0.000000E+00
ML-R(KG/S)	8.545357E+01	7.304018E+02	0.000000E+00	0.000000E+00
ILEV	0	0	0	0
DZLEV	2.890000E+00	2.890000E+00	2.890000E+00	2.890000E+00
VLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.[illegible]000E+00
ALPP	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPM	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ICCFLN	0	0	0	0
ICCFL	0	0	0	0
TV(K)	5.612135E+02	5.612122E+02	5.612081E+02	5.612481E+02
TL(K)	5.530568E+02	5.527368E+02	5.528[illegible]33E+02	5.510560E+02
TSAT	5.612135E+02	5.612122E+02	5.612081E+02	5.612481E+02

LEVEL 4 NSTEP= 281 TIME = 6.49375 DELT = 2.61780E-02

CELL(RING,THETA)	1,(1, 1)	2,(2, 1)	3,(3, 1)	4,(4, 1)
PRESS(PA)	7.213795E+06	7.213823E+06	7.213328E+06	7.217235E+06
VOID FRAC	1.298211E-01	1.425195E-01	4.766574E-02	4.792230E-16

```
VV-Z(M/S)      -2.410259E-01 -3.219684E-01  2.053343E+00 -2.106717E+00
VL-Z(M/S)      -9.526688E-01 -9.646110E-01  1.392686E+00 -1.793177E+00
VV-R(M/S)       1.128802E-01  6.127336E-01  0.000000E+00  0.000000E+00
VL-R(M/S)       1.646087E-01  3.396480E-01  0.000000E+00  0.000000E+00
MV-Z(KG/S)     -1.719173E+00 -1.143789E+01  5.098818E+00 -1.839185E-13
ML-Z(KG/S)     -3.723373E+01 -1.905905E+02  1.367081E+03 -1.064227E+04
MV-R(KG/S)      5.639017E-01  7.855403E+00  0.000000E+00  0.000000E+00
ML-R(KG/S)      1.080521E+02  5.127117E+02  0.000000E+00  0.000000E+00
    ILEV                    1             1             0             0
    DZLEV       1.350727E+00  1.388887E+00  1.620000E+00  1.620000E+00
    VLEV       -4.246391E-06 -4.338587E-06  0.000000E+00  0.000000E+00
    ALPP        7.810300E-01  9.990000E-01  0.000000E+00  0.000000E+00
    ALPM        5.611056E-15  4.291324E-15  0.000000E+00  0.000000E+00
ICCFLN                      0             0             0             0
ICCFL                      -1            -1            -1             0
TV(K)           5.610579E+02  5.610587E+02  5.610507E+02  5.610877E+02
TL(K)           5.595052E+02  5.600785E+02  5.563150E+02  5.510554E+02
TSAT            5.610552E+02  5.610554E+02  5.610507E+02  5.610877E+02


    LEVEL  5   NSTEP=   281  TIME =    6.49375      DELT = 2.61780E-02

 CELL(RING,THETA) 1.( 1, 1)     2.( 2, 1)     3.( 3, 1)     4.( 4, 1)


PRESS(PA)       7.204698E+06  7.204680E+06  7.205068E+06  7.203609E+06
VOID FRAC       7.810300E-01  7.784695E-01  6.926191E-01  3.118068E-16
VV-Z(M/S)       1.108326E+01  1.227507E+01  1.359314E+01 -2.722292E+00
VL-Z(M/S)       1.053276E+01  1.162690E+01  1.135123E+01 -2.412613E+00
VV-R(M/S)       3.439465E-01  5.348611E-01  0.000000E+00  0.000000E+00
VL-R(M/S)       1.731032E-01  1.782998E-01  0.000000E+00  0.000000E+00
MV-Z(KG/S)      1.398646E+02  9.811667E+02  4.396027E+02  0.000000E+00
ML-Z(KG/S)      7.283184E+02  6.168869E+03  3.184778E+03 -9.077346E+03
MV-R(KG/S)      1.029347E+02  4.040444E+02  0.000000E+00  0.000000E+00
ML-R(KG/S)      2.838670E+02  7.491206E+02  0.000000E+00  0.000000E+00
    ILEV                   -1            -1            -1             0
    DZLEV       5.314844E-01  6.766908E-01  7.561484E-01  2.100000E+00
    VLEV        1.285019E+00  4.848786E-01  5.791157E-01  0.000000E+00
    ALPP        0.000000E+00  0.000000E+00  0.000000E+00  0.000000E+00
    ALPM        0.000000E+00  0.000000E+00  0.000000E+00  0.000000E+00
ICCFLN                      0             0             0             0
ICCFL                       0             0             0             0
TV(K)           5.609653E+02  5.609650E+02  5.609725E+02  5.609588E+02
TL(K)           5.609841E+02  5.605855E+02  5.609022E+02  5.510544E+02
TSAT            5.609691E+02  5.609689E+02  5.609726E+02  5.609588E+02


    LEVEL  6   NSTEP=   281  TIME =    6.49375      DELT = 2.61780E-02

 CELL(RING,THETA) 1.( 1, 1)     2.( 2, 1)     3.( 3, 1)     4.( 4, 1)


PRESS(PA)       7.202306E+06  7.202284E+06  7.201286E+06  7.183611E+06
VOID FRAC       8.356493E-01  8.445914E-01  9.555840E-01  9.9[illegible]2340E-02
VV-Z(M/S)       1.239065E+01  1.208336E+01  7.769949E+00  6.797820E-03
VL-Z(M/S)       4.929845E-17  4.917519E-17  4.282688E-17 -7.697294E+00
VV-R(M/S)      -6.302680E-02 -7.495605E-02  1.811211E-14  0.000000E+00
VL-R(M/S)       4.421229E-01  1.494919E+00  7.075879E+00  0.000000E+00
MV-Z(KG/S)      1.672321E+02  1.047465E+03  3.464822E+02  3.821206E+00
ML-Z(KG/S)      2.558848E-15  1.533790E-14  1.736078E-15 -7.911312E-02
MV-R(KG/S)     -2.728285E+01 -9.295743E+01  2.557133E-11  0.000000E+00
ML-R(KG/S)      7.282359E+02  5.896491E+03  9.081435E+03  0.000000E+00
```

ILEV	-1	-1	-1	1
DZLEV	0.000000E+00	0.000000E+00	0.000000E+00	2.482640E+00
VLEV	0.000000E+00	0.000000E+00	0.000000E+00	3.20752 E-05
ALPP	0.000000E+00	0.000000E+00	0.000000E+00	8.500000E-01
ALPM	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ICCFLN	0	0	0	0
ICCFL	0	0	0	0
TV(K)	5.609462E+02	5.609458E+02	5.609353E+02	5.607693E+02
TL(K)	5.60947 E+02	5.609477E+02	5.609347E+02	5.608133E+02
TSAT	5.609465E+02	5.609463E+02	5.609368E+02	5.607693E+02

LEVEL 7 NSTEP= 281 TIME = 6.49375 DELT = 2.61780E-02

CELL(RING,THETA)	1,(1, 1)	2,(2, 1)	3,(3, 1)	4,(4, 1)
PRESS(PA)	7.169987E+06	7.169985E+06	7.169981E+06	7.169373E+06
VOID FRAC	9.999982E-01	9.999979E-01	9.999973E-01	9.999992E-01
VV-Z(M/S)	5.471788E+00	5.344667E+00	5.375985E+00	-2.362656E+00
VL-Z(M/S)	5.035825E+00	4.969244E+00	4.937579E+00	-2.615908E+00
VV-R(M/S)	-3.343605E-01	5.852537E-03	0.000000E+00	0.000000E+00
VL-R(M/S)	7.337599E-03	2.802054E-02	0.000000E+00	0.000000E+00
MV-Z(KG/S)	1.914724E+02	1.012432E+03	3.572151E+02	-1.561086E+03
ML-Z(KG/S)	6.217365E-03	3.802056E-02	1.762800E-02	-9.789857E-02
MV-R(KG/S)	-2.424633E+01	1.074779E+01	0.000000E+00	0.000000E+00
ML-R(KG/S)	1.876976E-04	2.236218E-03	0.000000E+00	0.000000E+00
ILEV	-1	-1	-1	0
DZLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
VLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPP	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPM	0.000000E+00	0.000000E+0	0.000000E+00	0.000000E+00
ICCFLN	0	0	0	0
ICCFL	0	0	0	0
TV(K)	5.604008E+02	5.604011E+02	5.604092E+02	5.604013E+02
TL(K)	5.606400E+02	5.606400E+02	5.606399E+02	5.606341E+02
TSAT	5.606400E+02	5.606400E+02	5.606399E+02	5.606341E+02

LEVEL 8 NSTEP= 281 TIME = 6.49375 DELT = 2.61780E-02

CELL(RING,THETA)	1,(1, 1)	2,(2, 1)	3,(3, 1)	4,(4, 1)
PRESS(PA)	7.168631E+06	7.168625E+06	7.168547E+06	7.168367E+06
VOID FRAC	9.999860E-01	9.999958E-01	9.999959E-01	9.999971E-01
VV-Z(M/S)	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
VL-Z(M/S)	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
VV-R(M/S)	3.991362E-01	1.285578E+00	1.719981E+00	0.000000E+00
VL-R(M/S)	8.203761E-02	9.238453E-01	1.305231E+00	0.000000E+00
MV-Z(KG/S)	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ML-Z(KG/S)	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
MV-R(KG/S)	1.914680E+02	1.203879E+03	1.561089E+03	0.000000E+00
ML-R(KG/S)	1.081827E-02	7.166847E-02	9.540109E-02	0.000000E+00
ILEV	-1	-1	-1	-1
DZLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
VLEV	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPP	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ALPM	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00
ICCFLN	0	0	0	0
ICCFL	0	0	0	0
TV(K)	5.603844E+02	5.603839E 02	5.603842E+02	5.603915E+02

```
TL(K)            5.606271E+02  5.606270E+02  5.606263E+02  5.60624(E+(.
TSAT             5.606271E+02  5.606270E+02  5.606263E+02  5.606246E+0?
0    TOTAL COMPONENT WATER MASS =    1.694064E+05 KG.      TOTAL COMPONENT WATER ENERGY =    2.211676E+11 J.

   PERCENT MASS CONTINUITY ERROR =    1.300510E-08  LOST KILOGRAMS=    2.202968E-05     PERCENT MASS FLOW THRU(TURNOVER)=   -8.189923E

  LOWER PLENUM LIQUID VOLUME=    8.481867E+01         LOWER PLENUM LIQUID MASS=    6.431200E+04

  DOWNCOMER LIQUID LEVELS (BY THETA ZONE)     1.07118E+01

0     TOTAL COMPONENT WATER MASS =  1.6941E+05 KG.      TOTAL COMPONENT WATER ENERGY =  2.2117E+11 J.
   PERCENT MASS CONTINUITY ERROR =  1.3005E-08   LOST MASS=  ?.2030E-05 KG.  PERCENT MASS FLOW THRU(TURNOVER)  = -8.1899E-03


  TOTAL SYSTEM WATER MASS            =     2.030640E+05         TOTAL SYSTEM WATER ENERGY=    2.675709E+11

  TOTAL MASS DISCHARGED AT BREAKS =     1.016236E+04

  TOTAL MASS INJECTED AT FILLS      =     1.017619E+04

  COMPUTED SYSTEM INITIAL MASS       =     2.030501E+05
0     SYSTEM PERCENT MASS CONTINUITY ERROR =   -1.857522E-05 LOST MASS=  -3.771700E-02 KG     PERCENT MASS FLOW THRU(TURNOVER)= -6.8289
0  MAXIMUM CORE SURFACE TEMPERATURE = 5.775008E+02, WHICH IS IN CHAN  62, ROD GROUP   1, CELL   5
0STEADY STATE - TOTAL SYSTEM NET RATE OF MASS CHANGE    =    -1.564934E+03 KG/SEC
0STEADY STATE - TOTAL SYSTEM NET RATE OF ENERGY CHANGE =     1.966636E+07 J/SEC

0STEADY STATE TIME STEP NO.  281 CONVERGED IN    1 ITERATIONS.  TIME =  6.493749E+00       DELT = 2.617799E-02
```

VARIABLE	MAX. CHANGE RATE	MAX. CHANGE RATE (%)	COMPONENT		LEVEL/GROUP/CELL
PRESSURE	1.109500E+01	1.753757E-04	TEE	80	6
VOID FRACTION	-1.403680E-05	-5.849840E-03	CHAN	60	7
LIQUID VELOCITY	-1.080196E-04	1.692486E-04	TEE	15	5
VAPOR VELOCITY	8.713309E-03	2.497451E-02	VALVE	83	2
LIQUID TEMP	4.105500E-03	7.450250E-04	VESSEL	1	4000004
VAPOR TEMP	4.708060E-03	8.511152E-04	VALVE	70	2
SYSTEM METAL TEMP	2.694699E-07	4.881098E-08	CHAN	60	1
ROD TEMP	-1.853502E-07	-3.304606E-08	CHAN	60	1002

1CONTROL SYSTEM EDIT

TIME = 6.49375E+00   CONTROL SYSTEM TIME STEP SIZE = 2.61780E-02   CONTROL SYSTEM TIME STEP NUMBER = 280

CONTROL SYSTEM TIMESTEP SIZE LIMITED BY CONTROL BLOCK NUMBER   8

SEQ NO.	BLK NO.	BLK TYPE	BLOCK INPUT 1	BLOCK INPUT 2	BLOCK INPUT 3	BLOCK CONST 1	BLOCK CONST 2	GAIN FACTOR	UPPER LIMIT	LOWER LIMIT	INITIAL OUTPUT VALUE	BLOCK OUTPUT	FLAG	BLOCK NAME
20	2	CONS	0.0000E+00	0.0000E+00	0.000E+00	9.83E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.830E+00	9.8300E+00	NA	NIVEL 0
21	4	SUBT	1.0712E+01	9.8300E+00	0.000E+00	0.00E+00	0.??E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8175E-01	UL	NIV.REL
1	6	LAG	8.8175E-01	0.0000E+00	0.000E+00	2.50E-01	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8174E-01	GO	NIV.MED
2	8	LAG	1.5649E+03	0.0000E+00	0.000E+00	1.00E-01	0.00E+00	0.06	1.00E+50	-1.00E+50	9.999E+01	9.9639E+01	GO	STM.FLOW
3	10	LAG	1.5648E+03	0.0000E+00	0.000E+00	2.50E-01	0.00E+00	0.06	1.00E+50	-1.00E+50	9.999E+01	9.9639E+01	GO	FW. FLOW
4	14	LAG	6.7631E+06	0.0000E+00	0.000E+00	1.00E-01	0.00E+00	1.00	1.00E+50	-1.00E+50	6.765E+06	6.7631E+06	GO	PRES.COL
22	102	DEAD	8.8174E-01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.52E+00	0.00E+00	8.800E-01	8.8174E-01	NL	LIMITADR
23	104	DEAD	9.9639E+01	0.0000E+00	0.000E+00	1.00E+02	2.00E+02	0.00	0.00E+00	-1.27E-01	-2.550E-05	-8.3335E-04	NL	PROG.LVL
24	106	SUBT	9.9639E+01	9.9639E+01	0.000E+00	0.00E+00	0.00E+00	0.01	1.00E+50	-1.00E+50	0.000E+00	-2.0774E-07	NL	VAP.AA
25	108	SUBT	8.8174E-01	-8.3335E-04	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8258E-01	EQ	NIV.TEL
26	110	SUBT	8.8258E-01	-2.0774E-07	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8258E-01	0	NIV-ERRO
5	112	LLAG	8.8258E-01	8.8213E-01	8.800E-01	1.50E+00	7.50E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8222E-01	GO	COMP

27	114	INSW	8.8258E-01	8.8222E-01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8272E-01	0	PASO 1/3
6	116	INT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	NL	TRPTSCRM
28	118	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0	SCRM NIV
28	120	FNG1	6.4676E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8000E-01	0	SETP.NIV
30	122	ADD	0.0000E+00	8.8000E-01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.800E-01	8.8000E-01	0	SP.NIVCO
31	124	SUBT	8.8000E-01	8.8222E-01	0.000E+00	0.00E+00	0.00E+00	39.37	1.00E+50	-1.00E+50	0.000E+00	-8.7307E-02	0	ERR.NIV
81	126	FNG1	8.5994E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+00	-1.00E+50	1.000E+00	1.0000E+00	UL	LIM.INT
32	128	CONS	0.0000E+00	0.0000E+00	0.000E+00	1.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	1.0000E+00	0	CONST 1
7	130	INTM	-8.7312E-02	1.0000E+00	1.000E+00	0.00E+00	0.00E+00	0.07	1.00E+02	-1.00E+01	8.620E+01	8.6168E+01	NL	INT.LIM
33	132	WSUM	-8.7307E-02	8.6169E+01	0.000E+00	2.00E+00	1.00E+00	1.00	1.00E+50	-1.00E+50	8.620E+01	8.5994E+01	0	SAL.PI
34	134	FNG1	6.4676E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	8.620E+01	8.6200E+01	0	DEM.MAN
35	136	INSW	8.6200E+01	8.5994E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+02	-1.00E+01	8.620E+01	8.5994E+01	0	MAN/AUTO
36	138	FNG1	8.5994E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	7.323E+01	7.2828E+01	0	LIN TBB
9	140	LAG	7.2828E+01	0.0000E+00	0.000E+00	1.18E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	7.323E+01	7.2848E+01	NL	ENT.TBB
8	142	SOTF	7.2849E+01	-3.1403E-02	0.000E+00	1.40E+00	1.00E+00	1.00	1.00E+02	0.00E+00	7.323E+01	7.2879E+01	NL	SAL TBB
10	144	INT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	NL	TRPT 1TB
37	146	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	1.0000E+00	0	CDWN.1TB
38	148	FNG1	7.2879E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.814E+01	9.7870E+01	0	RESP.2TB
39	150	GATE	7.2879E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.814E+01	0.0000E+00	0	DISP.1TB
40	152	MULT	1.0000E+00	9.7870E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.814E+01	9.7870E+01	0	CORCOAST
41	154	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	0.0000E+00	0	RESP1TBB
42	156	MAXS	9.7870E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.814E+01	9.7870E+01	0	CDOM1TBB
11	158	INT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	NL	TRPT2TBB
43	160	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	1.0000E+00	0	CDWN2TBB
44	162	MULT	1.0000E+00	9.7870E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.814E+01	9.7870E+01	0	Q PREV
45	164	FNG1	7.1694E+06	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.019E+00	1.0190E+00	0	COR.PRES
46	166	MULT	9.7870E+01	1.0190E+00	0.000E+00	0.00E+00	0.00E+00	15.69	1.00E+50	-1.00E+50	1.569E+03	1.5648E+03	0	FW(L/S)
47	302	FNG1	6.4676E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.481E+01	9.4810E+01	0	DEM.POS.
48	304	CONS	0.0000E+00	0.0000E+00	0.000E+00	5.17E+01	0.00E+00	1.00	1.00E+50	-1.00E+50	5.171E+01	5.1710E+01	0	ENC.RBK
82	306	INSW	5.1710E+01	9.4810E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.481E+01	9.4810E+01	0	RBK.TR-9
83	308	FNG1	9.4810E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	7.500E+01	7.4996E+01	0	LIN.DPOS
84	310	DLAY	7.4996E+01	0.0000E+00	0.000E+00	1.00E-02	0.00E+00	1.00	1.00E+50	-1.00E+50	7.500E+01	7.4996E+01	0	RETDO P
85	312	SUBT	7.4996E+01	7.4996E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	-7.4891E-12	0	ENT.PV
13	314	LAG	-7.6881E-12	0.0000E+00	0.000E+00	1.18E-01	0.00E+00	4.24	1.10E+01	-1.10E+01	0.000E+00	-1.4772E-11	NL	POSI VAL
12	316	INT	-1.0293E-11	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+02	0.00E+00	7.500E+01	7.4996E+01	NL	SAL PV
49	318	FNG1	7.4896E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	2.06	1.00E+50	-1.00E+50	4.550E-01	4.2811E-01	0	CV/POS 1
50	320	ABSV	4.2811E-01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	4.550E-01	4.2811E-01	0	CV/POS 2
51	402	FNG1	6.4676E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	6.576E+06	6.5759E+06	0	TAR.PRES
52	404	SUBT	6.7631E+06	6.5759E+06	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.889E+05	1.8721E+05	0	ERR.PRES
15	406	LLAG	1.8721E+05	9.0664E+01	9.123E+01	2.00E+00	5.40E+00	0.00	1.00E+50	-1.00E+50	9.123E+01	9.0570E+01	NL	/100.DEM
14	408	SOTF	9.0571E+01	-3.0834E-02	0.000E+00	2.40E-01	1.44E-02	1.00	1.00E+50	-1.00E+50	9.123E+01	9.0579E+01	NL	RESON.1
53	410	DER	9.0579E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	0.19	1.00E+50	-1.00E+50	0.000E+00	-5.9345E-03	0	RESON.2
54	412	SUBT	9.0570E+01	-5.9345E-03	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.123E+01	9.0576E+01	0	COMP.1
16	414	LAG	9.0577E+01	0.0000E+00	0.000E+00	3.60E-01	0.00E+00	1.00	1.15E+02	0.00E+00	9.123E+01	9.0589E+01	NL	COMP.2
55	416	CONS	0.0000E+00	0.0000E+00	0.000E+00	1.00E+02	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+02	1.0000E+02	0	LIM.CARG
56	418	MINS	9.0589E+01	1.0000E+02	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	9.122E+01	9.0589E+01	0	RESTA
57	420	DLAY	9.0589E+01	0.0000E+00	0.000E+00	9.20E-02	0.00E+00	1.00	1.00E+50	-1.00E+50	[illegible].123E+01	9.0592E+01	0	RTAR.TCV
58	422	FNG1	9.0592E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	3.813E+01	3.7389E+01	0	LIN TCV
59	424	SUBT	3.7389E+01	3.7493E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	-1.0396E-01	0	ENT TCV
60	426	DE[illegible]	-1.0396E-01	0.0000E+00	0.000E+00	-1.00E-01	1.00E-01	1.00	1.00E+00	-1.43E+00	0.000E+00	-3.9597E-03	0	DEAD TCV
17	428	IN	-3.9790E-03	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	10.00	1.00E+50	-1.00E+50	3.813E+01	3.7493E+01	NL	SALI TCV
18	430	INT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	NL	TRPT3
61	432	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+02	1.0000E+02	0	CIER.TCV
62	434	MINS	3.7493E+01	1.0000E+02	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	3.813E+01	3.7493E+01	0	POS TCV
63	436	FNG1	3.7493E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	0.[illegible]	1.00E+50	-1.00E+50	1.000E+00	9.9582E-01	0	Q.TCV
64	438	CONS	0.0000E+00	0.0000E+00	0.000E+00	3.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	3.000E+00	3.0000E+00	0	BIAS BPV
65	440	SUBT	9.0589E+01	3.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	8.7589E+01	0	DEM BPV
86	442	NOT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	1.0000E+00	0	PERM BPV
87	444	GATE	9.0589E+01	1.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	9.0589E+01	0	PA.AP.BP
66	446	CONS	0.0000E+00	0.0000E+00	0.000E+00	1.15E+02	0.00E+00	1.00	1.00E+50	-1.00E+50	1.150E+02	1.1500E+02	0	L.MAX.CO
88	448	SUBT	1.1500E+02	9.0589E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	2.4411E+01	0	DEF. Q
89	450	SUBT	8.7589E+01	9.0589E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	-3.0000E+00	0	AP. BP.
67	452	FNG1	6.4676E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	0.0000E+00	0	APMAN BP
90	454	MAXS	-3.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	0.0000E+00	0	SEL MAX

[illegible]	[illegible]	MIUS	1.4411E+01	0.0000E+00	0.000E+00	0.00E+00	0.00E+03	2.86	1.00E+02	-1.00E-01	0.000E+00	0.0000E+00	0 POS/MINU
9.	458	DLAY	0.0000E+00	0.0000E+00	0.000E+00	9.20E-02	F.00E+C[illegible]	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 RET BP
93	460	SUBT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	L.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 ETR BP
94	462	DEAD	0.0C00E+00	0.0000E+00	0.000E+00	-1.00E-01	1.00E-01	1.00	4.20E+01	-4.20E+01	0.000E+00	0.0000E+00	0 BMTA.BPV
19	464	INT	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	10.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	HI SAL.BPV
68	466	FNG1	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 AP.P.BPV
86	468	GATE	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	L.000E+00	0.0000E+00	0 PA.AP.BP
87	470	MAXS	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 SEL POS
98	472	FNG1	0.Q000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	15.70	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 @ BPV
69	474	FNG1	6.7640E+06	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.0CE+50	1.000E+00	7.6955E-01	0 CORR.NOR
70	476	FNG1	6.7640E+06	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	9.9320E-01	0 CORR.CRI
71	478	INSW	9.9320E-01	7.6955E-01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.000E+00	7.6955E-01	0 SEL CORR
99	480	MULT	0.0000E+00	7.6955E-01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 CORROBPV
72	482	CONS	0.0000E+00	0.0000E+00	0.000E+0C	9.90E+01	0.00E+00	1.00	1.00E+50	-1.00E+50	9.900E+01	9.9000E+01	0 99/100BP
73	484	LSTH	0.0000E+00	9.9000E+01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+56	-1.00E+50	1.000E+00	1.0000E+C[illegible]	0 DEM--99
95	486	AND	0.0000E+00	1.0000E+00	0.0G0E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 AP RAP
74	500	CONS	0.0000E+00	0.0000E+00	0.000E+00	1.32E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	1.321E+00	1.3208E+00	0 NIVEL 8
75	502	GREQ	8.8174E-01	1.3208E+00	0.000E+00	0.0CE+00	0.00E+00	1.00	1.00E+50	-1.90E+50	0.000E+00	0.0000E+00	0 COMP.NI
76	504	ZOH	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.G0E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 SUJETOR
77	506	CONS	0.0000E+00	0.0000E+00	0.000E+00	8.33E-01	0.00E+00	1.00	1.00E+50	-1.00E+50	8.330E-01	8.3300E-01	0 NIVEL 4
78	508	LSEQ	8.8174E-01	8.3300E-01	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 COMP.NI
79	510	ZOH	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 SUJETOR
80	520	MINS	0.0000E+00	0.0000E+00	0.000E+00	0.00E+00	0.00E+00	1.00	1.00E+50	-1.00E+50	0.000E+00	0.0000E+00	0 SELECTR

TIMING EDIT TOTAL TIME = 760.759 SEC

SUBROUTINE	CPU TIME (SEC)	PERCENT	NO. OF CALLS
INPUT	151.803	19.95	1
INIT	0.667	0.09	1
TRANS	0.031	0.00	9
DMPIT	1.248	0.16	2
EDIT	16.883	2.22	8
PREP	5.037	0.66	281
PRP1D	0.841	0.11	5339
VSL1	17.212	2.26	281
MFROD	22.705	2.98	843
HTCOR	47.821	6.29	42993
OUTER	1.244	0.16	303
INNER	3.237	0.43	11514
TF1DS	61.502	8.08	17271
TF1E	30.688	4.03	5339
TF1I	3.475	0.46	5757
FF1D	32.594	4.28	5757
HEAT1	32.822	4.31	34001
FRIC1	36.146	4.75	37935
FRCW	14.811	1.95	39621
CHOKE	0.978	0.13	726
VSL2	11.744	1.54	606
TF3E	18.007	2.37	2248
TF3I	20.987	2.76	2248
POST	31.825	4.18	281
PST1D	30.185	3.97	5339
VSL3	15.776	2.07	843
FF3D	10.87[illegible]	1.43	2248
FROD	40.594	5.34	843
FLROP	10.964	1.44	7617
J1D	14.529	1.91	65175
MFRC[illegible]	2.105	0.28	843
SOL[illegible]E	40.775	5.36	54097
THERM[illegible]	23.[illegible]	3.14	14779
CONTROL	6.7	0.89	281

0THE DUMP FILE HAS BEEN CL[illegible] IN S. R. CLEAN

NRC FORM 335 (2-89) NRCM 1102, 3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)

NUREG/IA-0068
ICSP-CO-TURFW-T

2. TITLE AND SUBTITLE

Assessment of the "One Feedwater Pump Trip Transient" in Cofrentes Nuclear Power Plant With TRAC-BF1

3. DATE REPORT PUBLISHED

MONTH	YEAR
April	1992

4. FIN OR GRANT NUMBER

A4682

5. AUTHOR(S)

F. Castrillo, Hidroelectrica Espanola
A. G. Navarro, I. Gallego, Union Iberoamericana De Tecnologia

6. TYPE OF REPORT

Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION — NAME AND ADDRESS (If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Hidroelectrica Espanola
Hermosilla, 3
28001-Madrid
Spain

9. SPONSORING ORGANIZATION — NAME AND ADDRESS (If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)

Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This report presents the results of the assessment of TRAC-BF1 (G1J1) code with the model of the C. N. Cofrentes for simulation of the transient originated by the manual trip of one pump.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Cofrentes, TRAC-BF1, Plant Transient

13. AVAILABILITY STATEMENT

Unlimited

14. SECURITY CLASSIFICATION

(This Page)
Unclassified

(This Report)
Unclassified

15. NUMBER OF PAGES

16. PRICE

NRC FORM 335 (2-89)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

SPECIAL FOURTH-CLASS RATE
POSTAGE AND FEES PAID
USNRC
PERMIT NO. G-67

120555139531 1 1AN1CI
US NRC-OADM
DIV FOIA & PUBLICATIONS SVCS
TPS-PDR-NUREG
P-211
WASHINGTON DC 20555