

*DOCKET NO 50-219*

*PRELIMINARY SUBMITTAL*  
OYSTER CREEK NUCLEAR GENERATING STATION

TOPICAL REPORT 045

Enclosed please find information concerning:

1. A comparison between RETRAN-02 MOD 3 and RETRAN-02 MOD 4 and its impact on the Oyster Creek RETRAN Model.
2. A description of all error corrections and the modifications to implement the new control rod model for one-dimensional kinetics.

A COMPARISON BETWEEN RETRAN-02 MOD3 &  
RETRAN-02 MOD4 AND ITS IMPACT ON  
OYSTER CREEK RETRAN MODEL

Revision 3 of Reference 1 identifies the changes made from MOD3 to MOD4. This list is reproduced in Attachment 1. This list has been checked out against the source updates description of file #3 of RETRAN transmittal tape which was sent to the NRC last November as part of the above issue. The conclusion of this comparison is that there is no modeling changes, or changes in equations used in MOD4 except as noted below:

1. Revised Critical Flow Transition Calculation - Section IV.3.6 shown in Attachment 1:

This calculation was implemented for the isenthalpic option (see Reference 1) which was not activated for the Oyster Creek Model (Moody option was used).

2. Control Rod Model: This revision is described in detail in Reference 1. GPUN motivation for using this model is described in Attachment 2 where a comparison was made for the Oyster Creek Cycle 1 startup tests benchmark which revealed the necessity for the new rod model. It was also found that the interpolation scheme during rod entry for end of cycle Turbine Trip Without Bypass was not adequate to show a reasonable comparison against vendor's data. Based on this experience, it was decided to use the new rod model for reload application.

3. Correction in the mass equation for the pressurizer liquid and vapor regions. Section VI.6.2.1,2 (Attachment 1). This correction deals with mass transfer between vapor and liquid regions due to condensation on vessel walls in the vapor region of a non-equilibrium volume. This effect takes place only when the local conditions heat transfer model is activated. For the Oyster Creek model, there are no stack conductors and the local conditions heat transfer model is not used.

A comparison between four sample problems run on MOD3 and MOD4 and documented in Reference 1, Volume 3 show deviation of less than 0.1% on major edits parameters. This deviation is believed to be due to the different compilers used since MOD3 used the H Compiler where MOD4 uses the FORTRAN 77 Compiler. The four problems were:

1. EDWARD PIPE
2. Standard Problem #4 - NRC's CASP Series (TITA Test 4906)
3. Sample Problem #5 - TTWOBP Using Point Kinetics
4. Sample Problem #9 - TTWOBP Using One-Dimensional Kinetics

The results of problems 3 and 4 above have been reproduced in Attachment 3 where Rev. 2 on the lower right/left corner of the figures indicate MOD3 results while Rev. 3 indicate MOD4 output.

It is concluded that the options of the code used for the Oyster Creek model in MOD4 are the ones already approved by the NRC (except for the Rod Model).

## References

1. RETRAN-02 - A Program for Transient Thermal-Hydraulic Analysis of Complex Fluid Flow Systems - EPRI NP-1850-CCH-A, Volumes 1, 2, 3 - Revision 3, 1987.



Attachment 1

List of Changes from RETRAN-02 MOD3 to MOD4

CHANGE PAGES FOR EPRI NP-1850-CCM VOLUME 1  
RETRAN THEORY MANUAL

The pages listed below are the replacement pages for the RETRAN-02 Theory Manual which are associated with various changes resulting from the MOD004 code modifications. These pages are either replacement pages for those with the same page number in Revision 2 of the Theory Manual distributed by EPRI for RETRAN-02 MOD003, or additional pages for those with new page numbers. Those pages which have changes are indicated by "Revision 3" in the lower, outside corner of the page, and the change is indicated by a vertical bar along the change.

Some of the changes are associated with error corrections for the MOD003 code version. All other changes are either associated with MOD004 code modifications (e.g., the multiple control state control rod model), minor changes to correct grammatical or typographical errors, or changes to clarify the original text.

<u>Section</u>	<u>Pages</u>	<u>Description of Changes</u>
	v	Update abstract
	ix to xiv	Update Table of Contents.
	xv	Update list of Illustrations.
I	I-1	Modification to Introduction.
I	I-6	Modification to Introduction.
III.2.1.2	III-30a	Typographical correction for reverse loss coefficient.
III.2.1.3	III-43	Typographical correction for Wilson bubble rise model.
III.3.2.6	III-82	Add description of condensing heat transfer model from MOD003 version.
III.3.2.6	III-84 to III-84a	Add description of condensing heat transfer model from MOD003 version.
III.3.2.7	III-86	Add reference to table for condensing heat transfer model from MOD003 version.
IV.3.5	IV-20	Correct typographical error.
IV.3.6	IV-27 to IV-27a	Modify text to describe revised critical flow transition calculation.
IV.3.6	IV-28 to IV-29	Correct errors on figure labels and revise plot curves for modified critical flow transition model.
IV.3.6	IV-30	Revise plot curve for modified critical flow transition model.
V.7.0	V-59	Revise text for control rod model to include new option added in MOD004.

V.7.1	V-59 to V-59a	Change section numbers and title for Y-function control rod model.
V.7.1.1	V-62	Typographical correction.
V.7.1.1	V-64	Typographical correction.
V.7.1.2	V-66	Typographical correction and change section number for Y-function control rod model.
V.7.2	V-69a to V-69g	Provide text for multiple state control rod model added as option in MOD004.
V.9.0	V-83	Correct typographical error in equation for conductor heating rate.
VI.3.2.3	V-43c	Clarify the discussion for slip and the separator model junctions.
VI.3.3.2	VI-43f	Correct typographical error.
VI.6.2.1	VI-54 to VI-55	Correct mass equation for pressurizer liquid region.
VI.6.2.2	VI-55 to VI-55a	Correct mass equation for pressurizer vapor region.
VI.6.2.4	VI-56	Extend text for energy equation in pressurizer vapor region.
VI.6.3.6	VI-60 to IV-60a	Add section describing condensation on pressurizer vessel wall.
VII.2	VII-14b to VII-14g	Clarify text regarding application of the temperature transport delay model.
IX.5.4	IX-37	Modify discussion of control system initialization to include option added in MOD004.
X	X-1	Add reference for MOD003 release.
X	X-14a	Add reference for multiple control state control rod model.

Attachment 2

GPUN Memo to EPRI Requesting the New Rod Model Implementation in MOD4



GPU Nuclear  
10000 E. 15th Ave., Suite 100  
Denver, CO 80231  
TELEPHONE (303) 733-1000  
TELEX 150000  
WIRE 570000

(201) 299-2244

February 24, 1986  
File 4  
NF-86- 4394

Mr. Lance J. Agee  
Electric Power Research Institute  
P.O. Box 10412  
Palo Alto, CA 94303

SUBJECT: New Control Rod Model for RETRAN

REFERENCE: GPU Nuclear Letter to L. J. Agee from R. V. Furia, dated June 14, 1985,  
NF-85-4158

Dear Lance:

As we discussed in our meeting on February 19, 1986, I am forwarding to you the preliminary results of the testing we have done with the new control rod model in SIMTRAN and RETRAN. The testing was performed with a modified version of RETRAN02 MODU3 with the new control rod model that was provided to us by EPRI in response to the above reference. A modified version of SIMTRAN was also provided.

The testing was performed using data for a turbine trip performed during Oyster Creek (OC) startup testing. The control rod density at the time of the test was 22.1% (See Figure 1 for the control rod pattern). The high rod density makes this a good test for the new control rod model and highlights the deficiency in the current control rod model. Some of the basic data for the test is included in Table 1.

The input to SIMTRAN and RETRAN was identical for the two models, except for input changes required for the modification. The results for this transient using the two RETRAN models are shown in Figures 2 and 3. Figure 2 shows

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Page Two

transient power response and Figure 3 pressure. Clearly, the new control rod model shows an improvement over the current model. The current model does not handle high control rod density very well. If it is at all possible, we would like to see the new control rod model in RETRAN02 MUD04.

Sincerely,



R. V. Furia  
Reload Methodology Engineer

KVF/jh  
Enclosure

bcc:  
R. B. Lee  
N. G. Trikouros

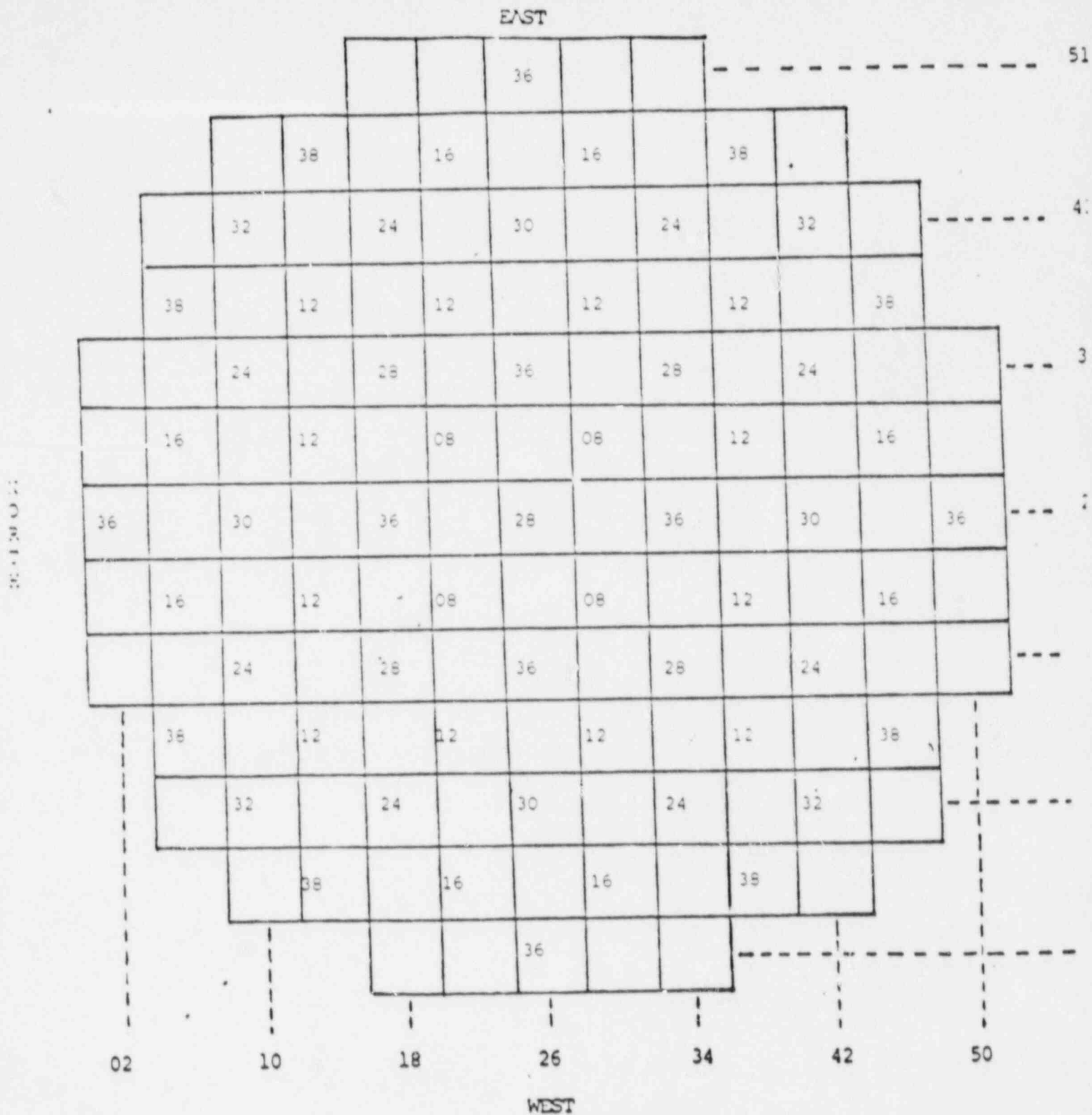
TABLE 1

## OC TURBINE TRIP DATA

## Initial Conditions

Power (Mwt)	1591.0
Dome Pressure (PSIG)	1000.0
Core Flow ( $10^6$ lb/hr)	61.0
Peak Pressure (PSIG)	1059.0
Time to Peak Pressure (sec)	3.0
Maximum Neutron Power (%)	150.0
Time to Peak Power (sec)	1.3

Figure 1: Control Rod Pattern for OC Turbine Trip



XX - notches inserted  
 00 - full in  
 48 - full out (blank space indicates full out)

CORE ARRANGEMENT  
 CONTROL CELLS  
 TOP VIEW



FIGURE 3

COMPARE CURRENT VS NEW CONTROL ROD MODEL IN RETRAN

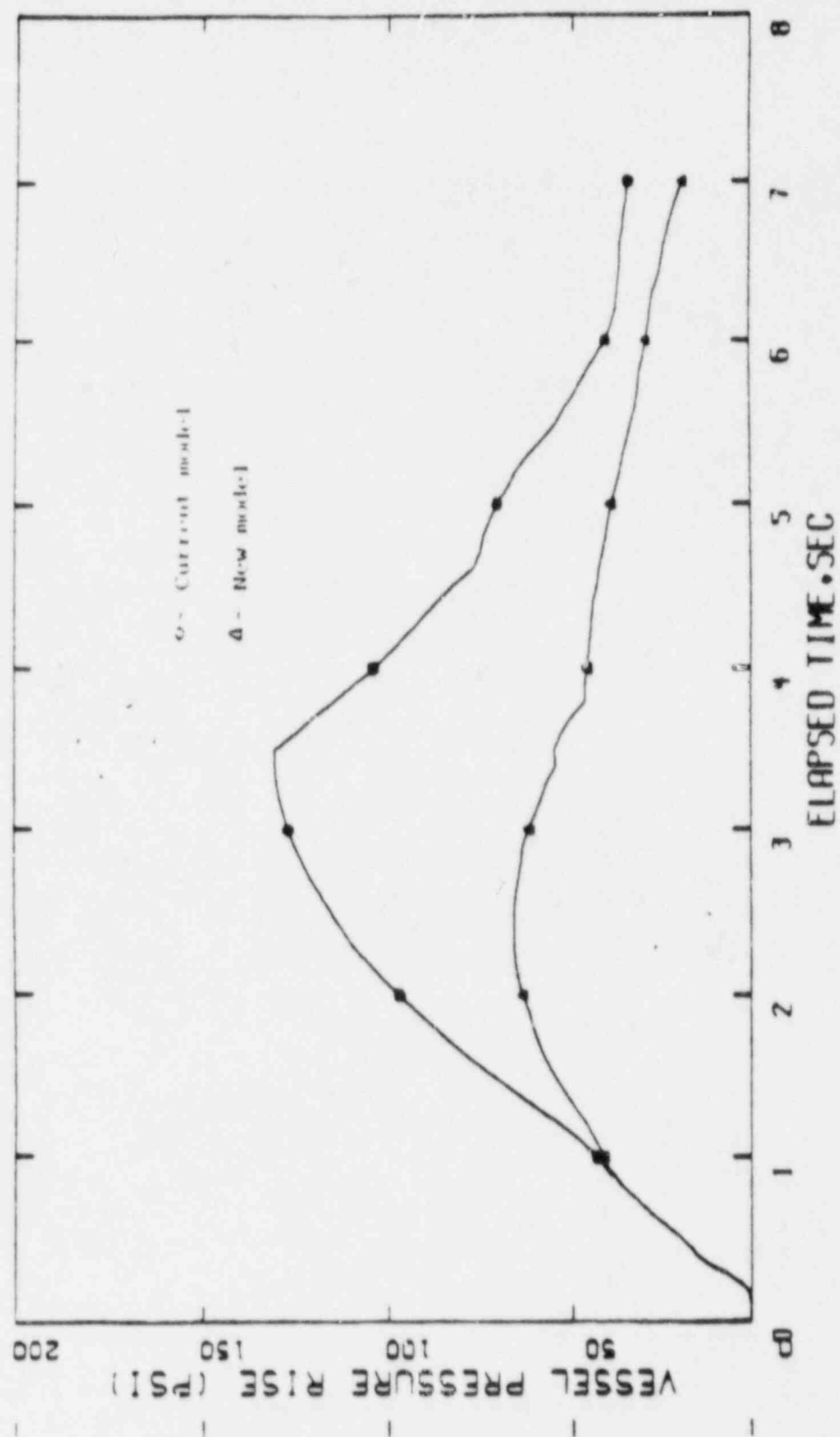
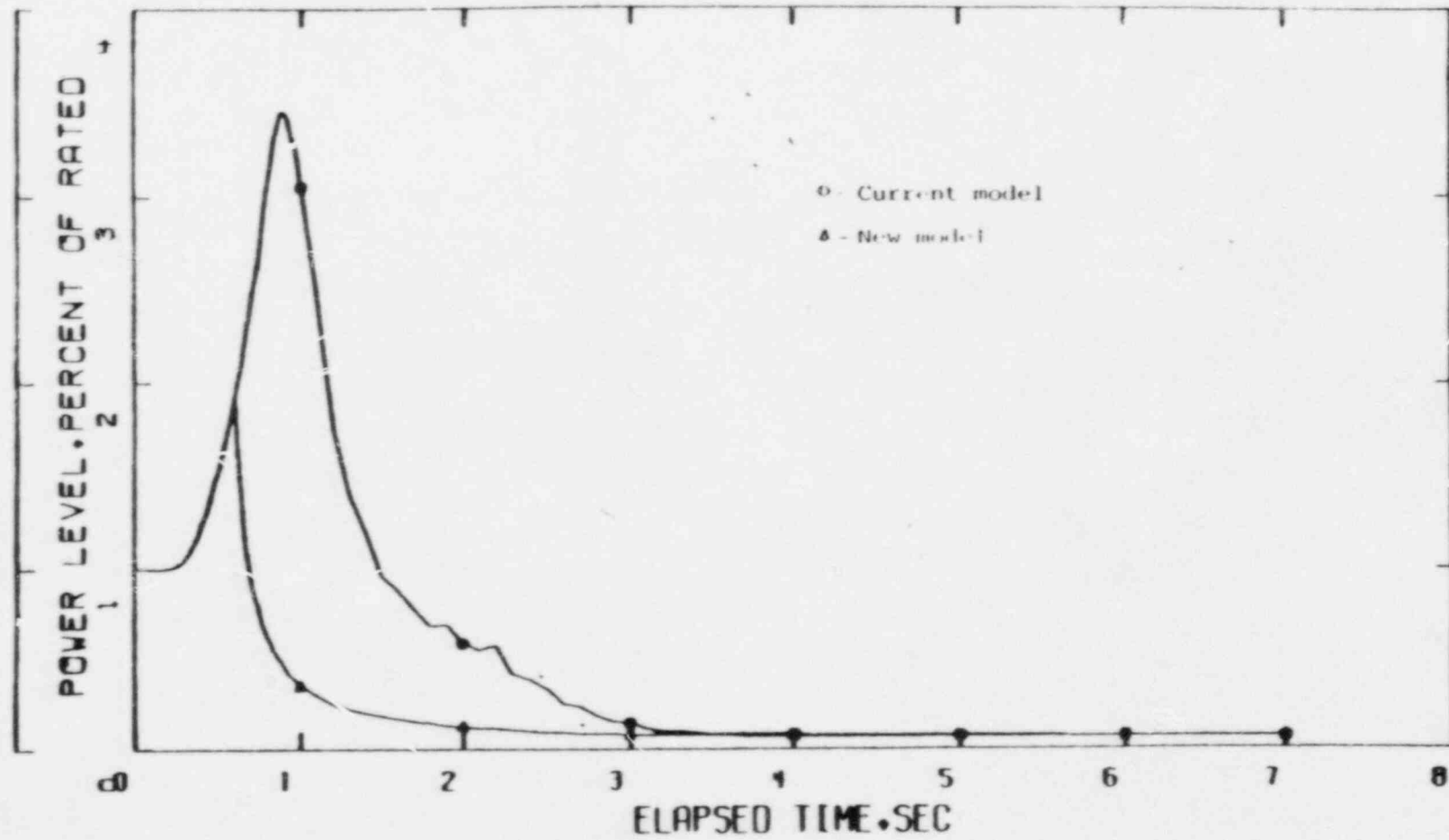


FIGURE 2

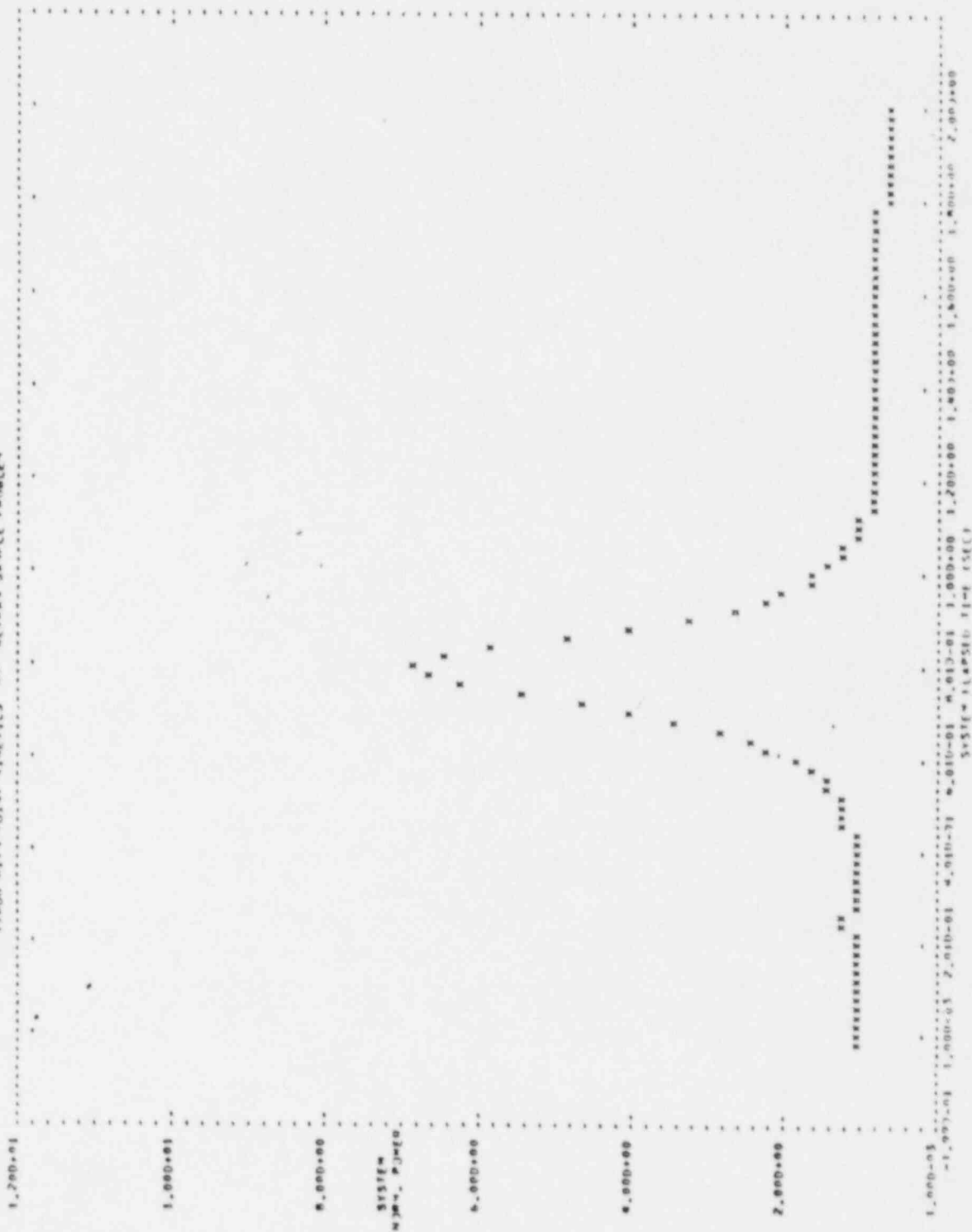
COMPARE CURRENT VS NEW CONTROL ROD MODEL IN RETRAN



Attachment 3

Comparison Between MOD3 and MOD4 for a TTWOBP  
Using Point & One-Dimensional Kinetics

# TITRIMETRIC KINETICS -- MECHANISM SAMPLE PROBLEM



TIME WITH POINT KINETICS --- RETRAH SAMPLE PROBLEM

1.00E+01

1.00E+01

8.00E+00

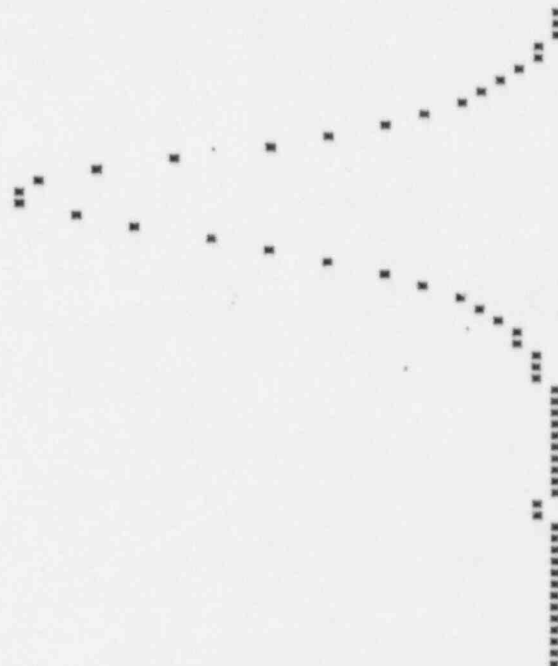
SYSTEM  
HEAT POWER

6.00E+00

4.00E+00

2.00E+00

1.00E+00



1.00E+01 1.00E-01 1.00E-02 2.01E-01 4.01E-01 6.01E-01 8.01E-01 1.00E+00 1.20E+00 1.40E+00 1.60E+00 1.80E+00 2.00E+00  
 SYSTEM SLAPSED TIME (SEC)

log N

t (min)

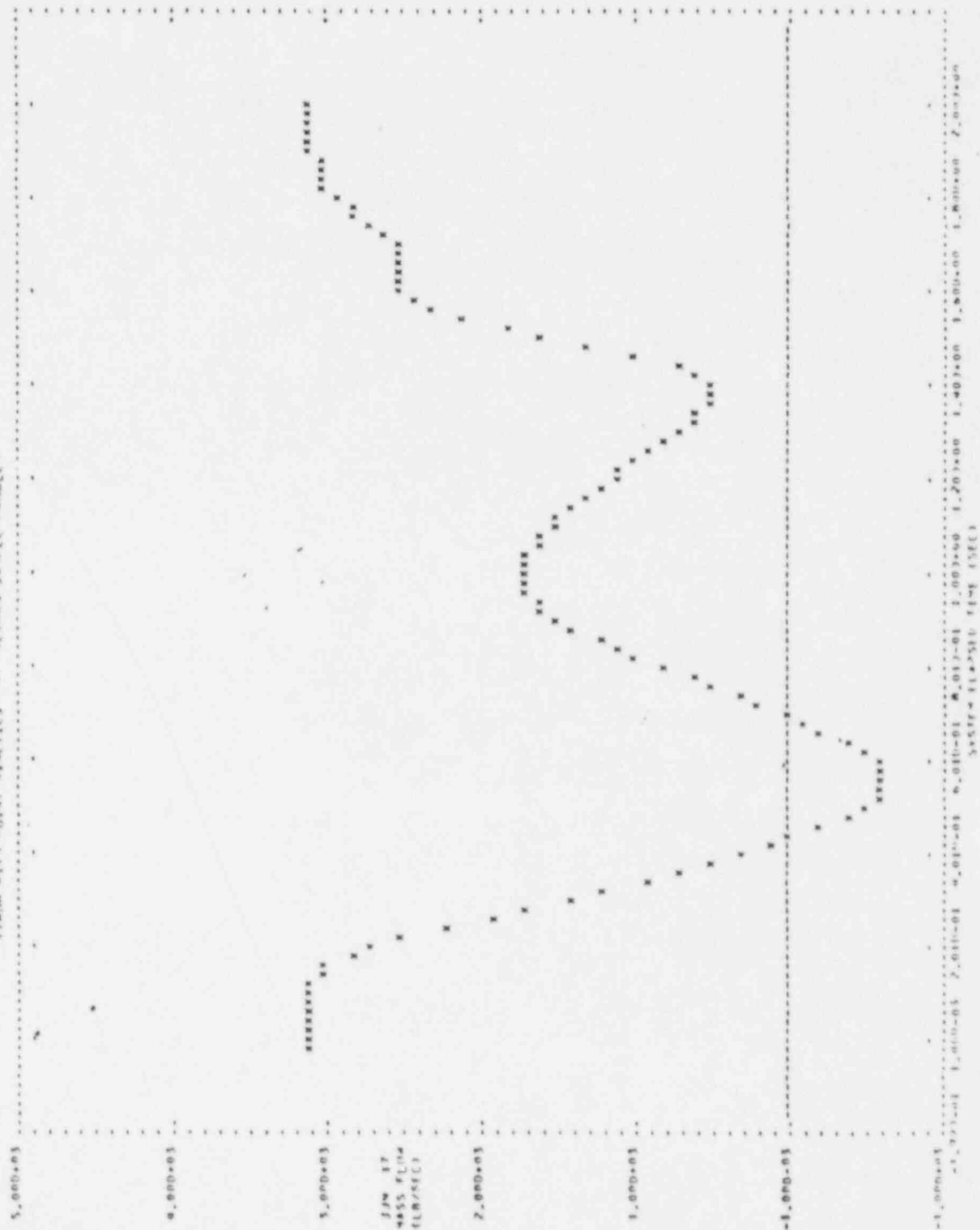
1.240  
1.200  
1.160  
1.120  
1.080  
1.040  
1.000

0.000 0.200 0.400 0.600 0.800 1.000 1.200 1.400 1.600 1.800 2.000

5. *Stigmaphyllon* (L.) DC. *Stigmaphyllon* (L.) DC. *Stigmaphyllon* (L.) DC.



TIME-TO-POINT KINETICS -- OF THE S-401 PUMP





TIME WITH POINT MINUTES ... METRAM SAMPLES PROBLEM

5 000E+03

4 000E+03

3 000E+03

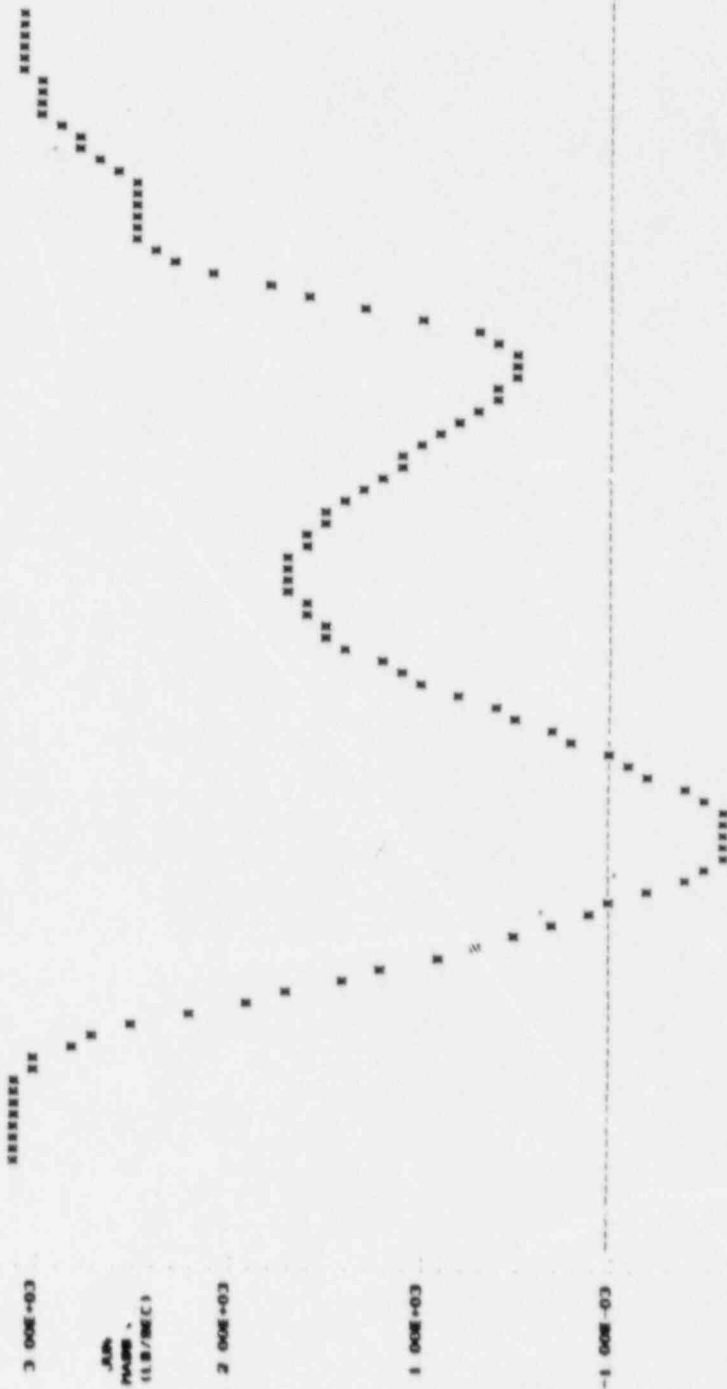
AM  
PHASE  
(11.8/SEC)

2 000E+03

1 000E+03

-1 000E+03

-1 000E+03



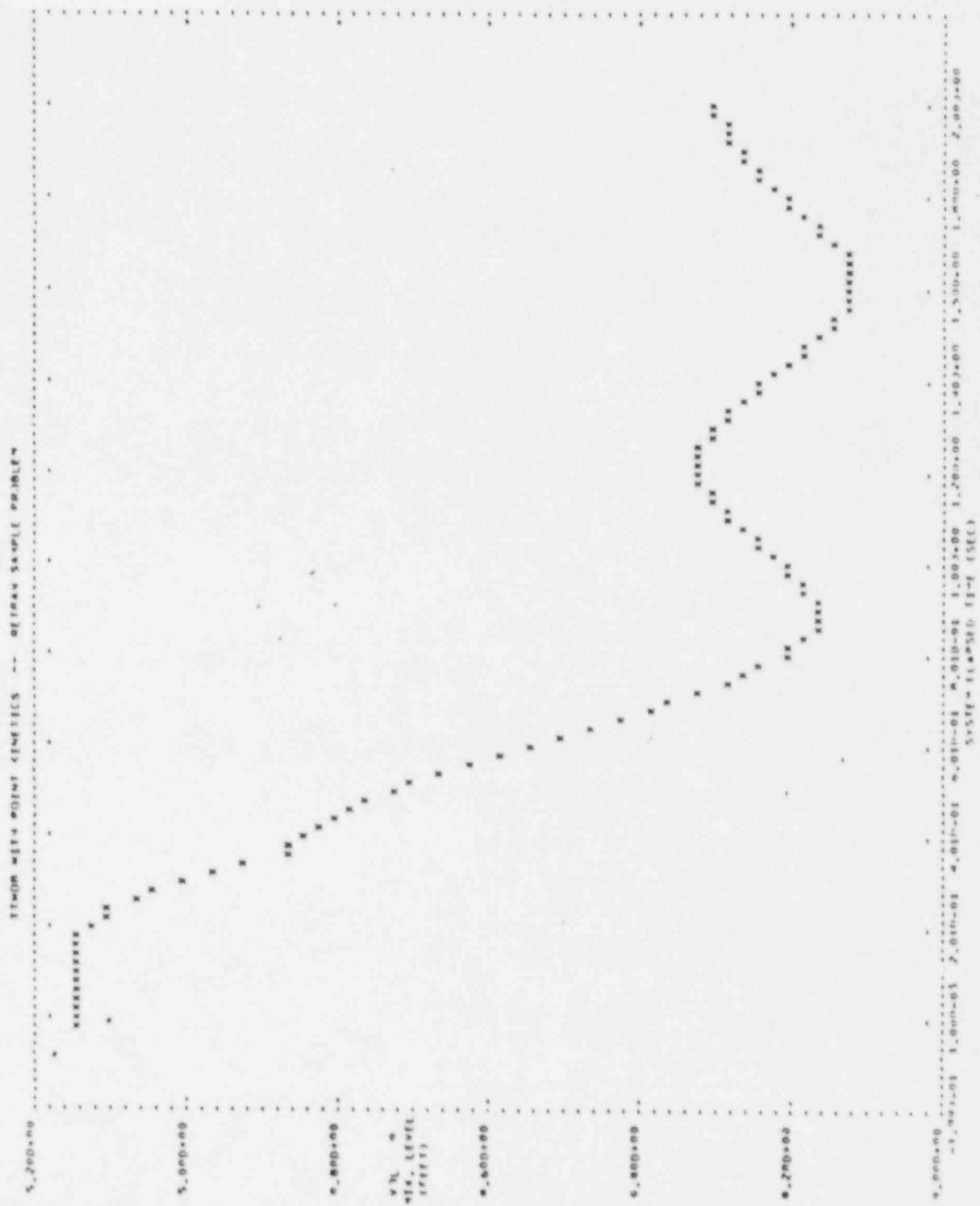
VIII-60g

Revision 3

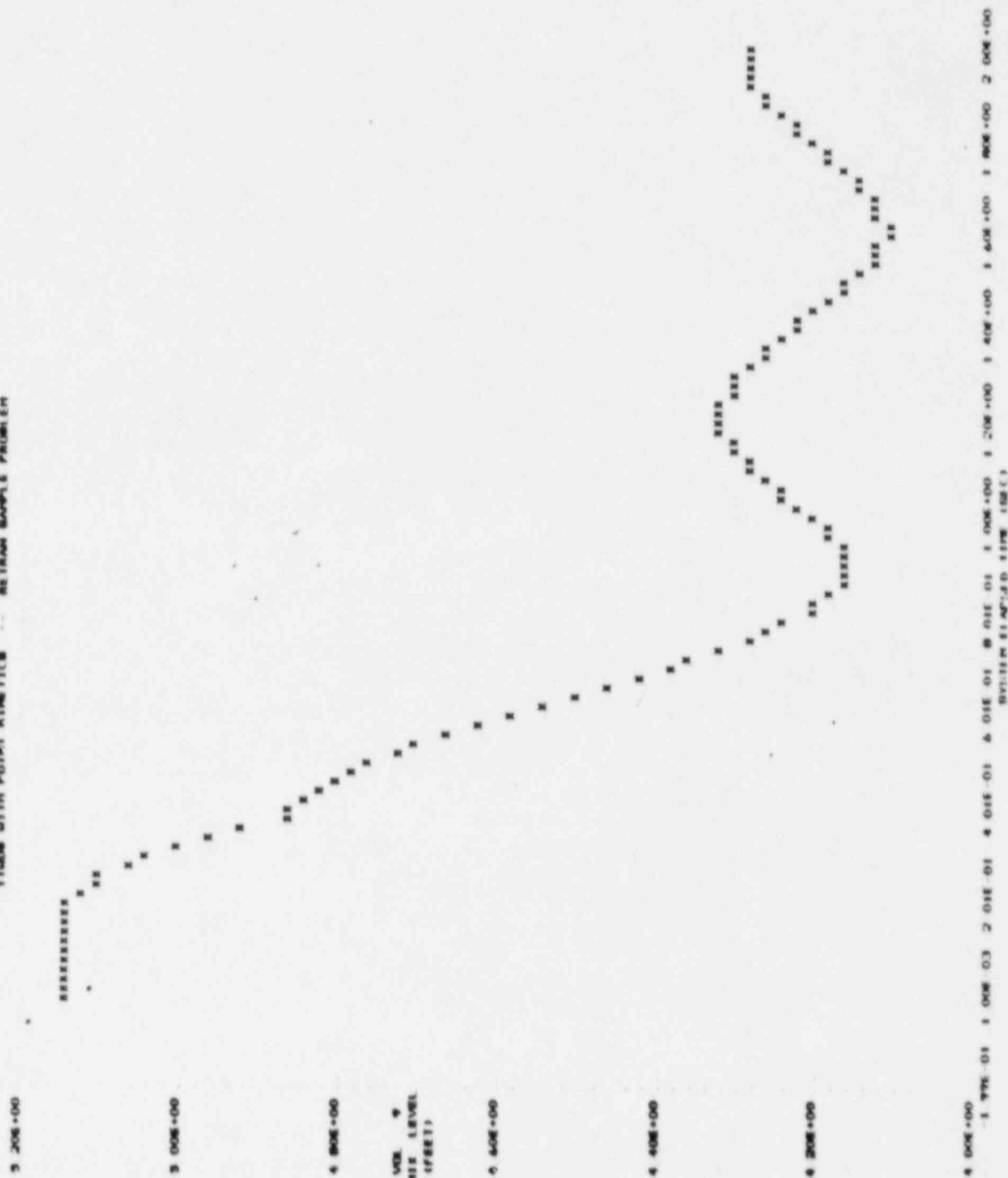
-1 000E+03  
-1 000E+03 1 000E+03 2 000E+03 3 000E+03 4 000E+03 5 000E+03  
SYSTEM SLAPED TIME (SEC)

Revision 2

VIII-60h



TIME WITH POINTS KINETIC ... RETAIN SAMPLE FROM EM



Revision 3

VIII-60h



RETRAN-02-0000004 04/08/84 EPRI BEST ESTIMATE THERMAL HYDRAULIC ANALYSIS PACKAGE ELECTRIC POWER SOFTWARE CENTER 10/08/84 PAGE 38  
 \*\*\* EPRI RELEASE 02 - LIGHT WATER REACTOR TRANSMISSION ANALYSIS PACKAGE  
 TIME WITH SPACE TIME KINETICS -- RETRAN SAMPLE PROBLEM  
 \*\*\*\*\*

SYSTEM ELAPSED TIME (SEC)	SYSTEM HEAT FLOW	REG 2 ABS GROUP 1	REG 4 ABS GROUP 1	VEL 10 AVG PRESS (PSI)	MASS FLOW (LB/SEC)	MASS FLOW (LB/SEC)	MASS FLOW (LB/SEC)	REG 4 ABS GROUP 1	VEL 9 MIX LEVEL (FEET)
0000000-00	1 0000000-00	7 1700000-03	7 1700000-03	1 0199900-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1300000-00
1 0000000-03	1 0017400-00	7 1699900-03	7 1699900-03	1 0199900-03	3 0341000-03	3 0341000-03	3 0341000-03	4 8999900-03	5 1299900-00
1 0000000-01	1 0021400-00	7 1699900-03	7 1699900-03	1 0199900-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
1 0000000-01	1 0027300-00	7 1699900-03	7 1699900-03	1 0199900-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
2 0000000-01	1 0032900-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
2 0000000-01	1 0042400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
3 0000000-01	1 0047400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
3 0000000-01	1 0057400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
4 0000000-01	1 0067400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
4 0000000-01	1 0077400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
5 0000000-01	1 0087400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
5 0000000-01	1 0097400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
6 0000000-01	1 0107400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
7 0000000-01	1 0117400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
7 0000000-01	1 0127400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
8 0000000-01	1 0137400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
8 0000000-01	1 0147400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
9 0000000-01	1 0157400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
9 0000000-01	1 0167400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
1 0000000-00	1 0177400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00
1 0000000-00	1 0187400-00	7 1699900-03	7 1699900-03	1 0202400-03	3 0341000-03	3 0341000-03	3 0341000-03	4 9000000-03	5 1299900-00

STATUS WITH SPACE TIME KINE TICB --- AIRMAN SAMPLE PROBLEM

3 500+00

X X

3 000+00

X

2 500+00

X

SYSTEM  
MEAN POWER

X

2 000+00

X

1 500+00

X

1 000+00

X

X

X

9 010-01  
9 900-02 1 000-03 1 010-01 2 010-01 3 010-01 4 010-01 5 010-01 6 010-01 7 010-01 8 010-01 9 010-01 1 000+00  
SYSTEM ELAPSED TIME (SEC)



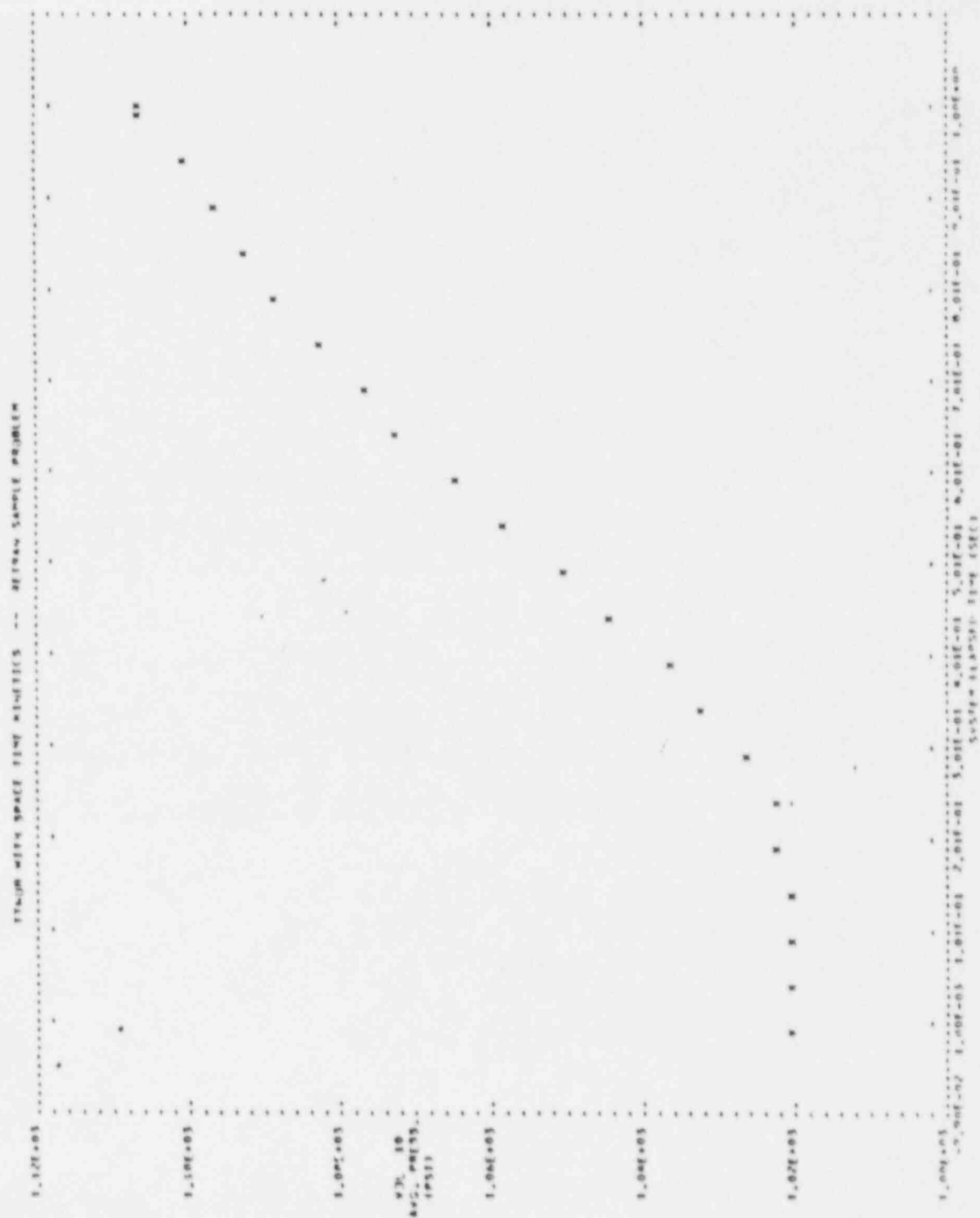




PLATE 10 WITH SPACE 5146. NINE FIGS. — THE TRAIL SAMPLES & PROFILES

0 125 03

 $\sigma = 0.05 + 0.73$ CO + H<sub>2</sub>O → H<sub>2</sub> + CO<sub>2</sub>

VER. 10  
AND PRESS  
(PBI)

 $\sigma = 0.03$ 

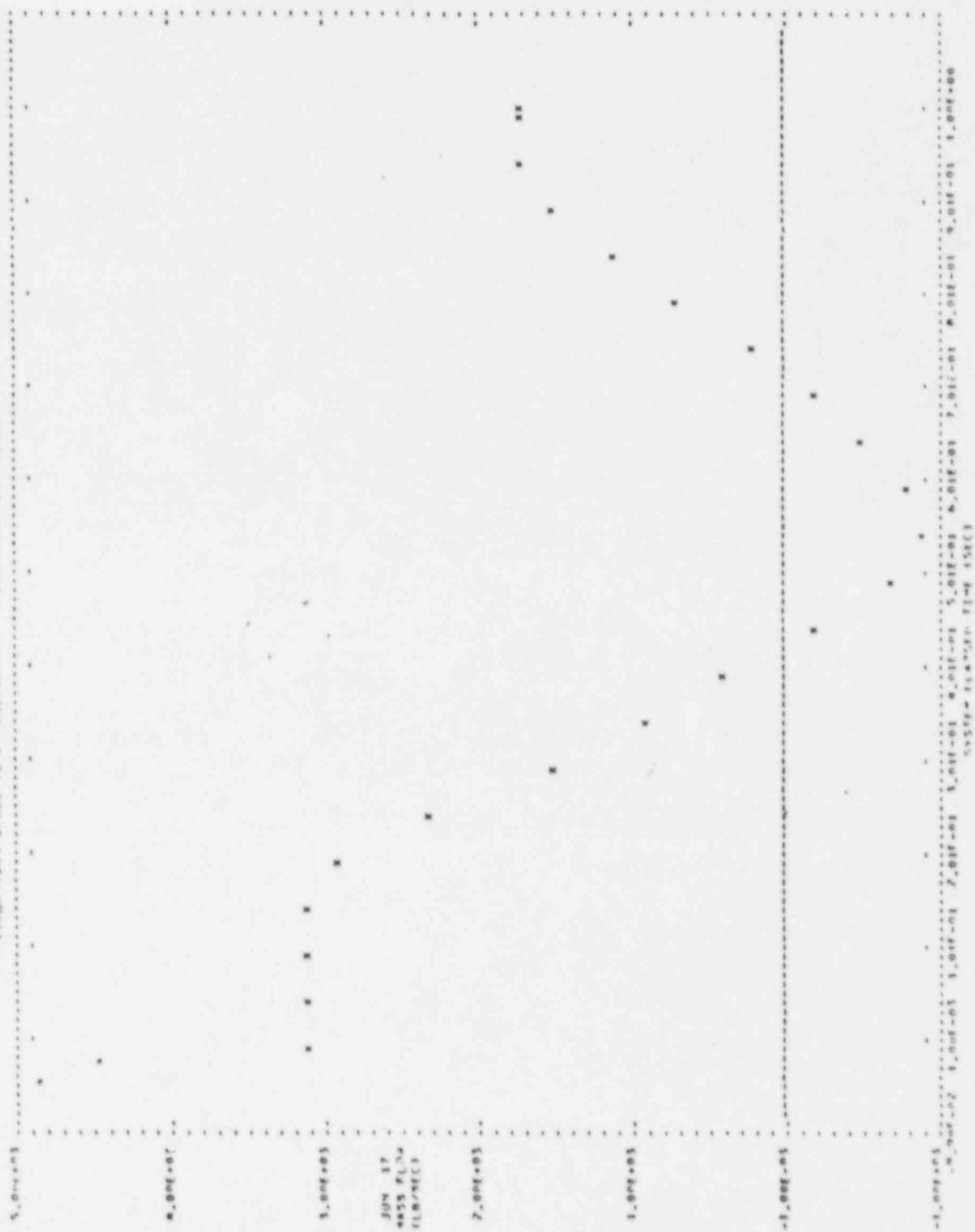
0045-0033

02M-03

EO 14176

[illegible]

10-01 4 018-01 9 018-01  
SYSTEM IS OPENED VIA COMC

[illegible]

TIME TO LIFT SPACE TIME MINUTES ... REFRAN SAMPLE PROBLEM

5 000E+03

4 000E+03

3 000E+03

JAN 17  
MARS FLOW  
11.8/SEC

2 000E+03

1 000E+03

-1 000E+03

-1 000E+03

0 000E+00 1 000E+01 2 000E+01 3 000E+01 4 000E+01 5 000E+01 6 000E+01 7 000E+01 8 000E+01 9 000E+01  
SYSTEM CLAPNET TIME (SEC)

Revision 3

VIII-110h

LISTING OF FILE #3 OF RETRAN-02

MOD4 TRANSMITTAL TAPE

VERBAL DESCRIPTION OF ALL MOD4 UPDATES

\*/ \*\*\*\*\*

\*/ THIS FILE CONTAINS A DESCRIPTION OF ALL THE UPDATES IN THE  
 \*/ MOD004 VERSION OF RETRAN-02. IT INCLUDES MODIFICATIONS MADE  
 \*/ TO THE RETRAN SOURCE, THE CDC LIBRARY, AND THE IBM LIBRARY.  
 \*/ THE UPDATE DESCRIPTIONS ARE LISTED ACCORDING TO IDENT, FIRST  
 \*/ FOR THE RETRAN SOURCE, THEN FOR THE CDC LIBRARY, AND FINALLY  
 \*/ FOR THE IBM LIBRARY.

\*/  
 \*/ RETRAN MODIFICATIONS:

*/ MOD004A	MODIFICATION 257-282
*/ MOD004B	MODIFICATION 283-297
*/ MOD004C	MODIFICATION 298-311
*/ MOD004D	MODIFICATION 312-314
*/ MOD004	MODIFICATION 315-321

\*/  
 \*/ CDC ENVIRONMENTAL LIBRARY:

*/ MOD26	MODIFICATION 11
*/ MOD27	MODIFICATION 12
*/ MOD28	MODIFICATION 13

\*/  
 \*/ IBM ENVIRONMENTAL LIBRARY:

*/ MOD30	MODIFICATION 14-15
*/ MOD31	MODIFICATION 16
*/ MOD32	MODIFICATION 17

\*/ \*\*\*\*\*

\*/ \*\*\*\*\*

\*/ RETRAN SOURCE MODIFICATIONS FOLLOW

\*/ \*\*\*\*\*

\*/ \*\*\*\*\*

\*/ MODIFICATIONS 257-282 ARE IN UPDATE MOD004A

\*/ \*\*\*\*\*

\*/ \*\*\*\*\* MODIFICATION NUMBER 257 \*\*\*\*\*

\*/  
 \*/ ERROR DESCRIPTION:

\*/  
 \*/ CHANGING A BUBBLE RISE VOLUME FROM A HEM VOLUME TO A NON  
 \*/ EQUILIBRIUM VOLUME PRODUCES A MODE 6 ERROR IN SUBROUTINE  
 \*/ EXPINT.

\*/  
 \*/ MODIFICATION DESCRIPTION:

\*/  
 \*/ THE MODIFICATION REQUIRES THE ADDITION OF A SINGLE "IF" TEST  
 \*/ TO SUBROUTINE BUBB. THIS MODIFICATION PRODUCES NO INPUT,  
 \*/ MANUAL, OR DATA TAPE STRUCTURE CHANGES.

\*/  
 \*/ MODELING ALTERNATIVES:

\*/  
 \*/ NONE

\*/  
 \*/ CHECK OUT:

\*/  
 \*/ THE MODIFICATION WAS CHECKED OUT BY EXECUTING THE UPDATED CODING  
 \*/ WITH THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR.

\*/  
 \*/ VERIFICATION:  
 \*/  
 \*/ THE MODIFICATION WAS VERIFIED BY VISUALLY INSPECTING THE ORIGINAL  
 \*/ AND MODIFIED CODING AND THE CORRESPONDING RESULTS PRODUCED RELATIVE  
 \*/ TO THE PROBLEM PRODUCING INPUT DECK.  
 \*/

\*/ REPORTED BY : RON GRIEBENOW (EI) DATE: 03/01/84  
 \*/ CORRECTED BY : RON GRIEBENOW (EI) DATE: 03/02/84  
 \*/ VERIFIED BY : L.V. ELLIS (EI) DATE: 03/16/84  
 \*/

\*/ \*\*\*\*\*  
 \*/  
 \*/

\*/ \*\*\*\*\* MODIFICATION NUMBER 258 \*\*\*\*\*  
 \*/

\*/ ERROR DESCRIPTION:  
 \*/

\*/ APPARENTLY THE SSI ENTHALPY BIAS CALCULATION IS NEGLECTING TO INCLUDE  
 \*/ THE NONCONDUCTING HEAT EXCHANGER ENERGY IN THE ENERGY BALANCE BIAS  
 \*/ CALCULATION. THIS RESULTS IN AN ERRONEOUS BIAS OF FW FILL ENTHALPY.  
 \*/ (SEE PROBLEM REPORT NUMBER 191.)  
 \*/

\*/ MODIFICATION DESCRIPTION:  
 \*/

\*/ SUBROUTINE JHOFF WAS CORRECTED TO INCLUDE THE EFFECT OF A NONCONDUCTING  
 \*/ HEAT EXCHANGER IN THE FEEDWATER LINE IN CALCULATING THE ENTHALPY BIAS.  
 \*/ (NOTE: THE HEAT EXCHANGER MUST BE ASSOCIATED WITH THE FIRST VOLUME ON  
 \*/ THE DOWNSTREAM SIDE OF THE FILL JUNCTION AT WHICH THE BIAS IS BEING  
 \*/ CALCULATED.)  
 \*/

\*/ THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES  
 \*/ NOT ALTER DATA TAPE STRUCTURE.  
 \*/

\*/ MODELING ALTERNATIVES:  
 \*/

\*/ NONE  
 \*/

\*/ CHECK OUT:  
 \*/

\*/ THE MODIFICATION WAS CHECKED BY EXECUTING THE DECK WITH WHICH THE  
 \*/ ERROR WAS ORIGINALLY ENCOUNTERED.  
 \*/

\*/ VERIFICATION:  
 \*/

\*/ THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE  
 \*/ WITH THE DECK WHICH FIRST ENCOUNTERED THE ERROR. ( THAT DECK  
 \*/ HAD TO BE MODIFIED SLIGHTLY TO ALLOW IT TO RUN ON MOD3. )  
 \*/

\*/ REPORTED BY : MIKE BAKER (CPCO) DATE: 09/20/83  
 \*/ CORRECTED BY : L.V. ELLIS (EI) DATE: 02/15/84  
 \*/ VERIFIED BY : D.A. TROTT (EI) DATE: 11/27/84  
 \*/

\*/ \*\*\*\*\*  
 \*/  
 \*/

\*\*\*\*\* MODIFICATION NUMBER 259 \*\*\*\*\*

ERROR DESCRIPTION:

HEAT TRANSFER MODE 16 CAN NOT BE COMPUTED DUE TO BAD NUMBERS FOR CP AT THE NEIGHBORHOOD OF CRITICAL PRESSURE. THE COMPUTED VALUES FOR CP FOR THESE CASES ARE THE ORDERS OF  $-10^{**4}$ . (SEE PROBLEM REPORT NUMBER 212.)

MODIFICATION DESCRIPTION:

THE PROBLEM IS A RESULT OF INFLECTION POINTS IN THE "SURFACE FITS" USED TO APPROXIMATE THE TEMPERATURE OF WATER AS A FUNCTION OF ITS PRESSURE AND ENTHALPY IN THE NEIGHBORHOOD OF THE CRITICAL POINT. SPECIFICALLY, FOR PRESSURES RANGING FROM APPROXIMATELY 3208.0 (0.2 PSI BELOW THE CRITICAL PRESSURE) TO APPROXIMATELY 3700 PSI, AND FOR ENTHALPIES RANGING FROM APPROXIMATELY 850. TO 906. BTU/LB, THE TEMPERATURE FUNCTIONS GO THROUGH A RELATIVE MINIMUM, SLIGHTLY TO THE LEFT OF THE CRITICAL POINT ( $H=906$ ). AS A RESULT THE HEAT CAPACITY ( $1/DTDH$ ) BECOMES NEGATIVE NEAR THE CRITICAL POINT. TO ELIMINATE THE PROBLEM, SUBPROGRAM WATER WAS MODIFIED TO CUT OUT THE "BAD" PORTION OF THE LIQUID TEMPERATURE "SURFACE FIT" ( $H<906$ .) AND REPLACE IT WITH A RULED SURFACE "PATCH" BETWEEN BOUNDING AREAS OF THE ORIGINAL SURFACE. THE RESULT HAS THE EFFECT OF KEEPING THE TEMPERATURE FUNCTION (STRICTLY) MONOTONICALLY INCREASING WITH ENTHALPY FOR FIXED PRESSURE. THE HEAT CAPACITY IN THIS REGION IS CONSTANT AND THE DERIVATIVE OF THE TEMPERATURE WITH RESPECT TO PRESSURE FOR A FIXED ENTHALPY IS LINEARLY WEIGHTED SIMILARLY TO THE TEMPERATURE FUNCTION. THE RULED SURFACE IS USED BETWEEN 800. AND 906. BTU/LBM FOR ALL PRESSURES GREATER THAN 3208.2 AND PRODUCES TEMPERATURES IN BETTER AGREEMENT WITH THE ASME VALUES THAN THE ORIGINAL SURFACE IN SOME AREAS. THE DISCREPANCIES BETWEEN THE MODIFIED FUNCTION VALUES AND THE ASME VALUES ARE WITHIN THE SAME ERROR BOUND AS THE ORIGINAL FIT. IN THE SMALL WINDOW BETWEEN 3208.0 AND 3208.2 PSI, AND 903. AND 906. PSI NEGATIVE HEAT CAPACITIES ARE ALSO COMPUTED (DIFFERENT SURFACE FIT THAN THE ONE DISCUSSED ABOVE). TO AVOID CODE FAILURES RESULTING FROM THESE NEGATIVE VALUES, THE ABSOLUTE VALUE OF THE COMPUTED HEAT CAPACITY IS RETURNED. IN THE ORIGINAL WATER PROPERTIES, THERE WAS A DISCONTINUITY IN THE TEMPERATURE AT 906. BTU/LB FOR PRESSURES EXCEEDING THE CRITICAL POINT. THIS CORRECTION ELIMINATES THIS DISCONTINUITY BUT INTRODUCES A DISCONTINUITY AT THE CRITICAL PRESSURE FOR ENTHALPIES BETWEEN 800. AND 906. BTU/LB.

THE MODIFICATION REQUIRES NO INPUT MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE, BUT THE THEORY MANUAL NEEDS TO BE MODIFIED TO REFLECT THE USE OF THE RULED SURFACE BETWEEN 800 AND 906 BTU/LB FOR PRESSURES EXCEEDING THE CRITICAL POINT.

MODELING ALTERNATIVES:

NONE

CHECK OUT:

THE ORIGINAL ERROR COULD NOT BE RE-CREATED BECAUSE IT HAD OCCURRED AFTER SEVERAL RESTARTS WITH CODE UPDATES AND THE HISTORY WAS NOT RECORDED. THE INITIAL PORTION OF THE RUN WAS EXECUTED TO SHOW THAT THE MODIFICATIONS DON'T CAUSE ANY IMMEDIATE PROBLEMS.

# VERIFICATION:

THE ORIGINAL CODE MODIFICATION CONTAINED AN ERROR IN THAT THE HEAT CAPACITY WAS NOT CONSTANT IN THE REGION WHERE THE TEMPERATURE WAS COMPUTED AS A LINEAR FUNCTION OF THE ENTHALPY FOR A GIVEN PRESSURE. THE COMPUTATION OF THE PARTIAL DERIVATIVE OF THE TEMPERATURE WITH RESPECT TO THE ENTHALPY WAS ALSO MODIFIED TO BE CONSISTENT WITH THE LINEAR WEIGHTING. THE LOWER ENTHALPY BOUND FOR THE RULED SURFACE WAS MODIFIED FROM A FUNCTION OF PRESSURE TO A FIXED ENTHALPY OF 800 BTU/LBM AND THE RULED SURFACE IS APPLIED FOR ALL PRESSURES ABOVE THE CRITICAL POINT. A DRIVER SUBROUTINE WAS WRITTEN TO EXERCISE THE WATER PROPERTY FUNCTIONS FROM 3150 PSI TO 6000 PSI FOR ENTHALPIES RANGING FROM 800 TO 906 BTU/LB. THE RULED SURFACE INTERPOLATION ELIMINATED THE PROBLEMS OBSERVED WITH THE ORIGINAL FITS (NEGATIVE HEAT CAPACITIES). THE MODIFIED CODE WAS ALSO VISUALLY VERIFIED TO BE CORRECT.

REPORTED BY :	W.G. CHOE	(EI)	DATE: 11/01/83
CORRECTED BY :	L.V. ELLIS	(EI)	DATE: 02/06/84
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 03/18/85

\*\*\*\*\* MODIFICATION NUMBER 260 \*\*\*\*\*

# ERROR DESCRIPTION:

ABOVE THE CRITICAL PRESSURE REGION, THE CODE CHANGES THE PHASE FROM LIQUID TO VAPOR BASED ON ENTHALPY. THEREFORE, THE PRESSURIZER (NON-EQUILIBRIUM MODEL) LIQUID REGION'S VOID FRACTION BECOMES 1.0 AND THE DIVIDE CHECK (ERROR MODE 2) OCCURS.

# MODIFICATION DESCRIPTION:

A CODE UPDATE WAS MADE TO SUBROUTINE VAPOR1 TO PROTECT AGAINST A DIVIDE BY ZERO. THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

NONE

# CHECK OUT:

A 0.86 TRANSIENT WAS RUN WITH THE UPDATE, BUT THE ERROR DOES NOT OCCUR UNTIL 168.2 SECONDS INTO THE TRANSIENT. THUS, NO CHECKOUT CALCULATION IS PROVIDED.



\*/  
\*/ VERIFICATION:

\*/ VISUAL VERIFICATION WAS MADE OF THIS UPDATE. THE ORIGINAL  
\*/ CALCULATION WAS CHECKED TO VERIFY THAT THE MODE 2 ERROR  
\*/ WAS IN SUBROUTINE VAPOR1 (TROUBLE REPORT 213 IN BINDER).  
\*/ THEN THE UPDATE WAS CHECKED WITH A LISTING OF VAPOR1 TO  
\*/ VERIFY THAT THE MODIFICATION WAS CORRECT.

\*/  
\*/  
\*/  
\*/  
\*/  
\*/  
\*/ REPORTED BY : W.G. CHOE (EI) DATE: 11/01/83  
\*/ CORRECTED BY : L.V. ELLIS (EI) DATE: 02/06/84  
\*/ VERIFIED BY : K.R. KASTSMA (EI) DATE: 03/12/85

\*/ \*\*\*\*\*

\*/ \*\*\*\*\* MODIFICATION NUMBER 261 \*\*\*\*\*

\*/ ERROR DESCRIPTION:

\*/ THE VALVE OPERATES PROPERLY IN THE INITIAL RUN, BUT ON RESTART  
\*/ IT FAILS IN SUBROUTINE POLATE DURING INVERSE INTERPOLATION IF  
\*/ THE VALVE CLOSURE TABLE DOES NOT CONTAIN AN AREA MATCH WITHIN  
\*/ THE NUMBER OF POINTS STIPULATED IN INITIAL DECK. (SEE PROBLEM  
\*/ REPORT NUMBER 227.)

\*/ MODIFICATION DESCRIPTION:

\*/ THE EQUIVALENCING OF SOME OF THE RELATED VARIABLES WAS LEADING TO A  
\*/ RESTART PROBLEM. THE VALVE AREA INPUT PROCESSING SUBROUTINE INCK  
\*/ WAS MODIFIED TO ELIMINATE THE UNNECESSARY EQUIVALENCING.

\*/ THE MODIFICATION DOES NOT ALTER DATA TAPE STRUCTURE AND REQUIRES NO  
\*/ MODIFICATIONS TO INPUT. THE PROGRAMMER'S MANUAL SHOULD BE CHANGED  
\*/ TO REFLECT THE CHANGE TO THE VALVE FILES.

\*/ MODELING ALTERNATIVES:

\*/ INCLUDE AS MANY POINTS IN THE ORIGINAL TABLE AS IN THE  
\*/ RESTART TABLE FOR NORMALIZED VALVE AREA VS. TIME.

\*/ CHECK OUT:

\*/ THE MODIFICATION WAS CHECKED BY EXECUTING THE DECK WHICH  
\*/ ORIGINALLY ENCOUNTERED THE ERROR.

\*/ VERIFICATION:

\*/ THE CORRECTION WAS VERIFIED BY EXECUTING THE MODIFIED CODE  
\*/ WITH THE DECK WHICH FIRST ENCOUNTERED THE ERROR.

\*/  
\*/ REPORTED BY : J.H. TESSIER (ANL-D208) DATE: 03/07/84  
\*/ CORRECTED BY : L.V. ELLIS (EI) DATE: 03/07/84  
\*/ VERIFIED BY : D.A. TROTT (EI) DATE: 11/28/84  
\*/

```

*/ *****
*/
*/
*/
*/ ***** MODIFICATION NUMBER 262 *****
*/
*/ ERROR DESCRIPTION:
*/
*/   A 208 UNDERFLOW ERROR MESSAGE IS PRINTED OUT. THE MESSAGE IS
*/   PRINTED ON IBM RUNS ONLY. (SEE TROUBLE REPORTS 223 AND 229).
*/
*/ MODIFICATION DESCRIPTION:
*/
*/   THE UNDERFLOW ERROR MESSAGE IS DUE TO AN INITIAL VALUE OF ZERO
*/   FOR OLVLN IN A "DO LOOP" IN EXPINT. THE ERROR WAS CORRECTED
*/   BY INCREASING THE STARTING VALUE OF THE DO LOOP BY ONE INCREMENT.
*/
*/   THIS MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT
*/   ALTER THE DATA TAPE STRUCTURE.
*/
*/ MODELING ALTERNATIVES:
*/
*/   NONE.
*/
*/ CHECK OUT:
*/
*/   THE CORRECTION WAS CHECKED OUT BY RUNNING A DECK SIMILAR TO THE
*/   DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR.
*/
*/ VERIFICATION:
*/
*/   THE MODIFICATION WAS VERIFIED BY A VISUAL INSPECTION OF THE
*/   ORIGINAL DECK WITH THE ERROR, THE MODIFIED DECK, AND THE
*/   CODING OF EACH DECK. A TEST WAS ALSO ADDED TO BRANCH TO THE
*/   END OF THE LOOP (100) FOR BUBBLE SETS NOT REFERENCED BY A
*/   VOLUME (E.G. IV = 0).
*/
*/
*/ REPORTED BY : DONALD DIEKER (IPC) DATE: 01/25/84
*/               ROBERT W. TSAI (CE)   02/28/84
*/ CORRECTED BY : B.E. GRIEBENOW (EI)   DATE: 03/11/85
*/ VERIFIED BY : M.P. PAULSEN (EI)    DATE: 03/13/85
*/
*/ *****
*/
*/
*/ ***** MODIFICATION NUMBER 263 *****
*/
*/ ERROR DESCRIPTION:
*/
*/   AN FTB ERROR 14 OCCURS ON SOME IBM RESTART JOBS ON MOD003 (SEE
*/   TROUBLE REPORT 238)
*/
*/ MODIFICATION DESCRIPTION:
*/
*/   AN FTB FILE USED TO PROTECT FORTRAN BUFFER SPACE USES A FILE ID
*/   OF 2.0. THIS FILE IS ONLY RESERVED WHEN THE BUFFER SPACE RESIDES

```

AT THE END OF THE RETRAN LOAD MODULE. THE CARDS DATA FILE ALSO  
 USES A FILE ID OF 2.0, THUS LEADING TO THE FTB 14 ERROR. THE  
 ERROR WAS CORRECTED BY USING FUNCTION NEXTID TO OBTAIN A UNIQUE  
 FILE NUMBER FOR THE CARD DATA FILE IN SUBROUTINE INPUT.

THIS MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT  
 ALTER THE DATA TAPE STRUCTURE.

#### MODELING ALTERNATIVES:

FOR MVS OPERATING SYSTEMS, MINIMIZING THE BUFFER SIZE FOR AUXILIARY  
 DATA SETS OFTEN ELIMINATES THE PROBLEM. FOR XA OPERATING SYSTEMS,  
 THERE DOES NOT APPEAR TO BE AN ALTERNATIVE TO THIS CODING CHANGE.

#### CHECK OUT:

THE FORTRAN SOURCE LISTING WAS VISUALLY CHECKED AND THE CORRECTIONS  
 WERE ALSO CHECKED BY MIDDLE SOUTH AND FOUND TO CORRECT THE REPORTED  
 PROBLEM (SEE TROUBLE REPORT 238)

#### VERIFICATION:

THE MODIFIED CODING WAS VISUALLY VERIFIED TO BE CORRECT.

REPORTED BY : SAL RANATZA (MSS)	DATE: 04/04/84
CORRECTED BY : M.P. PAULSEN (EI)	DATE: 07/24/84
VERIFIED BY : J.A. MCCLURE (EI)	DATE: 03/13/85

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 264 \*\*\*\*\*

#### ERROR DESCRIPTION:

WHEN BYPASSING THE STEADY-STATE INITIALIZATION OPTION, THE WILSON  
 BUBBLE RISE MODEL YIELDS ZERO VELOCITY AFTER T=0.  
 ( SEE TROUBLE REPORT NUMBER 226 )

#### MODIFICATION DESCRIPTION:

SUBROUTINES INBUBL AND EXPINT WERE MODIFIED SO THAT ON THE FIRST  
 PASS THROUGH EXPINT THE COEFFICIENT OF THE WILSON BUBBLE VELOCITY,  
 VBNORM, WAS INITIALIZED TO ONE UNDER THESE CIRCUMSTANCES.  
 THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE WERE NO INPUT  
 CHANGES REQUIRED. THERE WERE NO MANUAL CHANGES NECESSARY.

#### MODELING ALTERNATIVES:

NONE

#### CHECK OUT:

THE CORRECTION WAS CHECKED OUT BY EXECUTING THE DECK  
 WHICH ORIGINALLY ENCOUNTERED THE PROBLEM.

## \*/ VERIFICATION:

\*/  
 \*/ THE MODIFIED CODING WAS VISUALLY VERIFIED TO BE CORRECT.  
 \*/ THE CHECKOUT RUNS WERE ALSO VISUALLY VERIFIED TO BE CORRECT  
 \*/ WHEN RUN WITH THE MODIFICATION.  
 \*/

\*/ REPORTED BY : JACK TESSIER (ANL) DATE: 01/24/84  
 \*/ CORRECTED BY : D. A. TROTT (EI) DATE: 08/01/84  
 \*/ VERIFIED BY : M.P. PAULSEN (EI) DATE: 03/13/85  
 \*/

\*/ \*\*\*\*\*  
 \*/  
 \*/

\*/ \*\*\*\*\* MODIFICATION NUMBER 265 \*\*\*\*\*  
 \*/

## \*/ ERROR DESCRIPTION:

\*/  
 \*/ WHEN PRINTING THE CONDUCTOR NODAL TEMPERATURE, THE MINOR EDIT  
 \*/ HEADING IS WRITTEN AS PUMP. THE TEMPERATURE VALUES APPEAR TO  
 \*/ BE CORRECT. ( SEE TROUBLE REPORT NUMBER 231 OR 247 )  
 \*/

## \*/ MODIFICATION DESCRIPTION:

\*/  
 \*/ SUBROUTINE EDATA2 WAS MODIFIED TO CHANGE AN INDEX, WHICH HAD BEEN  
 \*/ HARDWIRED TO SIX, TO BE A DYNAMIC VARIABLE.  
 \*/ THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE WERE NO INPUT  
 \*/ CHANGES REQUIRED. THERE WERE NO MANUAL CHANGES NECESSARY.  
 \*/

## \*/ MODELING ALTERNATIVES:

\*/  
 \*/ NONE  
 \*/

## \*/ CHECK OUT:

\*/  
 \*/ THE CORRECTION WAS CHECKED OUT BY EXECUTING THE DECK  
 \*/ WHICH ORIGINALLY ENCOUNTERED THE PROBLEM.  
 \*/

## \*/ VERIFICATION:

\*/  
 \*/ THE CORRECTION WAS VERIFIED BY EXECUTING A DECK SIMILAR  
 \*/ TO THE DECK WHICH ENCOUNTERED THE PROBLEM. THE DECK WAS  
 \*/ FIRST RUN WITH THE MODIFICATION THEN WITHOUT THE MODIFICATION.  
 \*/

\*/ REPORTED BY : GREG SWINDLEHURST (DUKE) DATE: 06/07/84  
 \*/ ROBERT TSAI (COM.ED) DATE: 02/28/84  
 \*/ CORRECTED BY : D. A. TROTT (EI) DATE: 08/01/84  
 \*/ VERIFIED BY : B. E. GRIEBENOW (EI) DATE: 03/08/85  
 \*/

\*/ \*\*\*\*\*  
 \*/  
 \*/

\*/ \*\*\*\*\* MODIFICATION NUMBER 266 \*\*\*\*\*  
 \*/

## \*/ ERROR DESCRIPTION:

\*/  
 \*/ THE CODE WILL NOT READ PAST THE FIRST TAPE DATA RECORD. CONSEQUENTLY,  
 \*/

NO PLOTS ARE GENERATED. ( SEE TROUBLE REPORT NUMBER 228 )

# MODIFICATION DESCRIPTION:

IN SUBROUTINE REDTAP A CHECK ON XREG = 0.0 WAS REMOVED.  
THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE WERE NO INPUT  
CHANGES REQUIRED. THERE WERE NO MANUAL CHANGES NECESSARY.

# MODELING ALTERNATIVES:

NONE

# CHECK OUT:

THE CORRECTION WAS CHECKED OUT BY EXECUTING THE DECK  
WHICH ORIGINALLY ENCOUNTERED THE PROBLEM.

# VERIFICATION:

THE CORRECTION WAS VERIFIED BY EXECUTING THE DECK  
WHICH FIRST ENCOUNTERED THE PROBLEM.

REPORTED BY :	CRAIG PETERSON	(EI)	DATE: 03/14/84
CORRECTED BY :	CRAIG PETERSON	(EI)	DATE: 03/14/84
VERIFIED BY :	DAVE TROTT	(EI)	DATE: 08/02/84

\*\*\*\*\* MODIFICATION NUMBER 267 \*\*\*\*\*

# ERROR DESCRIPTION:

DURING INITIALIZATION, A DIVIDE BY ZERO FROM SUBROUTINE EDATA3  
OCCURS. PROBLEM REPORT 235.

# MODIFICATION DESCRIPTION:

THIS PROBLEM IS DUE TO AN INPUT ERROR ON THE PROBLEM DESCRIPTION  
CARD (C1000Y). IF NCOR, WORD 16, IS SET EQUAL TO ZERO, NODEL,  
WORD 19, MUST ALSO BE SET EQUAL TO ZERO. IN THIS CASE NCOR WAS 0  
AND NODEL WAS 3 AND THERE MUST BE CORE CONDUCTORS TO USE POINT  
KINETICS. AN ERROR MESSAGE WAS ADDED TO DETECT THIS INPUT ERROR  
IN SUBROUTINE INRTRN.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES  
NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

NONE.

# CHECK OUT:

THE CORRECTION WAS CHECKED OUT BY RUNNING THE DECK PROVIDED, BOTH  
WITH AND WITHOUT THE INPUT ERROR. THE INPUT CHECK FLAGGED THE  
PROBLEM AS AN ERROR.



\*/  
\*/ VERIFICATION:

\*/ THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE  
\*/ WITH A DECK SIMILAR TO THE DECK WHICH ENCOUNTERED THE CODE  
\*/ ERROR. IN THE VERIFICATION RUN NCOR WAS SET TO ZERO AND  
\*/ MODEL WAS SET EQUAL TO THREE FOR THE FIRST RUN, AND EQUAL  
\*/ TO ONE FOR THE SECOND RUN.

\*/ REPORTED BY : GREGG SWINDLEHURST (DUKE) DATE: 04/04/84  
\*/ CORRECTED BY : C. E. PETERSON (EI) DATE: 07/31/84  
\*/ VERIFIED BY : B.E. GRIEBENOW (EI) DATE: 03/06/85

\*/ \*\*\*\*\*

\*/ \*\*\*\*\* MODIFICATION NUMBER 268 \*\*\*\*\*

\*/ ERROR DESCRIPTION:

\*/ THERE IS A DIFFERENCE IN FORWARD AND REVERSE LOSS COEFFICIENT  
\*/ VALUES FROM THE OUTPUT PROVIDED ON TAPE (VALUE = 10E-5 MAGNITUDE)  
\*/ AND THE OUTPUT FROM AN APS RUN FROM A COMPILED SOURCE (VALUE = 100).  
\*/ SEE TROUBLE REPORT 239.

\*/ MODIFICATION DESCRIPTION:

\*/ A LOCAL VARIABLE USED TO COMPUTE THE EDITTED LOSS COEFFICIENT  
\*/ WAS UNDEFINED. THE UNDEFINED VARIABLE CAUSED DIFFERENT RESULTS  
\*/ ON CDC MACHINES DEPENDING ON THE PRESET OPTION USED AT LOAD TIME  
\*/ AND COULD ALSO CHANGE ON IBM MACHINES WHENEVER THE CODE WAS  
\*/ INSTALLED. THE FIX WAS TO ELIMINATE USE OF THE UNDEFINED LOCAL  
\*/ VARIABLE AND REPLACE IT WITH THE APPROPRIATE PARAMETER FROM  
\*/ FILE 6. THE MODIFICATION WAS TO SUBROUTINE JVEDIT AND WILL ONLY  
\*/ EFFECT THE "JUNCTION DATA ACTUALLY BEING USED" EDIT. THE CORRECT  
\*/ LOSS COEFFICIENT VALUE IS BEING USED IN THE TRANSIENT CALCULATION  
\*/ FOR BOTH MOD002 AND MOD003.

\*/ THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES  
\*/ NOT ALTER DATA TAPE STRUCTURE.

\*/ MODELING ALTERNATIVES:

\*/ NO MODELING CHANGES ARE REQUIRED SINCE THE ERROR ONLY EFFECTS SOME  
\*/ EDITTED LOSS COEFFICIENTS, NOT THOSE USED IN MOMENTUM EQUATION.

\*/ CHECK OUT:

\*/ THE SAMPLE DECK THAT ENCOUNTERED THE ERROR WAS USED TO CHECK OUT  
\*/ THE ERROR CORRECTION (SCG>RET>QA>DECKS>PR239).

\*/ VERIFICATION:

\*/ THE CORRECTION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL  
\*/ AND MODIFIED CODING. IT WAS DECIDED THAT A MORE CORRECT 'IF'  
\*/ STATEMENT THAN THE ORIGINAL MODIFICATION 'IF' STATEMENT OF

IF (JCALCI(I).GT.1 .AND. AJUNT(I).GT.ZERO) AJ = AJUNT(I)

WOULD BE THE FOLLOWING STATEMENT:

IF ((JCALCI(I).EQ.1.OR.JCALCI(I).EQ.3).AND.AJUNT(I).GT.ZERO) AJ = AJUNT(I)

REPORTED BY : G.L. PICKARD (APS) DATE: 04/13/84

CORRECTED BY : M.P. PAULSEN (EI) DATE: 07/23/84

VERIFIED BY : B.E. GRIEBENOW (EI) DATE: 03/06/85

\*\*\*\*\* MODIFICATION NUMBER 269 \*\*\*\*\*

#### ERROR DESCRIPTION:

THE VALUE OF NODAL CROSS SECTIONS AS REQUESTED BY A MINOR EDIT IS NOT PROPERLY EDITED. PROBLEM REPORT 193.

#### MODIFICATION DESCRIPTION:

THE CORRECTION REQUIRED CHANGES IN SUBROUTINE EDATA5. THE ERROR IS IBM SPECIFIC, CDC EDITS WILL WORK WITHOUT THE CORRECTION. THE OFFSET TO THE WORD TO BE EDITED WAS BEING COMPUTED WRONG WHEN EXECUTED ON IBM. THIS IS DUE TO THE DIFFERENCE IN THE WAY MEMORY LOCATIONS ARE COUNTED BETWEEN CDC AND IBM FOR VARIABLES AVAILABLE FOR EDITING.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

#### MODELING ALTERNATIVES:

NONE. THE ERROR IS ONLY A EDITING PROBLEM, IT IS NOT FATAL AND DOES NOT AFFECT THE CALCULATION.

#### CHECK OUT:

THE DECK WAS NOT SUPPLIED; HOWEVER, IT WAS PRODUCED WITH ONE OF THE RETRAN SAMPLE PROBLEMS. THIS SAMPLE PROBLEM WAS USED TO CHECK THE CORRECTION.

#### VERIFICATION:

THE MODIFIED CODING WAS VISUALLY VERIFIED TO BE CORRECT. THE CHECKOUT PROBLEMS WERE ALSO EXAMINED AND VERIFIED (VISUALLY) AS BEING CORRECT.

REPORTED BY : ADEL ALAPOUR (SCS) DATE: 09/19/83

CORRECTED BY : CRAIG PETERSON (EI) DATE: 07/26/84

VERIFIED BY : M.P. PAULSEN (EI) DATE: 03/11/85

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 270 \*\*\*\*\*

ERROR DESCRIPTION:

AT 24 TIME STEPS WE GOT A DUMP INDICATING A ZERO VALUE OF DELTA H USED IN THE DENOMINATOR FOR CALCULATING A DERIVATIVE FOR THE ITERATIVE TIME STEP CONTROL FOR VOLUME 64. PROBLEM REPORT 252.

MODIFICATION DESCRIPTION:

A DIVIDE BY ZERO OCCURRED IN SUBROUTINE IMPSTP. THIS PROBLEM OCCURRED IN THE SATURATION LINE CROSSING TIME STEP CONTROL LOGIC. IN THIS INSTANCE, VALVES CLOSED AT THE INLET AND OUTLET JUNCTION OF A VOLUME AT THE SAME TIME. A CHECK WAS ADDED TO SUBROUTINE IMPSTP TO PREVENT THIS FROM OCCURRING. THE PROBLEM SHOULD ONLY OCCUR IN MOD003 IF THE VOLUME STATE IS CLOSE TO THE SATURATION LINE AND IS COMPLETELY ISOLATED OVER A TIME STEP FROM THE REST OF THE SYSTEM.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

MODELING ALTERNATIVES:

DO NOT CLOSE THE VALVE AT THE INLET AND OUTLET JUNCTION AT THE SAME EXACT TIME.

CHECK OUT:

THE CORRECTION WAS CHECKED WITH THE RUN THAT ENCOUNTERED THE PROBLEM.

VERIFICATION:

THE MODIFICATION WAS VERIFIED VISUALLY. THE CODE UPDATE (1 LINE OF CODING) WAS INSPECTED. THE CHECKOUT CALCULATION WAS COMPARED TO THE ORIGINAL PROBLEM REPORTING THE ERROR. THE CALCULATION MADE WITH THE UPDATE CORRECTED THE REPORTED PROBLEM.

REPORTED BY : HUGH D. FULCHER

DATE: 06/20/84

CORRECTED BY : CRAIG PETERSON

DATE: 07/31/84

VERIFIED BY : KEN KATSMAN (EI)

DATE: 03/08/85

\*\*\*\*\* MODIFICATION NUMBER 271 \*\*\*\*\*

ERROR DESCRIPTION:

THE DECK DOES NOT GET A CONVERGED STEADY-STATE WHEN THE FULL TRANSIENT DATA FOR THE TIME DEPENDENT VOLUMES IS INPUT. THE PROBLEM DOES NOT DEPEND ON THE LENGTH OF TRANSIENT DATA BUT RATHER ON THE ACTUAL VALUES INPUT, E.G., IN THE CASES PROVIDED,



CASE 3 HAS A CONVERGED STEADY-STATE BUT CASE 4 DOES NOT. CASE 4  
 DIFFERS FROM CASE 3 ONLY IN PRESSURE INPUT FOR DATA POINT 813  
 WITH THE PRESSURE BEING CHANGED FROM 850.708 TO 849.976.  
 (SEE PROBLEM REPORT NO. 236.)

#### MODIFICATION DESCRIPTION:

THE PROBLEM RESULTS FROM A MINOR CODE LIMITATION WHICH WILL ONLY  
 BE FACED INFREQUENTLY AND IS ROOTED IN THE FACT THAT THE SEPARATE  
 MATHEMATICAL EXPRESSIONS WHICH APPROXIMATE THE SPECIFIC ENTHALPY  
 OF SATURATED LIQUID OVER A COMMON INTERVAL OF PRESSURE YIELD  
 SLIGHTLY DIFFERENT VALUES. THE IMMEDIATE TYPE OF PROBLEM CAN BE  
 ELIMINATED ONLY BY INTRODUCING ANOTHER NUMERICAL PROBLEM. THUS,  
 THE CODE WAS MODIFIED TO INCLUDE A MESSAGE TO ALERT THE USER OF  
 THE POTENTIAL PROBLEM SOURCE IN THE RARE INSTANCES IN WHICH IT  
 MAY REOCCUR. THE CODE MODIFICATION IS IN THE TIME DEPENDENT  
 VOLUME INPUT PROCESSING ROUTINE INTDV.

THE MODIFICATION DOES NOT ALTER DATA TAPE STRUCTURE AND DOES NOT  
 REQUIRE INPUT OR MANUAL CHANGES.

#### MODELING ALTERNATIVES:

THE PARTICULAR PROBLEM MAY BE AVOIDED BY ADDING ANOTHER DATA  
 POINT TO THE DATA TABLE FOR THE FIRST TIME DEPENDENT VOLUME  
 AND ASSIGNING THE ARTIFICIAL DATA POINT A PRESSURE VALUE OF  
 951 PSI. ANALOGOUS (BUT DIFFERENT) INPUT REMEDIES WOULD BE  
 NECESSARY FOR OTHER OCCURRENCES OF THE LIMITATIONS.

#### CHECK OUT:

THE UPDATE TO INCLUDE THE PRINTING OF THE MESSAGE WAS COMPILED  
 WITHOUT ERROR AND THE RESULTING SOURCE LISTING VISUALLY EXAMINED.  
 THE DATA DECKS WERE NOT RECEIVED WITH THE TROUBLE REPORT.

#### VERIFICATION:

THE ORIGINAL UPATE WAS MODIFIED SO THAT THE INFORMATIVE MESSAGE  
 IS ONLY PRINTED WHEN THE PROPERTY DISCONTINUITY IS ENCOUNTERED  
 RATHER THAN FOR ANY JOB USING TIME DEPENDENT VOLUMES. THIS SUB-  
 SEQUENT MODIFICATION IS CONSISTENT WITH THE MODIFICATION DESCRIPTION  
 GIVEN ABOVE WHERE IT IS STATED THAT "A MESSAGE" ... "IS WRITTEN" ...  
 "TO ALERT THE USER OF THE POTENTIAL PROBLEM SOURCE IN THE RARE  
 INSTANCES IN WHICH IT MAY REOCCUR" RATHER THAN FOR ALL JOBS WITH  
 TIME DEPENDENT VOLUMES.

THE MODIFIED SOURCE CODE WAS VISUALLY VERIFIED AND FOUND TO BE  
 CORRECT.

REPORTED BY	: SAL RANATZA	(MSS)	DATE: 04/04/84
CORRECTED BY	: LARRY ELLIS	(EI)	DATE: 07/31/84
VERIFIED BY	: M.P. PAULSEN	(EI)	DATE: 03/18/85

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 272 \*\*\*\*\*

```

*/
*/ ERROR DESCRIPTION:
*/
*/ THE MODEL WILL NOT INITIALIZE WITH THE COMBINED HEAT TRANSFER
*/ MAP. AN ERROR IN FDXPD# AND DLOG OCCURS. INITIALIZATION WITH
*/ FORCED HEAT TRANSFER ONLY IS SUCCESSFUL. (SEE PROBLEM REPORT
*/ NUMBER 245.)
*/
*/ MODIFICATION DESCRIPTION:
*/
*/ THE PROBLEM RESULTED FROM A SPECIAL CASE IN WHICH THE INITIAL
*/ CONDITIONS CALLED FOR A CONDUCTOR IN THE ENVIRONMENT OF A
*/ STAGNANT FLUID. LOW-FLOW HEAT TRANSFER CORRELATIONS 10 AND
*/ 14 FAIL TO YIELD REALISTIC VALUES IN THE ZERO OR VERY LOW
*/ FLOW CASES, BUT WERE BEING CALCULATED AS THOUGH THE REYNOLDS
*/ NUMBER WAS ONE WHENEVER IT WAS ACTUALLY LESS. THE MODIFICATION
*/ CONSISTED OF CHANGING SUBROUTINE QDOT TO RAISE THE REYNOLDS
*/ NUMBER CUTOFF BOUND TO 512 (8 CUBED) FOR THESE CORRELATIONS.
*/ THIS CUTOFF IS SOMEWHAT ARBITRARY, BUT SELECTED ON THE PRIMARY
*/ BASIS THAT IT YIELDS A HEAT TRANSFER COEFFICIENT OF APPROXI-
*/ MATELY 5 BTU/FT2-HR-F IN THE INSTANT CASE.
*/
*/ MODELING ALTERNATIVES:
*/
*/ NONE (IF THE PROBLEM REQUIRES INITIALIZATION WITH NO FLOW)
*/
*/ CHECK OUT:
*/
*/ THE EQUIVALENT PROBLEM WAS PRODUCED ON THE CDC SYSTEM (WITH
*/ THE ORIGINAL INPUT DECK) AND THEN DETERMINED TO BE RESOLVED
*/ BY EXECUTING WITH THE CITED MODIFICATIONS TO SUBROUTINE QDOT.
*/
*/ VERIFICATION:
*/
*/ THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE
*/ WITH THE DECK WHICH FIRST ENCOUNTERED THE ERROR.
*/
*/ REPORTED BY : GREGG SWINDLEHURST (DUKE) DATE: 06/05/84
*/ CORRECTED BY : L.V. ELLIS (EI) DATE: 08/02/84
*/ VERIFIED BY : D.A. TROTT (EI) DATE: 11/27/84
*/
*/ *****
*/
*/ ***** MODIFICATION NUMBER 273 *****
*/
*/ ERROR DESCRIPTION:
*/
*/ THERE IS A PROBLEM WITH THE SAFETY/RELIEF VALVE ACTUATION ON THE
*/ HIGH PRESSURE TRIP. INPUT FOR FJUNF WAS -1.0. (SEE ATTACHED
*/ SHEET). WHEN THE VALVE OPENED, THE FLOW WAS NEGATIVE. PROBLEM
*/ REPORT 208.
*/
*/ MODIFICATION DESCRIPTION:
*/

```

THE PROBLEM WAS CAUSED BY AN INPUT ERROR. AN INPUT CHECK WAS ADDED TO IDENTIFY THE ERROR, WRITE AN ERROR MESSAGE AND TERMINATE EXECUTION. THE INPUT REQUESTED THE CODE TO COMPUTE THE JUNCTION LOSS COEFFICIENT USING STEADY STATE INITIALIZATION FOR A CLOSED VALVE JUNCTION. THE CODE CANNOT COMPUTE THE LOSS COEFFICIENT FOR THIS SITUATION AND CONSEQUENTLY LEFT -1.0 FOR THE FORWARD LOSS COEFFICIENT. THE INPUT CHECK WAS ADDED TO SUBROUTINE PRSORK.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

#### MODELING ALTERNATIVES:

INPUT A LOSS COEFFICIENT FOR JUNCTIONS THAT HAVE CLOSED VALVES AT TIME ZERO.

#### CHECK OUT:

THE ORIGINAL DECK WAS NOT SUPPLIED; HOWEVER, ONE OF THE RETRAN SAMPLE PROBLEMS WAS MODIFIED TO PRODUCE THE ERROR AND THE MODIFICATION WAS CHECKED WITH THIS PROBLEM.

#### VERIFICATION:

THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE WITH A RETRAN SAMPLE PROBLEM MODIFIED TO PRODUCE THE ERROR. A -1.0 WAS INPUT FOR THE FORWARD LOSS COEFFICIENT OF A CLOSED VALVE; AN ERROR MESSAGE WAS PRINTED AND THE JOB WAS ABORTED.

REPORTED BY :	J.G. REGISTER	(CEI)	DATE: 10/18/83
CORRECTED BY :	CRAIG PETERSON	(EI)	DATE: 08/06/84
VERIFIED BY :	B.E. GRIEBENOW	(EI)	DATE: 03/07/85

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 274 \*\*\*\*\*

#### ERROR DESCRIPTION:

THE RUN DIES ON AN OC4 ERROR ON COMBINATION PLOTS. PROBLEM REPORT 254.

#### MODIFICATION DESCRIPTION:

A RELOCATABLE FTB FILE USED FOR COMBINATION PLOTS IS REDUCED IN SIZE BY A CALL TO SHIFT. IN THIS PARTICULAR SHIFT, THE FILE MAY ALSO BE MOVED IN MAIN MEMORY. THE PROBLEM OCCURED BECUASE THE ADDRESS OF THE FILE WAS NOT STORED AFTER IT WAS REDUCED AND MOVED. THE MODIFICATION TO SUBROUTINE INPLOT STORED THE NEW ADDRESS AFTER THE FILE WAS SHIFTED. THIS ERROR DOES NOT OCCUR ON ALL COMBINATION PLOT PROBLEMS. IT WILL OCCUR ONLY IF THE FILE IS MOVED ALONG WITH BEING REDUCED, WHICH DEPENDS ON THE SPECIFIC COMPUTER AND INPUT OPTIONS USED.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

NONE.

# CHECK OUT:

THE CORRECTION WAS CHECKED BY EXECUTING THE PROBLEM THAT ENCOUNTERED THE ERROR.

# VERIFICATION:

THE RUN THAT ENCOUNTERED THE PROBLEM AND THE RUN WITH THE ERROR CORRECTION WERE EXAMINED. THE ERROR CORRECTION DID CORRECT THE PROBLEM. THE ERROR CORRECTION AND MODIFIED SUBROUTINE WERE ALSO EXAMINED.

REPORTED BY :	B. GRIEBENOW	(EI)	DATE: 07/17/84
CORRECTED BY :	M.P. PAULSEN	(EI)	DATE: 08/01/84
VERIFIED BY :	C.E. PETERSON	(EI)	DATE: 03/07/85

\*\*\*\*\* MODIFICATION NUMBER 275 \*\*\*\*\*

# ERROR DESCRIPTION:

THE SPECIFIED CHANGE IN MIXTURE LEVEL IN THE TIME DEPENDENT VOLUME WAS IGNORED BY THE PROGRAM. PROBLEM REPORT 222.

# MODIFICATION DESCRIPTION:

THE ERROR WAS CAUSED BY THE MIXTURE LEVEL GETTING RESET TO THE OLD TIME STEP VALUE. THIS WAS DONE IN SUCH A MANNER THAT THE MIXTURE LEVEL WOULD NOT CHANGE FROM THE TIME ZERO VALUE. THIS OCCURS ONLY FOR SEPARATED TIME DEPENDENT VOLUMES WHEN ITERATIVE NUMERICS IS USED. THE ERROR WAS CORRECTED BY A MODIFICATION OF SUBROUTINE EXPINT.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

USE STANDARD NUMERICS.

# CHECK OUT:

THE ERROR CORRECTION WAS CHECKED BY EXECUTING THE DECK THAT ENCOUNTERED THE PROBLEM.

# VERIFICATION:

THE MODIFICATION WAS VERIFIED TO BE CORRECT BY VISUALLY EXAMINING

THE SOURCE CODE. THE PROBLEM THAT ENCOUNTERED THE ERROR WAS ALSO  
EXECUTED WITHOUT ERROR WITH THE MODIFICATION INSTALLED.

REPORTED BY : BOB JARVIS (HL&P) DATE: 01/05/84  
CORRECTED BY : CRAIG PETERSON (EI) DATE: 08/06/84  
VERIFIED BY : M.P. PAULSEN (EI) DATE: 03/11/85

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\*\*\*\*\* MODIFICATION NUMBER 276 \*\*\*\*\*

ERROR DESCRIPTION:

THE CODE DOES NOT HAVE A DIAGNOSTIC TO DETECT AN ERRONEOUS INPUT  
ID (CP1) FOR A DELAY (DLY) CONTROL BLOCK. SEE CARD 703227 OF THE  
INPUT LISTING. (SEE TROUBLE REPORT 233).

MODIFICATION DESCRIPTION:

AN INPUT DATA RANGE CHECK WAS ADDED TO SUBROUTINE INCNT1.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES  
NOT ALTER DATA TAPE STRUCTURE.

MODELING ALTERNATIVES:

USE CORRECT CONTROL BLOCK ID'S.

CHECK OUT:

THE PROBLEM THAT ENCOUNTERED THE ERROR WAS RUN WITH THE MODIFICATION  
AND THE ERROR WAS DETECTED.

VERIFICATION:

THE RUN THAT HAD THE ERROR (TR 233) WAS CHECKED TO SEE THAT THE  
ERROR WAS PROPERLY IDENTIFIED. THEN THE MODIFICATION RUN (MOD 276)  
WAS EXAMINED TO SEE THAT THE ERROR WAS SATISFACTORILY CORRECTED.  
A CHECK WAS MADE TO CHECK FOR DATA ENTRY OUT OF RANGE, AND IT  
EXECUTED CORRECTLY.

VERIFICATION CALCULATIONS WERE MADE THAT:

- (1) REPRODUCED THE ERROR
- (2) EXECUTED THE PROBLEM WITH CORRECT INPUT AS GIVEN  
UNDER MODELING ALTERNATIVES ABOVE.
- (3) USED THE CODING UPDATES THAT DETECTED THE ERROR  
AND WROTE OUT AN ERROR MESSAGE. (REPRODUCING THE  
MODIFICATION CALCULATION).

REPORTED BY : CHET MOTLOCH (EI) DATE: 03/21/84  
CORRECTED BY : M.P. PAULSEN (EI) DATE: 03/13/85  
VERIFIED BY : K.R.KATSMA (EI) DATE: 03/14/85

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\*\*\*\*\* MODIFICATION NUMBER 277 \*\*\*\*\*

ERROR DESCRIPTION:

THE TRIP (IDTRIP=2) WAS NOT ACTIVATED WHEN THE SPECIFIED CONDITIONS WERE MET. TRIP 2 IS ACTIVATED BY EITHER OF TWO SEPARATE CONTROL BLOCKS (-6 & -13) AND IS RESET BY EITHER OF TWO OTHER SEPARATE CONTROL BLOCKS (-16 & -17). ALL FOUR SETPOINTS ARE 0.0 AS THE SIGNAL GOES POSITIVE. WHEN ONE OF THE TWO RESET TRIPS (IXI=-16) IS REMOVED, THE TRIP ACTIVATES AND RESETS AS SPECIFIED. (SEE TROUBLE REPORT 221).

MODIFICATION DESCRIPTION:

AN EXTRANEIOUS TEST WAS DELETED FROM SUBROUTINE TRIP.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE PROBLEM THAT ENCOUNTERED THE ERROR WAS EXECUTED SUCCESSFULLY WITH THE MODIFIED CODE. DEBUGS PLANTED IN THE CODE DURING THE CHECKOUT RUN ALSO INDICATE THAT THE ERROR IS CORRECTED BY THE MODIFICATION.

VERIFICATION:

THE PROBLEM THAT ENCOUNTERED THE ERROR WAS EXECUTED SUCCESSFULLY WITH THE MODIFIED CODE. THE MODIFIED SOURCE CODE WAS ALSO VISUALLY VERIFIED TO BE CORRECT.

REPORTED BY :	BOB JARVIS	(HL&P)	DATE: 12/09/83
CORRECTED BY :	R.D. GRIEBENOW	(EI)	DATE: 10/16/84
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 03/13/85

\*\*\*\*\* MODIFICATION NUMBER 278 \*\*\*\*\*

ERROR DESCRIPTION:

TRIPS THAT ARE RESET AT THE PROBLEM TERMINATION ARE ERRONEOUSLY RE-TRIPPED UPON RESTART.

MODIFICATION DESCRIPTION:

THE RESET PARAMETERS ARE NOW SAVED ON TAPE FOR USE DURING RESTART. THE MODIFICATION WAS TO SUBROUTINE EDATA3.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES. THE MODIFICATION DOES ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

PROBLEM SPECIFIC MODELING ALTERNATIVES HAVE BEEN IDENTIFIED. AN EXAMPLE IS TO SET FILL FLUXES TO ZERO USING GENERALIZED RESTART, RESULTING IN NO FILL FLOW WHEN THE RETRIP OCCURS.

# CHECK OUT:

THE PROBLEM WAS RUN WITH AND WITHOUT THE CODE UPDATES.

\*\*\*\*\* NOTE \*\*\*\*\* DURING VERIFICATION, THE CALCULATION WITHOUT UPDATES COULD NOT BE FOUND. KRK, 3/12/85

# VERIFICATION:

THE VERIFICATION OF THIS MODIFICATION WAS DONE VISUALLY.

THE CALCULATION FILED WITH TROUBLE REPORT WAS FIRST EXAMINED TO VERIFY THAT THE ERROR EXISTED. THE CODE UPDATES WERE CHECKED. A LISTING OF SUBROUTINE EDATA3 WAS CHECKED TO SEE THAT THE UPDATES WERE REQUIRED.

THE CALCULATIONS (2 RUNS) FILED WITH MODIFICATION 278 WERE THEN CHECKED. RUN 2 OF 2 VERIFIES THAT THE UPDATES CORRECT THE RESET PROBLEM.

REPORTED BY	:	P. J. JENSEN	(EI)	DATE: 12/05/84
CORRECTED BY	:	P. J. JENSEN	(EI)	DATE: 02/06/84
VERIFIED BY	:	K. R. KATSMA	(EI)	DATE: 03/12/85

\*\*\*\*\*-\*\*\*\*\* MODIFICATION NUMBER 279 \*\*\*\*\*

# ERROR DESCRIPTION:

THE JOB FAILS WITH A BUFREQ ERROR ON UNIT 13 WHILE TRYING TO MOUNT A SECOND TAPE. (CDC REEDIT PROBLEM SEE TROUBLE REPORT 274)

# MODIFICATION DESCRIPTION:

AN INDEX ERROR WAS CORRECTED IN SUBROUTINE EDITRE.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

THE ERROR CAN BE AVOIDED BY SPECIFYING EACH DATA TAPE AS A SEPARATE DATA SET, E.G. USE SEPARATE 01XX30 AND 01XX31 CARDS FOR EACH TAPE. A JOB WITH 3 TAPES REQUIRES CARDS WITH XX=01,

02, AND 03.

CHECK OUT:

THE PROBLEM THAT ENCOUNTERED THE ERROR WAS RUN WITH THE ERROR CORRECTION AND THE ERROR WAS DEMONSTRATED TO BE CORRECTED.

THE ORIGINAL ERROR WAS ENCOUNTERED BY JOHN SORENSEN OF S. LEVY BUT AN ERROR REPORT WAS NOT FILED. THE ERROR WAS IDENTIFIED AND AN APPROACH TO AVOIDING THE ERROR BY MODIFYING THE INPUT WAS IDENTIFIED. A CORRECTION TO THE ERROR WAS ALSO MADE AND CHECKED. AN ERROR REPORT WAS NEVER FILED BY S. LEVY. THE DATA TAPES ARE NO LONGER AVAILABLE.

VERIFICATION:

THE RUN THAT ENCOUNTERED THE ERROR AND THE RUN WITH THE ERROR CORRECTION WERE EXAMINED. THE ERROR CORRECTION DID FIX THE PROBLEM. THE CHANGE AND THE FORTRAN WERE ALSO REVIEWED.

REPORTED BY : M.P. PAULSEN (EI)	DATE: 02/26/85
CORRECTED BY : M.P. PAULSEN (EI)	DATE: 02/26/85
VERIFIED BY : C.E. PETERSON (EI)	DATE: 03/07/85

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\*\*\*\*\* MODIFICATION NUMBER 280 \*\*\*\*\*

ERROR DESCRIPTION:

THE PRESSURIZER AND SEPARATOR FLASHING AND CONDENSING MASS TRANSFER RATES ARE ERRONEOUSLY LIMITED TO A MAXIMUM VALUE THAT HAS UNITS OF MASS. THE ERROR OCCURS WHEN VERY LITTLE VAPOR EXISTS IN LIQUID REGION OR VERY LITTLE LIQUID EXISTS IN THE VAPOR REGION (SEE TROUBLE REPORT 275).

MODIFICATION DESCRIPTION:

THE ERRONEOUS TESTS WERE DELETED IN SUBROUTINES PRZEMT AND SEPMT. THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER THE DATA TAPE STRUCTURE.

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THERE IS NO DATA DECK THAT ENCOUNTERED THE PROBLEM. THE PROBLEM WAS DISCOVERED BY VISUAL EXAMINATION OF THE SOURCE CODE. THE MODIFIED SOURCE CODE COMPILED WITHOUT ERRORS AND THE DESIRED CORRECTION WAS MADE.

VERIFICATION:



THE MODIFICATION WAS VERIFIED BY RUNNING A DECK WITH AND WITHOUT THE UPDATED CODE. THE UPDATED CODE CHANGED THE VALUE OF THE MIXTURE LEVEL AS WAS EXPECTED.

REPORTED BY : M.P. PAULSEN (EI)	DATE: 02/27/85
CORRECTED BY : M.P. PAULSEN (EI)	DATE: 02/27/85
VERIFIED BY : B.E. GRIEBENOW (EI)	DATE: 03/07/85

\*\*\*\*\* MODIFICATION NUMBER 281 \*\*\*\*\*

#### ERROR DESCRIPTION:

THERE IS A LOCAL FLOW AND PRESSURE PERTURBATION WHEN THE BOILING BOUNDARY MOVES BETWEEN ADJACENT VOLUMES. THIS PERTURBATION DISTURBS THE CORE EXIT FLOW SUFFICIENTLY TO PRODUCE ERRORS IN CALCULATING CHANNEL STABILITY RESPONSE (SEE TROUBLE REPORT 265).

#### MODIFICATION DESCRIPTION:

THE SATURATION LINE CROSSING ALGORITHM FOR THE ITERATIVE NUMERICS OPTION FORCES THE PREVIOUS ITERATE DERIVATIVES TO BE USED WHEN THE PHASE CROSSING IS DETERMINED TO BE NEAR THE END OF A TIME STEP. USING THESE OLD DERIVATIVES CAUSES THE FLOW PERTURBATION. CODING IN SUBROUTINES IMPSTP AND STATEW WAS MODIFIED SO THAT THE CURRENT DERIVATIVES ARE ALWAYS USED.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

#### MODELING ALTERNATIVES:

FORCE SMALLER TIME STEPS IN THE REGION WHERE THE PERTURBATION IS OBSERVED.

#### CHECK OUT:

THE STABILITY DECK THAT ORIGINALLY ENCOUNTERED THE ERROR WAS RUN WITH THE MODIFICATION AND THE ERRONEOUS FLOW PERTURBATIONS WERE ELIMINATED.

#### VERIFICATION:

THE PROBLEM THAT ENCOUNTERED THE ERROR ORIGINALLY WAS RUN SATISFACTORILY WITH THE MODIFIED CODE.

REPORTED BY : JOHN M. SORENSEN (SLI)	DATE: 09/20/84
CORRECTED BY : B.E. GRIEBENOW (EI)	DATE: 03/04/85
VERIFIED BY : M.P. PAULSEN (EI)	DATE: 03/12/85

\*\*\*\*\* MODIFICATION NUMBER 282 \*\*\*\*\*

# ERROR DESCRIPTION:

A STEADY-STATE INITIALIZATION WITH ALGEBRAIC SLIP OPTION WOULD NOT INITIALIZE (SAME DECK WILL INITIALIZE USING RETRAN02 MOD002). THE DECK FAILED TO CONVERGE ON SLIP VELOCITY AND ENTHALPY (SEE TROUBLE REPORT 251).

THE CODE WILL NOT CONVERGE TO STEADY-STATE. ASSUME THIS IS A CONTINUATION OF TROUBLE REPORT 100 - MOD002. HOWEVER, THE PROBLEM IS OCCURRING DURING STEADY-STATE INITIALIZATION. TROUBLE REPORT 100 DEALT WITH LARGE POWER PERTURBATIONS WHEN THE BOILING BOUNDARY CROSSED A JUNCTION USING ALGEBRAIC SLIP (SEE TROUBLE REPORT 255).

# MODIFICATION DESCRIPTION:

THE PROBLEM WAS FOUND TO BE ASSOCIATED WITH THE ALGEBRAIC SLIP VELOCITY CALCULATION FOR STEADY-STATE INITIALIZATION. THE LOOSE COUPLING BETWEEN THE ENERGY EQUATION AND THE ALGEBRAIC SLIP VELOCITY IN THE STEADY-STATE SOLUTION CAUSED THE SLIP VELOCITY TO OSCILLATE AND NOT CONVERGE. THE SOLUTION TO THE PROBLEM WAS TO RELAX THE ALGEBRAIC SLIP VELOCITY LIKE IS DONE FOR THE DYNAMIC SLIP EQUATION. THE MODIFICATION WAS ADDED TO SUBROUTINE JSVEL.

THE MODIFICATION REQUIRES NO INPUT OR MANUAL CHANGES AND DOES NOT ALTER DATA TAPE STRUCTURE.

# MODELING ALTERNATIVES:

TRY ALLOWING MORE ITERATIONS -- THIS MAY NOT HELP

# CHECK OUT:

TROUBLE REPORTS 251 AND 255 REPORTED THE PROBLEM. THE DECKS SENT WITH THESE 2 TROUBLE REPORTS WERE EXECUTED AND CONVERGED STEADY-STATE SOLUTIONS WERE OBTAINED FOR BOTH. THE DECKS ARE LOCATED IN SCG>RET>QA>PR251 AND PR255. BOTH ORIGINAL DECKS USED SPACE TIME KINETICS. THE SPACE TIME KINETICS OPTION WAS ELIMINATED IN THE CHECKOUT RUNS SINCE THE CROSS SECTION FILES WERE IN IBM FORMAT.

# VERIFICATION:

THE ERROR CORRECTION WAS VERIFIED VISUALLY BY THE CODE LISTINGS. ALSO, PROBLEM REPORT LISTING 251 WAS COMPARED TO MODIFICATION LISTING (MOD282). THE IBM PROBLEM DECK FOR THE PROBLEM REPORT USED SPACE-TIME KINETICS WHICH WAS REMOVED FOR THE CHECK OUT RUN. THE LISTING FILED WITH ERROR REPORT 251 IS A RETRAN02,MOD2 RUN THAT IS CONVERGED. THE MOD3 LISTING THAT DID NOT CONVERGE IS NOT STORED WITH THE ERROR REPORT. PROBLEM REPORT 255 WAS THEN COMPARED WITH THE MODIFICATION (282) CALCULATION, AND THE UPDATE DID CORRECT THE CONVERGENCE PROBLEM FOR PROBLEM REPORT 255.

REPORTED BY : ANDY OLSON (PECO)  
REPORTED BY : MARK WALTZ (TVA)

DATE: 05/31/84 (TR 251)  
DATE: 06/13/84 (TR 255)

✓/ CORRECTED BY : M.P. PAULSEN (EI)                      DATE: 02/05/85  
 ✓/ VERIFIED BY : K.R.KATSMAN (EI)                      DATE: 03/08/85 (MOD282)

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✓/ MODIFICATIONS 283-297 ARE IN UPDATE MOD004B  
 ✓/ \*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 283 \*\*\*\*\*

✓/ ERROR DESCRIPTION:

✓/ THE HOT CHANNEL CALCULATION IS ABORTED DUE TO A DIVIDE CHECK (DIVIDE  
 ✓/ BY ZERO) IN SUBROUTINE PBOUND WHEN THE PRESSURE IN THE VOLUME, WHICH  
 ✓/ IS RETRIEVED FROM THE DATA TAPE GENERATED BY THE SYSTEM CALCULATION,  
 ✓/ IS ABOVE CRITICAL PRESSURE. (SEE TROUBLE REPORT #273)

✓/ MODIFICATION DESCRIPTION:

✓/ SUBROUTINE PBOUND WAS MODIFIED TO CORRECT THE ERROR. AVEX WAS REDEFINED  
 ✓/ FOR PRESSURES ABOVE PCRT TO AVOID THE ERROR. IF THE PRESSURE IS BELOW  
 ✓/ PCRT AVEX IS CALCULATED USING THE ORIGINAL EQUATION.

✓/ THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT OR MANUAL  
 ✓/ CHANGES.

✓/ MODELING ALTERNATIVES:

✓/ AVOID TIME DEPENDENT VOLUMES READ FROM TAPE WHEN POSSIBLE.

✓/ CHECK OUT:

✓/ THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR WAS NOT SUPPLIED.  
 ✓/ THE MODIFICATION WAS CHECKED BY REVIEWING THE ORIGINAL AND THE  
 ✓/ MODIFIED CODING.

✓/ VERIFICATION:

✓/ THE MODIFICATION WAS VERIFIED BY VISUALLY INSPECTING THE ORIGINAL  
 ✓/ AND THE MODIFIED CODING. THE REPORTING ORGINAIZATION ALSO USED  
 ✓/ THESE MODIFICATIONS AND THE ERROR WAS CORRECTED.

✓/ REPORTED BY : WHEE G. CHOE (NEI)                      DATE: 02/01/85  
 ✓/                      (PROBLEM REPORT #273)  
 ✓/ CORRECTED BY : B.E. GRIEBENOW (EI)                      DATE: 11/06/85  
 ✓/ VERIFIED BY : M.P. PAULSEN (EI)                      DATE: 11/08/85

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\*\*\*\*\* MODIFICATION NUMBER 284 \*\*\*\*\*

✓/ ERROR DESCRIPTION:

✓/ JOB ABORTS DUE TO ERROR IN INBUBL WITH MESSAGE "INITIAL OUTPUT OF  
 ✓/ CONTROL BLOCK IS NEGATIVE". ERROR MESSAGE IS MISLEADING. JOB

ACTUALLY ABORTS BECAUSE THE CONTROL BLOCK FOR VBUB IS INITIALIZED  
EQUAL TO ZERO. (SEE PROBLEM REPORT 237)

# MODIFICATION DESCRIPTION:

AN "IF" STATEMENT THAT ORIGINALLY PRINTED AN ERROR MESSAGE FOR  
VBUB LESS THAN OR EQUAL TO ZERO WAS CORRECTED TO PRINT THE  
MESSAGE ONLY FOR VBUB LESS THAN ZERO. THIS CHANGE WAS MADE IN  
SUBROUTINE INBUBL.

THE DATA TAPE STRUCTURE WAS NOT CHANGED. NO MANUAL OR INPUT CHANGES  
ARE NECESSARY.

# MODELING ALTERNATIVES:

USE A TINY POSITIVE VBUB INSTEAD OF ZERO FOR VBUB.

# CHECK OUT:

THE CORRECTION WAS CHECKED BY RUNNING SAMPLE PROBLEM FIVE WITH  
ONE OF THE BUBBLE SETS CONTROLLED BY A CONTROL BLOCK. THIS CONTROL  
BLOCK WAS INITIALIZED WITH VBUB EQUAL TO ZERO. THE PROBLEM WAS  
ALSO RUN WITH VBUB EQUAL TO -1 TO SEE IF THE ERROR MESSAGE WOULD  
BE PRINTED IN THE CASE OF A NEGATIVE VBUB.

FOR THE FIRST CASE THE PROBLEM RAN AS EXPECTED AND FOR THE SECOND  
CASE THE ERROR MESSAGE WAS PRINTED.

# VERIFICATION:

VERIFICATION WAS PERFORMED BY VISUAL COMPARISON OF THE ORIGINAL  
CODE AND THE MODIFICATION. THE FOLLOWING PORTION OF THE MODIFICATION  
WAS REMOVED:

\*D MOD003D.590

IF (IDA.EQ.0) GO TO 85

THE MODIFICATION WAS SHOWN TO REMAIN EFFECTIVE WITH THIS UPDATE REMOVED  
BY EXECUTING THE TWO CASES GIVEN IN THE "CHECKOUT" SECTION WITH IDENTICAL  
RESULTS OCCURRING.

# CONCURRENCE:

THE CHANGE IN THE MODIFICATION IS CORRECT AND IN AGREEMENT WITH WHAT  
IS STATED IN THE USER'S MANUAL. THE ORIGINAL MODIFICATION WOULD ALLOW  
EITHER ALPH OR VBUB TO BE CONTROLLED INDIVIDUALLY, WHICH IS NOT ALLOWED  
ACCORDING TO THE MANUAL

REPORTED BY	:	SAL RANATZA	(MSS)	DATE: 04/10/84
CORRECTED BY	:	B.E. GRIEBENOW	(EI)	DATE: 05/14/85
VERIFIED BY	:	P.J. JENSEN	(EI)	DATE: 6/13/85
CONCURRENCE BY	:	B.E. GRIEBENOW	(EI)	DATE: 06/14/85

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\*\*\*\*\* MODIFICATION NUMBER 285 \*\*\*\*\*

# ERROR DESCRIPTION:

A FUNCTION GENERATOR CONTROL BLOCK REFERENCED A NON-EXISTENT TABLE. NO INPUT CHECK REPORTED THIS INPUT ERROR AND NO ERROR MESSAGE WAS PRINTED. (SEE TROUBLE REPORT #267)

#### MODIFICATION DESCRIPTION:

AN INPUT CHECK WAS ADDED TO SUBROUTINE INCNT1 TO CHECK FOR THE VALIDITY OF THE GENERAL DATA TABLE REFERENCED. THIS CHECK WILL ONLY WORK IF THE TABLE ID REFERENCED IS GREATER THAN THE NUMBER OF TABLES INPUT.

NO INPUT OR MANUAL CHANGES ARE NECESSARY AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

REFERENCE AN EXISTING DATA TABLE.

#### CHECK OUT:

THE CORRECTION WAS CHECKED USING A SAMPLE PROBLEM. THE PROBLEM WAS RUN WITH THE FUNCTION GENERATOR REFERENCING A NON-EXISTENT TABLE FOR THE FIRST RUN AND REFERENCING AN EXISTING TABLE ON THE SECOND RUN. THE ERROR MESSAGE WAS PRINTED FOR THE FIRST CASE BUT NOT FOR THE SECOND CASE AS WAS EXPECTED.

#### VERIFICATION:

VERIFICATION WAS PERFORMED BY VISUAL INSPECTION OF THE ORIGINAL AND MODIFIED CODING. LISTINGS PRODUCED IN THE "CHECKOUT" SECTION WERE ALSO INSPECTED.

REPORTED BY :	JAMES BOATWRIGHT	(TUGC)	DATE: 10/22/84
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 05/14/85
VERIFIED BY :	P.J. JENSEN	(EI)	DATE: 06/14/85

\*\*\*\*\* MODIFICATION NUMBER 286 \*\*\*\*\*

#### ERROR DESCRIPTION:

A RETRAN MODEL WAS DRIVEN BY UPPER AND LOWER PLENUM TIME DEPENDENT VOLUMES. THE TDV CONDITIONS WERE TAKEN FROM A PREVIOUS RUN. THE BOUNDARY CONDITIONS WERE INCORRECTLY INTERPRETED BY RETRAN IN NUMERICAL ORDER, REGARDLESS OF WHAT WAS SPECIFIED ON THE 05XXX1 CARDS. (SEE TROUBLE REPORT 278)

#### MODIFICATION DESCRIPTION:

THE BOUNDARY CONDITIONS WERE READ FROM THE TAPE IN THE ORDER THAT THEY WERE RECORDED (IN NUMERICAL ORDER). THE NEW TIME DEPENDENT VOLUME CONDITIONS WERE ALSO CALCULATED IN NUMERICAL ORDER. THEREFORE, SINCE THE VOLUME NUMBERS ON TAPE AND THE NEW VOLUME NUMBERS WERE IN A REVERSED ORDER, THE BOUNDARY CONDITIONS WERE SET TO THE WRONG



VOLUME. A CHECK WAS ADDED TO SUBROUTINE TAPEBC TO SEE IF IREAD ON THE VOLUME CARDS WAS EQUAL TO THE VOLUME NUMBER ON TAPE BEFORE THE BOUNDARY CONDITIONS WERE RETRIEVED.

THERE ARE NO MANUAL, INPUT, OR DATA TAPE STRUCTURE CHANGES WITH THIS MODIFICATION.

#### MODELING ALTERNATIVES:

NO ALTERNATIVE MODELING IS NECESSARY.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED USING THE RESTART OF THE UCRW SAMPLE PROBLEM. THE DECK WAS RUN WITH VOLUME NUMBERS IDENTICAL TO THE ORIGINAL RUN AND THEN WITH VOLUME NUMBERS IN THE REVERSED NUMERICAL ORDER. THE MODIFICATION FIXED THE REPORTED ERROR.

#### VERIFICATION:

VERIFICATION WAS PERFORMED BY VISUAL INSPECTION OF THE ORIGINAL AND MODIFIED CODING.

REPORTED BY :	C.R. LEHMANN	(PPL)	DATE: 03/25/85
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 05/15/85
VERIFIED BY :	P.J. JENSEN	(EI)	DATE: 06/24/85

\*\*\*\*\* MODIFICATION NUMBER 287 \*\*\*\*\*

#### ERROR DESCRIPTION:

A O'S VOLUME PRESSURIZER MODEL WITH LOCAL CONDITIONS HEAT TRANSFER WOULD NOT INITIALIZE UNLESS A DUMMY CONDUCTOR WAS ADDED TO THE ADJOINING CONTAINMENT VOLUME. (SEE PROBLEM REPORT 270)

#### MODIFICATION DESCRIPTION:

THE ERROR WAS IBM SPECIFIC. THE VARIABLE NONSTK IN SUBROUTINE INSLAB DID NOT GET DEFINED WHEN ALL THE CONDUCTORS WERE CONTAINED IN STACKS. THIS VARIABLE WAS LATER USED IN A ERROR CHECK. THE MODIFICATION INITIALLY SETS NONSTK TO ZERO AND THE CODE WILL REDEFINE IT IF NOT ALL CONDUCTORS ARE STACK CONDUCTORS.

THERE ARE NO INPUT, MANUAL, OR DATA TAPE CHANGES FOR THIS MODIFICATION.

#### MODELING ALTERNATIVES:

NONE.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED USING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. THE MODIFICATION CORRECTED THE REPORTED PROBLEM.

THE RUN THAT ENCOUNTERED THE PROBLEM, THE RUN WITH THE ERROR CORRECTION AND THE MODIFIED FORTRAN WERE EXAMINED.

REPORTED BY : G.B. SWINDLEHURST (DPC) DATE: 12/18/84  
CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 05/24/85  
VERIFIED BY : C.E. PETERSON (EI) DATE: 11/05/85

\*\*\*\*\* MODIFICATION NUMBER 288 \*\*\*\*\*

WHILE MAKING THE MOD004A UPDATE, AN OC6 ERROR WAS ENCOUNTERED ON IBM.  
THE CAUSE OF THE ERROR WAS A DIMENSION STATEMENT OF THE WRONG LENGTH.  
(SEE TROUBLE REPORT 284)

MODIFICATION DESCRIPTION:

THE MODIFICATION WAS TO SUBROUTINE EDATA3. MODIFICATIONS IN MOD004A CHANGED THE SIZE OF ARRAYS FLAG39, HDA39, AND HDB39 - BUT THE CORRESPONDING DIMENSIONING WAS NOT MODIFIED.

THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT OR MANUAL CHANGES.

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE CHECK OUT WAS DONE WHILE RUNNING THE MOD004A SAMPLE PROBLEMS ON IBM.

VERIFICATION:

THE MODIFICATION WAS VERIFIED VISUALLY BY INSPECTING THE ORIGINAL AND THE MODIFIED CODING. THE MODIFICATION IS CORRECT.

REPORTED BY : JAMES MCFADDEN (EI) DATE: 05/24/85  
(TROUBLE REPORT #284)  
CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 03/28/85  
VERIFIED BY : M.P. PAULSEN (EI) DATE: 11/08/85

\*\*\*\*\* MODIFICATION NUMBER 289 \*\*\*\*\*

ERROR DESCRIPTION:

THE PRESSURE IN THE NON-EQUILIBRIUM VOLUME INCREASES 40 PSI IN

ONE TIME STEP WHILE TRYING TO RUN A NULL TRANSIENT. WITH THE NON-EQUILIBRIUM VOLUME OPTION OFF, THE PROBLEM IS ELIMINATED. THE NON-EQUILIBRIUM VOLUME INITIALIZES WITH 1.92 LBM OF BUBBLES IN THE LIQUID REGION EVEN IF THE QUALITY INPUT ON THE VOLUME CARD IS INPUT AT 0.0 OR -1.0. (SEE TROUBLE REPORT 283)

#### MODIFICATION DESCRIPTION:

THE PROBLEM WAS DUE TO THE LARGE BUBBLE VELOCITY THAT WAS INPUT. THE VELOCITY IS USED TO CALCULATE THE ENERGY IN THE NON-EQUILIBRIUM VOLUME. WITH THE LARGE INPUT VELOCITY THE ENERGY IN THE LIQUID REGION WAS CALCULATED TO BE A NEGATIVE NUMBER, WHICH CAUSED ALL THE MASS TO BE TRANSFERRED TO THE VAPOR REGION. THE USE OF VBUB IN THE ENERGY CALCULATION WAS ELIMINATED WHICH CORRECTED THE ERROR AND WILL HAVE LITTLE EFFECT ON OTHER PROBLEMS. A SIMILAR PROBLEM COULD RESULT FROM A LARGE VALUE OF VRAIN FOR THE VAPOR REGION; THEREFORE, THE VRAIN TERM WAS TAKEN OUT OF THE CONDENSATION ENERGY EQUATION.

SUBROUTINE PRZEMT WAS MODIFIED TO CORRECT THE ERROR. A SIMILAR MODIFICATION WAS ADDED TO SUBROUTINE SEPMT TO AVOID THE SAME PROBLEM WITH SEPERATORS. THERE WERE NO INPUT, MANUAL, OR DATA TAPE STRUCTURE CHANGES.

#### MODELING ALTERNATIVES:

USE A LOWER BUBBLE VELOCITY.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY RUNNING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. THE PRESSURE RISE WAS ELIMINATED AND THE VAPOR MASS IN THE LIQUID REGION IS ALL TRANSFERRED TO THE VAPOR REGION IN

#### VERIFICATION:

THE MODIFICATION WAS VERIFIED BY FIRST DUPLICATING THE PROBLEM USING A SINGLE VOLUME PRESSURIZER MODEL AND THEN RUNNING THE SINGLE VOLUME MODEL USING THE CORRECTION. THE ERROR WAS NOT OBSERVED WHEN THE CORRECTION WAS USED. THE MODIFIED CODING WAS ALSO VISUALLY VERIFIED TO BE CORRECT.

NOTE--THE UPDATE SEQUENCE NUMBERS WERE MODIFIED ON 10/30/85 TO BE CONSISTENT WITH MOD4A WHEN THEY GO INTO MOD4B. STEVE JAMES

REPORTED BY :	TONY ROSCIOLI	(PP&L)	DATE: 05/17/85
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 05/29/85
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 05/30/85

\*\*\*\*\* MODIFICATION NUMBER 290 \*\*\*\*\*

#### ERROR DESCRIPTION:



PROBLEM STOPS IMMEDIATELY FOLLOWING INITIALIZATION WITH NO ERROR MESSAGE GIVEN AND FOR NO OBVIOUS REASON. (SEE TROUBLE REPORT 285)

# MODIFICATION DESCRIPTION:

JOB ABORTS DUE TO ERROR IN SUBROUTINE EXPINT WHERE THE CODE LOOPS OVER THE SEPARATED VOLUME FILE (FILE 11) BY SETSIZE BEGINNING WITH THE SECOND SET AND TERMINATING ON THE NBUB+1 SET (THERE ARE NBUB+1 SETS, THE FIRST BEING A DUMMY). IF NBUB=0 THE SECOND SET DOES NOT EXIST RESULTING IN AN ERROR.

THE DO-LOOP INITIAL INDEX IN SUBROUTINE EXPINT WAS CHANGED FROM FILIDX(11)+SETsiz(11) TO FILIDX(11). THUS THE CODE WILL ONLY LOOP OVER THE DUMMY (FIRST) SET WHEN NBUB=0.

THE DATA TAPE STRUCTURE WAS NOT CHANGED. NO MANUAL OR INPUT CHANGES ARE NECESSARY.

# MODELING ALTERNATIVES:

SUPPLY A SEPARATED VOLUME IN THE INPUT.

# CHECK OUT:

FIRST THE ERROR WAS REPRODUCED ON A DECK SIMILAR TO THAT WHICH ENCOUNTERED THE PROBLEM (NO SEPARATED VOLUMES). WITH THE MODIFICATION IN PLACE THIS ERROR WAS REMOVED. THIS PROCESS WAS REPEATED ON ANOTHER DECK WHICH WAS ALSO FOUND TO REPRODUCE THE ERROR, SHOWING THAT THE ERROR WAS AGAIN REMOVED WITH THE MODIFICATION IN PLACE. THE MODIFICATION WAS SUCCESSFULLY TESTED ON A THIRD DECK WHICH HAD A SEPARATED VOLUME TO ENSURE THAT IT DID NOT AFFECT PROBLEMS WITH SEPARATED VOLUMES.

# VERIFICATION:

THE MODIFICATION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL CODING AND THE MODIFIED CODING. THE ORIGINAL DO-LOOP INDEX STARTED WITH THE SECOND BUBBLE SET TO CORRECT TROUBLE REPORTS 223 AND 229 (SEE MODIFICATION 262). HOWEVER, THE ERROR FOR THESE TROUBLE REPORTS WAS ALSO CORRECTED IN MODIFICATION 262 WITH THE "IF" TEST THAT BRANCHED TO THE END OF THE DO-LOOP FOR BUBBLE SETS NOT REFERENCED BY A VOLUME. THEREFORE, THE INDEX OF FILIDX(11)+SETsiz(11) IS NOT NECESSARY.

AN EXTRA LINE OF CODING WAS DELETED FROM EXPINT ALONG WITH WHAT WAS CHANGED IN THE MODIFICATION. THIS LINE OF CODING IS NO LONGER NEEDED WITH THE NEW INDEXING FOR THE DO-LOOP

REPORTED BY	: P.J. JENSEN	(EI)	DATE: 06/03/85
CORRECTED BY	: P.J. JENSEN	(EI)	DATE: 06/13/85
VERIFIED BY	: B.E. GRIEBENOW	(EI)	DATE: 10/22/85

\*\*\*\*\* MODIFICATION NUMBER 291 \*\*\*\*\*

# ERROR DESCRIPTION:

THE REPORTED ERROR RESULTS FROM SETTING INAPPROPRIATE FORM LOSS  
 FLAGS (USED FOR STEADY STATE INITIALIZATION) IN SUBROUTINE INITLZ.  
 (SEE TROUBLE REPORT 286)

#### MODIFICATION DESCRIPTION:

AN ADDITIONAL "IF" TEST WAS ADDED TO SUBROUTINE INITLZ TO TEST FOR  
 JUNCTIONS WHERE THE LOSS COEFFICIENTS ARE PREDETERMINED PRIOR TO  
 STEADY STATE INITIALIZATION.

THERE WERE NO CHANGES TO THE DATA TAPE STRUCTURE, INPUT, OR TO THE  
 MANUAL.

#### MODELING ALTERNATIVES:

AVOID CONTROL SYSTEM OPERATED LOSS COEFFICIENTS AS WELL AS LOSS  
 COEFFICIENTS EQUAL TO 0.0 ON JUNCTIONS CONNECTING VOLUMES WHERE  
 THE PRESSURE IS SPECIFIED.

#### CHECK OUT:

THE CORRECTION WAS CHECKED BY SUCCESSFULLY EXECUTING THE DECK WHICH  
 ORIGINALLY ENCOUNTERED THE ERROR. THIS DECK WAS ALSO USED TO ENSURE  
 THAT SEVERAL OTHER POSSIBILITIES FOR LOSS COEFFICIENT SPECIFICATION  
 WOULD SUCCESSFULLY EXECUTE OR CORRECTLY SUPPLY AN ERROR MESSAGE WHEN  
 INCORRECT INPUT WAS MADE. IN ADDITION, A LARGE RETRAN MODEL OF A  
 FOUR LOOP WESTINGHOUSE PLANT WAS INITIALIZED FIRST ON RETRAN02MOD003  
 AND THEN ON RETRAN02MOD004A WITH THIS CORRECTION, WITH IDENTICAL  
 RESULTS OCCURRING. THIS PROVIDES FURTHER ASSURANCE THAT THE CORRECTION  
 HAS NOT ADVERSELY AFFECTED OTHER PROBLEMS.

#### VERIFICATION:

VERIFICATION OF THE MODIFICATION WAS DONE BY VISUALLY INSPECTING  
 THE ORIGINAL AND THE MODIFIED CODING. SOME REDUNDENT CODING WAS  
 ALSO REMOVED IN THIS MODIFICATION.

REPORTED BY :	P.J. JENSEN	(EI)	DATE: 06/05/85
CORRECTED BY :	P.J. JENSEN	(EI)	DATE: 06/13/85
VERIFIED BY :	B.E. GRIEBENOW	(EI)	DATE: 11/04/85

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 \*\*\*\*\* MODIFICATION NUMBER 292 \*\*\*\*\*

#### ERROR DESCRIPTION:

CODE OBTAINS INCORRECT STATE PROPERTIES FROM BOUNDARY CONDITION  
 TAPE. (SEE TROUBLE REPORT 282)

#### MODIFICATION DESCRIPTION:

THE ERROR WAS CONTAINED IN SUBROUTINE PBOUND. THE LOGIC IN PBOUND

IS COMPLICATED DUE TO THE FACT THAT THE CODE MUST EXTRAPOLATE USING PRESSURE, TEMPERATURE, QUALITY AND MIXTURE LEVEL. THE ERROR WAS DUE TO A CALL TO SUBROUTINE WAT1 WITH SUPERHEATED STEAM; THE CALL SHOULD HAVE BEEN TO SUBROUTINE WAT2. ALSO IN SUBROUTINE PBOUND THE PRESSURE FROM THE BOUNDARY CONDITION TAPE WAS REDEFINED AND SHOULD HAVE RETAINED THE VALUE RETRIEVED FROM TAPE.

SUBROUTINE TAPEBC WAS MODIFIED TO CHECK A TAPE TO ENSURE THAT IS WAS STILL MOUNTED FOR AN UNLOAD COMMAND, IF THE TAPE WAS NO LONGER MOUNTED THE UNLOAD COMMAND WAS SKIPPED.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

DO NOT USE A BOUNDARY CONDITION TAPE.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED BY EXECUTING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. NO ERRORS OCCURRED DURING THE TRANSCIENT.

#### VERIFICATION:

THE MODIFICATION WAS VISUALLY VERIFIED TO BE CORRECT. THE ORIGINAL AND THE MODIFIED CODING WERE EXAMINED AND SHOULD CORRECT THE REPORTED ERROR.

REPORTED BY :	SAM WOOD	(UNC)	DATE: 04/29/85
	(TROUBLE REPORT #282)		
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 09/26/85
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 11/08/85

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\*\*\*\*\* MODIFICATION NUMBER 293 \*\*\*\*\*

#### ERROR DESCRIPTION:

AN ADDRESS OR OVERFLOW ERROR OCCURED IN 1-D KINETICS ROUTINES DURING THE FIRST TIME STEP ITERATION WHEN THE 1-D KINETICS SAMPLE PROBLEM WAS RUN USING THE SHAPE FUNCTION TIME DERIVATIVE OPTION KUDYS = 1 ON CARD 300001. NO PROBLEM HAVE BEEN REPORTED WHEN THE OPTION KUDYS = 2 IS USED. (SEE TROUBLE REPORT 279)

#### DISPOSITION:

THE REPORTED ERROR IS DESCRIBED IN PROBLEM REPORT 279 AND HAS BEEN IDENTIFIED. THE ERROR RESULTS FROM NOT INITIALIZING A TEMPORARY DATA STORAGE AREA WHEN THE KUDYS = 1 OPTION IS USED. THE FIRST FEW LOCATIONS IN THE ARRAY ARE INDICIES WHICH CAUSE THE ERROR WHEN UNDEFINED.

#### MODIFICATION DESCRIPTION:

A CHANGE WAS MADE IN SUBROUTINE RESHAP TO INITIALIZE THE DATA LOCATIONS

TO THE PROPER VALUES.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

NONE.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY VISUALLY INSPECTING THE REVISED CODING.

#### VERIFICATION:

THE CODE MODIFICATION WAS VERIFIED BY RERUNNING THE PROBLEM WHICH DEMONSTRATED THE ERROR ON THE UPDATED CODE AND VERIFYING THE PROPER PERFORMANCE FOR BOTH KUDYS = 1 AND KUDYS = 2.

REPORTED BY :	T. SUGIYAMA (NEI)	DATE: 04/09/85
	(TROUBLE REPORT #279)	
CORRECTED BY :	G. C. GOSE (EI)	DATE: 09/29/85
VERIFIED BY :	J. A. MCCLURE (EI)	DATE: 11/05/85

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\*\*\*\*\* MODIFICATION NUMBER 294 \*\*\*\*\*

#### ERROR DESCRIPTION:

THE PROBLEM CRASHES WHEN THE CONTROL BLOCK OPTION OF THE STEAM SEPARATOR MODEL IS USED. (SEE PROBLEM REPORT #292)

#### MODIFICATION DESCRIPTION:

THE ERROR WAS DUE TO AN INCORRECT INDEX FOR THE CONTROL BLOCK ID. IN SUBROUTINE INSEP THE CHECK ON THE BLOCK ID WAS INCREMENTED BY FILSIZ(53), BUT SHOULD HAVE BEEN INCREMENTED BY SETSIZ(53).

THIS MODIFICATION DID NOT REQUIRE INPUT OR MANUAL CHANGES. THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

TO MODEL AROUND THE ERROR DO NOT USE THE CONTROL BLOCK OPTION.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED OUT USING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR.

#### VERIFICATION:

THE MODIFICATION WAS VISUALLY VERIFIED BY INSPECTING THE ORIGINAL

AND THE MODIFIED CODING. THE MODIFICATION WILL CORRECT THE REPORTED  
ERROR. THE CHECK OUT RUN WAS ALSO INSPECTED.

REPORTED BY : JOSEPH WALDMAN (PSU) DATE: 08/12/85  
(PROBLEM REPORT #292)  
CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 09/24/85  
VERIFIED BY : M.P. PAULSEN (EI) DATE: 11/08/85

\*\*\*\*\* MODIFICATION NUMBER 295 \*\*\*\*\*

ERROR DESCRIPTION:

THE STEAM SEPARATOR MODEL'S INITIAL CARRYUNDER AND DESIGN CARRYUNDER  
ARE UNEQUAL AT INITIALIZATION WHEN THE NORMALIZATION FACTORS ARE  
EQUAL TO ONE. (SEE PROBLEM REPORT #293)

MODIFICATION DESCRIPTION:

THE SEPARATOR EDIT FOR CARRYUNDER DID NOT PRINT OUT THE CORRECT  
PARAMETER FOR DESIGN CARRYUNDER. THE RECIRCULATION JUNCTION QUALITY  
WAS PRINTED RATHER THAN THE SEPARATOR LIQUID REGION QUALITY. THE  
EDIT WAS CHANGED IN SUBROUTINE JVEDIT.

THERE WERE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE  
WAS NOT CHANGED.

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE MODIFICATION WAS CHECKED BY EXECUTING THE DECK WHICH ORIGINALLY  
ENCOUNTERED THE ERROR. THE DESIGN CARRYUNDER AND THE INITIAL  
CARRYUNDER WERE EQUAL.

VERIFICATION:

THE MODIFICATION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL  
AND THE MODIFIED CODING. THE MODIFICATION WILL EDIT THE CORRECT  
PARAMETER. THE OUTPUT FROM THE CHECK OUT RUN WAS ALSO INSPECTED.

REPORTED BY : JOSEPH WALDMAN (PSU) DATE: 08/12/85  
(PROBLEM REPORT #293)  
CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 09/24/85  
VERIFIED BY : M.P. PAULSEN (EI) DATE: 11/08/85

\*\*\*\*\* MODIFICATION NUMBER 296 \*\*\*\*\*

ERROR DESCRIPTION:



OCCASIONAL INCORRECT CALCULATION OF VAPOR IN THE LIQUID REGION OF  
A PRESSURIZER VOLUME AT STEADY-STATE. (SEE TROUBLE REPORT #295)

# MODIFICATION DESCRIPTION:

A MODIFICATION WAS MADE TO SUBROUTINE HAVG. THE VARIABLES LIQMAS  
AND LIQVOL IN THE SUBROUTINE SHOULD BE REALS RATHER THAN INTEGERS.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE  
WAS NOT CHANGED.

# MODELING ALTERNATIVES:

NONE.

# CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY COMPARING THE ORIGINAL CODING  
WITH THE MODIFIED CODING.

# VERIFICATION:

THE FORTRAN LISTING OF THE CHANGED SUBROUTINE WAS VISUALLY  
EXAMINED. THE TROUBLE REPORT DID NOT PROVIDE A DECK HOWEVER  
IT DID SAY THE RECOMMENDED CORRECTIONS DID FIX THE PROBLEM.

REPORTED BY :	S.R. KINNERSLY	(UKAEA)	DATE: 09/10/85
	(TROUBLE REPORT #295)		
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 10/01/85
VERIFIED BY :	C.E. PETERSON	(EI)	DATE: 10/05/85

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\*\*\*\*\* MODIFICATION NUMBER 297 \*\*\*\*\*

# ERROR DESCRIPTION:

THE PROGRAM REQUESTS SCRATCH TAPES WHENEVER THE NUMBER OF PLOT TAPE  
RECORDS EXCEED THE CAPACITY OF TAPE VOLUMES DESCRIBED FOR THE DATASET.  
SCRATCH TAPE REQUESTS ARE IDENTIFIED BY SETTING THE TAPE VSN TO ZERO  
OR BLANKS. THE ERROR OCCURRED BECAUSE THE VSN WAS NOT RESET AFTER ALL  
SPECIFIED VOLUMES WERE USED. THIS CAUSED THE LAST VOLUME TO BE REMOUNTED  
AND OVERWRITTEN. (SEE TROUBLE REPORT 296)

# MODIFICATION DESCRIPTION:

A MODIFICATION WAS MADE TO SUBROUTINE PLTAPE WHERE THE NEW VSN  
WAS SET TO BLANKS TO REQUEST A SCRATCH TAPE AFTER THE LAST SPECIFIED  
VSN USED.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE  
WAS NOT CHANGED.

# MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE CODE MODIFICATION WAS CHECKED OUT BY RERUNING THE PROBLEM WHICH DEMONSTRATED THE ERROR ON THE UPDATED CODE AND VERIFYING THE PROPER TAPE REQUESTS.

VERIFICATION:

THE MODIFICATION WAS VERIFIED BY VISUALLY INSPECTING THE REVISED CODING.

REPORTED BY : SAM WOOD (UNC) DATE: 05/25/85  
 (TROUBLE REPORT #296)  
 CORRECTED BY : J. A. MCCLURE (EI) DATE: 09/29/85  
 VERIFIED BY : S. W. JAMES (EI) DATE: 11/05/85

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 MODIFICATIONS 298-311 ARE IN UPDATE MOD004C  
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\*\*\*\*\* MODIFICATION NUMBER 298 \*\*\*\*\*

ERROR DESCRIPTION:

THE REACTOR VESSEL INTERNALS VENT VALVE IS MODELED AS A VALVE JUNCTION CONTROLLED BY A CONTROL SYSTEM. THE JUNCTION ENTHALPY USED BY RETRAN IS THE RECEIVER RATHER THAN THE DONOR VOLUME ENTHALPY. (SEE TROUBLE REPORT #303)

MODIFICATION DESCRIPTION:

THE ERROR IS CONTAINED IN SUBROUTINE JUNPRP. THE ENTHALPY FOR A CLOSED VALVE IS DETERMINED BASED ON THE PRESSURES OF THE TWO ADJOINING VOLUMES. IN THIS PROBLEM THE PRESSURE OF THE RECEIVING VOLUME WAS GREATER THAN THE PRESSURE OF THE DONOR VOLUME. THE FLOW WAS FROM THE DONOR VOLUME TO THE RECEPTOR VOLUME WHEN THE VALVE WAS OPENED DUE TO ELEVATION HEAD. THE MODIFICATION INCLUDES ELEVATION HEAD IN THE ENTHALPY DETERMINATION.

THE DATA TAPE STRUCTURE WAS NOT CHANGED AND THERE ARE NO INPUT OR MANUAL CHANGES.

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE MODIFICATION WAS CHECKED OUT USING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. THE MODIFICATION ALLOWED THE CODE TO OBTAIN THE CORRECT JUNCTION ENTHALPY.

VERIFICATION:

THE CORRECTION WAS VERIFIED BY REVIEWING THE ORIGINAL PROBLEM WITH THE ERROR, THE PROBLEM EXECUTED WITH THE ERROR CORRECTION AND LISTINGS OF THE MODIFIED SUBROUTINES WITH AND WITHOUT THE CORRECTION.

REPORTED BY : STEVE NESBIT (DUKE) DATE: 11/22/85  
 (PROBLEM REPORT #303)  
 CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 11/26/85  
 VERIFIED BY : L.R. FEINAUER (EI) DATE: 02/24/86

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 \*\*\*\*\* MODIFICATION NUMBER 299 \*\*\*\*\*

# ERROR DESCRIPTION:

RETRAN SELECTS AN INCORRECT CONTROL BLOCK ID TO DETERMINE THE REVERSE LOSS COEFFICIENT OF A JUNCTION FOR WHICH A CONTROL SYSTEM SPECIFIES THE LOSS COEFFICIENTS. CONTROL BLOCK 30 IS SPECIFIED, BUT BLOCK 29 IS USED. (SEE TROUBLE REPORT #302)

# MODIFICATION DESCRIPTION:

THE REPORTED PROBLEM IS AN INPUT ERROR. ACCORDING TO THE USER'S MANUAL, JUNCTION LOSS COEFFICIENTS CAN BE DEFINED BY CONTROL BLOCKS, BUT IN THIS PROBLEM A CONTROL INPUT WAS USED. THE CODE COULD HAVE BEEN MODIFIED TO WRITE AN ERROR MESSAGE OR TO ALLOW THE USE OF CONTROL INPUTS TO SPECIFY LOSS COEFFICIENTS. THE MODIFICATION CHOSEN WILL ALLOW THE USE OF CONTROL INPUTS FOR LOSS COEFFICIENT SPECIFICATION. SUBROUTINE INJUN WAS MODIFIED.

THERE ARE NO DATA TAPE STRUCTURE CHANGES OR INPUT CHANGES. THE MANUAL SHOULD BE CHANGED TO ALLOW THE USE OF EITHER CONTROL BLOCKS OR CONTROL INPUTS TO SPECIFY LOSS COEFFICIENTS.

# MODELING ALTERNATIVES:

DO NOT USE CONTROL INPUTS TO SPECIFY JUNCTION LOSS COEFFICIENTS.

# CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY EXECUTING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. THE MODIFICATION OBTAINED THE SPECIFIED CONTROL INPUT TO DETERMINE THE LOSS COEFFICIENT.

# VERIFICATION:

THE CORRECTION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL PROBLEM, THE ORIGINAL CODING, THE MODIFIED CODE AND THE CHECKOUT RUN USING THE CORRECTION. THE MODIFIED CODE SETS THE LOSS COEFFICIENT CORRECTLY WHEN CONTROL INPUTS ARE USED TO SPECIFY THE LOSS COEFFICIENT.

REPORTED BY : STEVE NESBIT (DUKE) DATE: 11/22/85  
 (SEE TROUBLE REPORT #302)



\*/ CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 12/16/85  
 \*/ VERIFIED BY : L.R. FEINAUER (EI) DATE: 04/16/86

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\*/

\*/ \*\*\*\*\* MODIFICATION NUMBER 300 \*\*\*\*\*

\*/ ERROR DESCRIPTION:

\*/ WHEN ATTEMPTING TO INITIALIZE WITH NO SLIP (ISFLAG = 0) WITH A  
 \*/ REQUEST FOR STEADY-STATE DEBUG OUTPUT (JSST=-45), A CODE ERROR  
 \*/ WAS ENCOUNTERED.

\*/ MODIFICATION DESCRIPTION:

\*/ THE MODIFICATION WAS TO SUBROUTINE STSTAT. WHEN SLIP IS TURNED  
 \*/ OFF, ONE OF THE LOCAL VARIABLES CONTAINED IN THE DEBUG IS NOT  
 \*/ DEFINED (DVSLIP). THE MODIFICATION SETS THE VARIABLE EQUAL TO  
 \*/ ZERO FOR THIS CASE.

\*/ THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT OR  
 \*/ MANUAL CHANGES.

\*/ MODELING ALTERNATIVES:

\*/ DO NOT USE STEADY-STATE DEBUGS WHEN SLIP IS TURNED OFF. (THIS  
 \*/ WILL NOT BE A PROBLEM WITH THE ERROR CORRECTION)

\*/ CHECK OUT:

\*/ THE MODIFICATION WAS CHECKED OUT BY RUNNING THE DECK WHICH ORIGINALLY  
 \*/ ENCOUNTERED THE ERROR. THE MODIFICATION CORRECTED THE ERROR.

\*/ VERIFICATION:

\*/ THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE  
 \*/ WITH A DECK SIMILAR TO THE DECK WHICH ENCOUNTERED THE  
 \*/ ERROR. STANDARD PROBLEM SP5 WAS MODIFIED TO PRINT A  
 \*/ STEADY-STATE DEBUG AT ITERATION NUMBER 5. THE SLIP FLAG  
 \*/ WAS NOT TURNED ON, AND THE DECK WAS MODIFIED SO THAT NO  
 \*/ RESTART TAPE WOULD BE GENERATED. THIS SAMPLE PROBLEM WAS  
 \*/ RUN TO VERIFY THAT IT WOULD RE-CREATE THE ERROR CONDITION.  
 \*/ THE MODIFICATION CARDS WERE THEN ADDED TO THE PROGRAM AND  
 \*/ THE DECK, UNALTERED FROM THE PREVIOUS RUN, WAS EXECUTED.  
 \*/ THIS RUN VERIFIED THAT THE MODIFIED CODE WAS CORRECT.

\*/

\*/ REPORTED BY : GEORGE SAWTELLE (EI) DATE: 12/17/85  
 \*/ (TROUBLE REPORT #306)

\*/ CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 12/17/85  
 \*/ VERIFIED BY : KEVIN T. COBLE (EI) DATE: 02/24/86

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\*/ \*\*\*\*\* MODIFICATION NUMBER 301 \*\*\*\*\*

\*/ ERROR DESCRIPTION:

\*/ FAILURE TO INITIALIZE WHEN THE CONDENSING HEAT TRANSFER CORRELATION  
 \*/ (UCHIDA) ON CARDS 15000X (MODE = 2) IS ACTIVATED.

\*/ MODIFICATION DESCRIPTION:

\*/ THE MODIFICATION WAS TO SUBROUTINE CONDHT. FOR THE UCHIDA  
 \*/ CORRELATION A CODING PROBLEM EXISTED WHEN THE GAS MASS WAS NOT  
 \*/ GREATER THAN THE BUBBLE MASS (NO CONDENSIBLES ABOVE THE SURFACE).  
 \*/ WHILE CORRECTING THE PROBLEM IT WAS NOTED THAT HEAT TRANSFER  
 \*/ MODE WAS INCORRECTLY EDITED FOR THE CONDUCTOR USING THE  
 \*/ UCHIDA CORRELATION. SUBROUTINE SLABHT WAS MODIFIED TO CORRECT  
 \*/ THE EDIT ERROR.

\*/ THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE  
 \*/ WAS NOT CHANGED.

\*/ MODELING ALTERNATIVES:

\*/ DO NOT USE THE UCHIDA HEAT TRANSFER CORRELATION.

\*/ CHECK OUT:

\*/ THE MODIFICATION WAS CHECKED BY EXECUTING THE DECK WHICH ORIGINALLY  
 \*/ ENCOUNTERED THE ERROR. THE ERROR WAS NOT ENCOUNTERED WITH THE  
 \*/ MODIFIED CODING IN PLACE.

\*/ VERIFICATION:

\*/ THE CORRECTION WAS VERIFIED BY REVIEWING THE ORIGINAL PROBLEM  
 \*/ WITH THE ERROR, THE PROBLEM EXECUTED WITH THE ERROR CORRECTION  
 \*/ AND FORTRAN LISTINGS OF THE MODIFIED SUBROUTINES WITH AND  
 \*/ WITHOUT THE CORRECTION.

\*/ REPORTED BY : BRUCE CHING (CE) DATE: 10/11/85  
 \*/ (FROM REPORT #299)  
 \*/ CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 01/17/86  
 \*/ VERIFIED BY : L.R. FEINAUER (EI) DATE: 02/24/86

\*/ \*\*\*\*\*

\*/ \*\*\*\*\* MODIFICATION NUMBER 302 \*\*\*\*\*

\*/ ERROR DESCRIPTION:

\*/ MODE ERROR IN SUBROUTINE PUMPS ON FIRST TIME STEP. (SEE TROUBLE  
 \*/ REPORT 300)

\*/ MODIFICATION DESCRIPTION:

\*/ THE PROBLEM WAS DUE TO AN INPUT ERROR. A POSITIVE PUMP SPEED WAS  
 \*/ INPUT WITH A PUMP TORQUE OF ZERO. AN ERROR MESSAGE WAS ADDED TO  
 \*/ SUBROUTINE PUMPS TO PRINT THE ERROR AND CALL FAIL.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

DO NOT INPUT A PUMP TORQUE VALUE OF ZERO WITH A NON-ZERO PUMP SPEED.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED OUT USING THE DLCK WHICH ORIGINALLY ENCOUNTERED THE ERROR. THE ERROR MESSAGE WAS PRINTED AND THE JOB WAS ABORTED AFTER STEADY-STATE INITIALIZATION. ALSO SAMPLE PROBLEM FIVE WAS RUN WITH THE MODIFICATION TO INSURE THAT THE ERROR MESSAGE WOULD NOT BE PRINTED IF THE INPUT WAS CORRECT.

#### VERIFICATION:

THE CORRECTION WAS VERIFIED BY EXECUTING THE UPDATED CODE WITH A DECK SIMILAR TO THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. SAMPLE PROBLEM TLTA WAS MODIFIED TO HAVE A CONTROL BLOCK AS THE INPUT FOR THE NORMALIZED TORQUE FOR PUMP #2. THE DECK WAS THEN EXECUTED TO VERIFY THAT THE NEW CODE WOULD CATCH THE ERROR CONDITION AND EXIT CORRECTLY.

REPORTED BY :	F. WENGER	(CP&L)	DATE: 11/06/85
	(TROUBLE REPORT 300)		
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 01/27/86
VERIFIED BY :	KEVIN T. COBLE	(EI)	DATE: 02/25/86

\*\*\*\*\*  
\*\*\*\*\* MODIFICATION NUMBER 303 \*\*\*\*\*

#### ERROR DESCRIPTION:

USE OF TIME STEP PARAMETER "DTMAX" OF 0.002 SECONDS RESULTS IN FORTRAN ERROR 209 (DIVIDE CHECK). THIS TIME STEP IS SLIGHTLY LESS THAN THAT CALCULATED BY THE CODE IN DISTRIBUTED PROBLEM (SP1) (SEE TROUBLE REPORT 230).

#### MODIFICATION DESCRIPTION:

THE ERROR IS IN SUBROUTINE IMPSTP, AND RESULTS FROM A VARIABLE (DELTAP) THAT IS CALCULATED TO BE EXACTLY ZERO. THE CODE NORMALLY FOLLOWS A DIFFERENT LOGIC PATH IN IMPSTP FOR THE FIRST TIME STEP, AND THUS HAS NOT ENCOUNTERED THIS PROBLEM BEFORE. THE CORRECTION INVOLVES HALVING THE TIME-STEP SIZE WHEN DELTAP OR DELTAN ARE COMPUTED TO BE ZERO, RATHER THAN USING THEM TO COMPUTE A TIME-STEP SIZE. THE MODIFICATIONS ARE IN SUBROUTINE IMPSTP.

THIS PROBLEM COULD NOT BE REPRODUCED ON CDC, BUT THE POTENTIAL OF ENCOUNTERING THE PROBLEM IS PRESENT.

WHILE CORRECTING THIS ERROR AND THE ERROR REPORT IN TROUBLE REPORT

NUMBER 248 IT WAS DISCOVERED THAT THE CALL TO IMPSTP FROM SUBROUTINE INRTRN WAS MADE WITH ON TOO FEW ARGUEMENTS. THIS ERROR WAS ALSO CORRECTED, BUT IS INCLUDED WITH MODIFICATION 305.

THERE ARE NO MANUAL CHANGES REQUIRED.

#### MODELING ALTERNATIVES:

USE A DIFFERENT TIME STEP SIZE.

#### CHECK OUT:

THE MODIFICATION WAS CHECKED BY EXECUTING STANDARD PROBLEM ONE (THE PROBLEM THAT ORIGINALLY ENCOUNTERED THE ERROR) WITH THE UPDATED CODE ON THE IBM.

#### VERIFICATION:

THE MODIFICATION WAS VERIFIED BY REVIEWING THE FORTRAN LISTING OF THE UPDATED CODE, AND BY RUNNING THE CORRECTED CODE ON CDC WITH THE PROBLEM DECK. A SIMILAR PROBLEM WAS CORRECTED BY MODIFICATION 270 IN MOD004A. THE NEW CORRECTION ALSO RESOLVES THE PREVIOUS ERROR, THEREFORE THE MOD004A CORRECTION CARD WAS DELETED.

REPORTED BY :	ROBERT TSAI (COM. ED.)	DATE: 02/28/84
CORRECTED BY :	MARK PAULSEN (EI)	DATE: 01/29/86
VERIFIED BY :	B.E. GRIEBENOW (EI)	DATE: 02/25/86

\*\*\*\*\* MODIFICATION NUMBER 304 \*\*\*\*\*

#### ERROR DESCRIPTION:

SUBROUTINE STEPIT CONTAINS AN ERROR AT LINE 727 (CYBER VERSION) IN WHICH THE VARIABLE "X1" IS USED BEFORE IT IS DEFINED. THIS ERROR WAS DISCOVERED WHILE REVIEWING THE ROUTINE DURING DEVELOPMENT WORK FOR AN ADVANCED RETRAN VERSION. THE EFFECT OF THE ERROR IS SHOWN IN THE RETRAN02MOD3 VERSION USING THE TTWOB SAMPLE PROBLEM AND A CHANGE TO THE TIME STEP CARD TO TAKE A LARGE TIME STEP. THE LARGE TIME STEP FORCES A DIFFERENT LOGIC PATH IN STEPIT THAN IS USUALLY TAKEN AND A MODE 2 ERROR OCCURS.

#### MODIFICATION (OR ERROR) DESCRIPTION:

SUBROUTINE STEPIT WAS MODIFIED TO CORRECT THE ERROR.

THE TTWOB DECK WAS USED TO CHECK OUT THE ERROR.  
SEE EPRI NP-1850-CCM VOL. 3 FOR A SIMILAR DESCRIPTION OF THE INPUT DECK.

THIS DECK IS NOT THE SAME AS THE DECK REFERRED TO IN THE PROBLEM

REPORT SINCE THAT DECK WAS COMPATIBLE WITH AN ADVANCED VERSION OF RETRAN. HOWEVER, THE ERROR WAS REPRODUCED WITH RETRAN-02 MOD3, USING A MODIFIED TURBINE TRIP DECK AS DESCRIBED ABOVE.

#### MODELING ALTERNATIVES:

WHERE POSSIBLE, SMALLER TIME STEPS CAN BE USED TO ALLOW BETTER CONVERGENCE. THIS WILL FOLLOW A DIFFERENT LOGIC PATH IN STEPIT AND BYPASS THE PROBLEM AREA. THE ERROR PATH WILL OCCUR WHENEVER THE PRODUCT OF TIME STEP ANY DELAYED GROUP DECAY CONSTANT IS GREATER THAN 1.0.

#### CHECK OUT:

SAMPLE PROBLEMS EXECUTED:  
TTWOB SAMPLE PROBLEM

OTHER PROBLEMS EXECUTED:  
NONE

#### VERIFICATION:

THE CORRECTION WAS VERIFIED BY VISUALLY INSPECTING THE ORIGINAL AND MODIFIED CODING.

THE PROBLEM DECK WHICH DEMONSTRATED THE ERROR WAS RERUN WITH THE UPDATED CODE TO DEMONSTRATE THAT THE ERROR WAS CORRECTED.

REPORTED BY	:	G.C. GOSE	(EI)	DATE:	12/09/85
CORRECTED BY	:	G.C. GOSE	(EI)	DATE:	01/20/86
VERIFIED BY	:	J.A. MCCLURE	(EI)	DATE:	02/05/86

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 305 \*\*\*\*\*

#### ERROR DESCRIPTION:

A RUN THAT EXECUTES IN 2 CPU SECONDS WITH STANDARD NUMERICS GETS INTO AN INFINITE LOOP WITH ITERATIVE NUMERICS AND EVENTUALLY EXCEEDS GLOBAL CPU TIME LIMIT (SEE TROUBLE REPORT 248).

#### MODIFICATION DESCRIPTION:

THE ERROR IS IN THE ITERATIVE TIME-STEP CONTROL SUBROUTINE IMPSTP WHERE A CONTROLLING VOLUME OR JUNCTION POINTER IS NOT VALID WHEN NO VOLUME OR JUNCTION CONTROLS ARE ACTIVE. THE ERROR IS PROBLEM DEPENDENT AND CAN NOT BE DUPLICATED ON CDC MACHINES. CORRECTIONS WERE ADDED TO SUBROUTINE IMPSTP TO ELIMINATE THE ERROR.

NO CHANGES WERE REQUIRED FOR THE DATA TAPE STRUCTURE, INPUT MANUAL, OR THEORY MANUAL.

WHILE CORRECTING THIS ERROR AND THE ERROR REPORT IN TROUBLE REPORT NUMBER 230 IT WAS DISCOVERED THAT THE CALL TO IMPSTP FROM SUBROUTINE INRTRN WAS MADE WITH ON TOO FEW ARGUEMENTS. THIS ERROR WAS ALSO CORRECTED.



\*/  
\*/ MODELING ALTERNATIVES:

\*/  
\*/ NONE HAVE BEEN IDENTIFIED.

\*/  
\*/ CHECK OUT:

\*/  
\*/ THE ERROR WAS IDENTIFIED AND CORRECTED USING THE INPUT DECK THAT  
\*/  
\*/ ORIGINALLY ENCOUNTERED THE ERROR.

\*/  
\*/ VERIFICATION:

\*/  
\*/ THE UPDATE WAS VISUALLY VERIFIED BY LOOKING AT THE ORIGINAL AND  
\*/  
\*/ THE MODIFIED CODING. THE MODIFICATION WILL NOT CALCULATE AN  
\*/  
\*/ INCORRECT INDEX IF NO VOLUME OR JUNCTION IS CONTROLLING.

\*/  
\*/ REPORTED BY : GREGG SWINDLEHURST (DUKE) DATE: 06/07/84  
\*/  
\*/ CORRECTED BY : MARK P. PAULSEN (EI) DATE: 01/29/86  
\*/  
\*/ VERIFIED BY : B.E. GRIEBENOW (EI) DATE: 02/25/86

\*/  
\*/ \*\*\*\*\*

\*/  
\*/ \*\*\*\*\* MODIFICATION NUMBER 306 \*\*\*\*\*

\*/  
\*/ ERROR DESCRIPTION:

\*/  
\*/ AFTER TURBINE STOP AND MAIN STEAM ISOLATION VALVES CLOSED, THE FLOW  
\*/  
\*/ BETWEEN THE TWO VALVES BECAME NEARLY ZERO. AT TWO JUNCTIONS  
\*/  
\*/ CONNECTING MAIN STEAM LINES TO STEAM HEADER, THE FLOW WAS CALCULATED  
\*/  
\*/ TO BE APPROXIMATELY  $1.0E-294$  WHICH RESULTED IN AN UNDERFLOW ERROR.  
\*/  
\*/ (SEE TROUBLE REPORT #262)

\*/  
\*/ MODIFICATION DESCRIPTION:

\*/  
\*/ THE MODIFICATION TO CORRECT THE ERROR WAS TO SUBROUTINE UPDATE.  
\*/  
\*/ SUBROUTINE FILL WAS ALSO MODIFIED TO CORRECT POSSIBLE SIMILAR  
\*/  
\*/ ERRORS TO FILL JUNCTIONS. IF THE ABSOLUTE VALUE OF THE JUNCTION  
\*/  
\*/ FLOW IS LESS THAN  $1.0E-60$  THE FLOW WILL BE SET TO ZERO.

\*/  
\*/ THERE ARE NO MANUAL OR INPUT CHANGES AND THE DATA TAPE STRUCTURE  
\*/  
\*/ WAS NOT CHANGED.

\*/  
\*/ MODELING ALTERNATIVES:

\*/  
\*/ NONE.

\*/  
\*/ CHECK OUT:

\*/  
\*/ TO REPRODUCE THE ERROR WITH THE ORIGINAL DECK WOULD HAVE BEEN  
\*/  
\*/ VERY EXPENSIVE SINCE IT WAS OUT A LONG WAY IN THE TRANSIENT  
\*/  
\*/ WHEN IT WAS ENCOUNTERED. CONSEQUENTLY, THE ERROR WAS REPRODUCED  
\*/  
\*/ BY HARD WIRING THE FLOW TO THE VALUE OF THE JUNCTION FLOW IN  
\*/  
\*/ THE ORIGINAL PROBLEM. THE REPRODUCED PROBLEM WAS THE CORRECTED  
\*/  
\*/ WITH THE MODIFICATION.

\*/  
\*/ VERIFICATION:

THE CORRECTION WAS VERIFIED BY REVIEWING THE ORIGINAL PROBLEM WITH THE ERROR, THE PROBLEM EXECUTED WITH THE ERROR CORRECTION AND A FORTRAN LISTING OF THE MODIFIED SUBROUTINES.

REPORTED BY : JAMES BOATWRIGHT (TUGCO) DATE: 09/24/84  
 (TROUBLE REPORT #262)  
 A. IRANI / E. MOZIAS (GPU) 03/04/85  
 (TROUBLE REPORT #277)  
 CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 02/06/86  
 VERIFIED BY : C.E. PETERSON (EI) DATE: 02/07/86

\*\*\*\*\* MODIFICATION NUMBER 307 \*\*\*\*\*

#### ERROR DESCRIPTION:

NO MASS TRANSFER ACCOMPANIES CONDENSATION ON THE HEAT CONDUCTORS. THIS IS INDICATED BY CONSTANT VAPOR REGION MASS (SEE TROUBLE REPORT 280).

#### MODIFICATION DESCRIPTION:

A MASS TRANSFER TERM WAS ADDED FOR VAPOR CONDENSED ON THE WALL OF A NONEQUILIBRIUM PRESSURIZER VOLUME ABOVE THE MIXTURE LEVEL. THE MASS TRANSFER IS COMPUTED ONLY FOR MODE 15 HEAT TRANSFER (CONDENSATION).

A DESCRIPTION OF THE MASS TRANSFER TERM MUST BE ADDED TO THE THEORY MANUAL.

WHILE CORRECTING THE ABOVE ERROR, IT WAS DISCOVERED THAT AN INCONSISTENCY EXISTED BETWEEN THE DOCUMENTED INTERREGION HEAT TRANSFER MODEL AND THE CODED MODEL. THE CODED MODEL WAS CHANGED TO BE CONSISTENT WITH THE DOCUMENTED MODEL.

#### MODELING ALTERNATIVES:

NONE.

#### CHECK OUT:

THE ORIGINAL PROBLEM THAT ENCOUNTERED THE ERROR WAS RUN WITH THE CORRECTED CODE AND OBSERVED TO EXECUTE CORRECTLY.

#### VERIFICATION:

THE CORRECTION WAS VERIFIED BY REVIEWING THE ORIGINAL PROBLEM WITH THE ERROR, THE PROBLEM EXECUTED WITH THE ERROR CORRECTION AND FORTRAN LISTINGS OF THE MODIFIED SUBROUTINES WITH AND WITHOUT THE CORRECTION.

REPORTED BY : G. SWINDLEHURST (DUKE) DATE: 04/15/85  
 CORRECTED BY : M.P. PAULSEN (EI) DATE: 02/13/86  
 VERIFIED BY : L.R. FEINAUER (EI) DATE: 02/25/86



\*\*\*\*\* MODIFICATION NUMBER 308 \*\*\*\*\*

ERROR DESCRIPTION:

THE DECK INITIALIZES WITH THE INITIALIZATION OPTION, BUT THE CARRYUNDER IS INCORRECT FOR THE SEPARATOR. WHEN A NULL TRANSIENT IS EXECUTED THE STATE BECOMES PERTURBED AND APPEARS TO BE APPROACHING A NEW (BUT DIFFERENT) STEADY-STATE. APPARENTLY THE PROBLEM IS DUE TO USING SLIP AT THE SEPARATOR OUTLET JUNCTION. WHEN SLIP IS NEGLECTED, A NULL TRANSIENT IS OBTAINED. (SEE TROUBLE REPORT #288)

MODIFICATION DESCRIPTION:

THE THEORY MANUAL STATES THAT THE PHASE VELOCITIES AT SEPARATOR EXIT JUNCTIONS ARE ASSUMED EQUAL. THIS MEANS THAT SLIP IS NEGLECTED AT THESE JUNCTIONS. SUBROUTINE INSEP WAS MODIFIED TO CHECK ON THE EXIT JUNCTION'S SLIP FLAGS. IF SLIP IS TURNED ON FOR THESE JUNCTIONS, A WARNING MESSAGE IS WRITTEN AND SLIP IS TURNED OFF.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

MODELING ALTERNATIVES:

IFRJ, WORD-17 ON THE JUNCTION CARDS, SHOULD BE SET TO -99 IF SLIP IS SPECIFIED ON THE PROBLEM DIMENSIONS CARD.

CHECK OUT:

THE MODIFICATION WAS CHECKED OUT USING THE DECK WHICH ORIGINALLY ENCOUNTERED THE ERROR. WHEN SLIP WAS TURNED ON AT THE RECIRCULATION AND STEAM FLOW PATH JUNCTIONS THE WARNING MESSAGE WAS WRITTEN AND SLIP WAS TURNED OFF AT THE JUNCTIONS. WHEN SLIP FOR THE JUNCTIONS WAS TURNED OFF, NO WARNING MESSAGE WAS WRITTEN.

VERIFICATION:

THE CORRECTION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL PROBLEM EXECUTION WHICH EXHIBITED THE ERROR, INSPECTION OF THE EXECUTION USING THE MODIFIED CODING, AND REVIEWING THE ORIGINAL AND MODIFIED CODING.

REPORTED BY :	MARK D. WALZ	(TVA)	DATE: 06/20/85
	(TROUBLE REPORT #288)		
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 03/07/86
VERIFIED BY :	L.R. FEINAUER	(EI)	DATE: 03/10/86

\*\*\*\*\* MODIFICATION NUMBER 309 \*\*\*\*\*

## / ERROR DESCRIPTION:

/ SAMPLE PROBLEMS ASKING FOR PRINTER PLOTS WILL ENTER SEGMENT PRNPLT  
 / AFTER NORMAL TRANSIENT RUN, GENERATE NORMAL PLOTS, ENTER SEGMENT  
 / INPUT, AND TRY TO REOPEN FTB FILE 1 WITH NO STACKED CASES SPECIFIED.  
 / SUBSEQUENT SYSTEM ERROR OCCURS, ALONG WITH ERROR NUMBER 11 FROM THE  
 / FTB PACKAGE AND ASSORTED DUMPS.

## / MODIFICATION DESCRIPTION:

/ THE ERROR IS UNIQUE TO NOS INSTALLATIONS. IT IS CORRECTED BY A  
 / MODIFICATION TO SUBROUTINE RMAIN.

/ THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT OR  
 / MANUAL CHANGES REQUIRED.

## / MODELING ALTERNATIVES:

/ NONE.

## / CHECK OUT:

/ THE MODIFICATION WAS CHECKED OUT BY VISUAL INSPECTION OF THE ORIGINAL  
 / AND MODIFIED CODING. THE CORRECTION WAS SENT TO THE REPORTING  
 / ORGANIZATION. A LETTER DATED 02/03/86 CONFIRMED THAT THE MODIFICATION  
 / CORRECTED THE REPORTED ERROR.

## / VERIFICATION:

/ THE CORRECTION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL  
 / AND MODIFIED CODING. THE CODE WILL CORRECTLY BY-PASS THE INPUT  
 / SUBROUTINE WHICH WAS RE-OPENING FTB FILE 1 WHEN NO STACKED CASES  
 / WERE SPECIFIED.

/ REPORTED BY : CHRISTOPHER BRENNAN (PSEGC) DATE: 05/31/84  
 / (TROUBLE REPORT #244)

/ CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 04/04/86

/ VERIFIED BY : L.R. FEINAUER (EI) DATE: 04/16/86

/ \*\*\*\*\*

/ \*\*\*\*\* MODIFICATION NUMBER 310 \*\*\*\*\*

## / ERROR DESCRIPTION:

/ "HEAT FLUX DOES NOT CONVERGE FOR MODE 11 IN SUBROUTINE QDOT" AT  
 / 600+ SECONDS INTO TRANSIENT (SEE TROUBLE REPORT 256).

## / MODIFICATION DESCRIPTION:

/ THE CONVERGENCE CRITERIA FOR MODE 11 WAS REDUCED FROM 0.1 TO 0.001  
 / IN MODIFICATION NUMBER 197. THIS NEW CRITERIA IS OVERLY RESTRICTIVE  
 / AND HAS BEEN RESTORED TO 0.1. THE CONVERGENCE CRITERIA FOR MODE 10  
 / WAS ALSO CHANGED FROM 1.0 TO 0.001 IN MOD. 197. THIS CONVERGENCE  
 / CRITERIA WAS ALSO RESTORED TO THE PRE-MOD003 VALUE. NEITHER OF THESE

CHANGES WERE DIRECTLY RELATED TO THE ERROR CORRECTED BY MOD. 197.

SUBROUTINE QDOT WAS MODIFIED.

#### MODELING ALTERNATIVES:

USE THE STANDARD HEAT TRANSFER MAP (CA<sup>17</sup> SWITCH USING GENERALIZED RESTART).

#### CHECK OUT:

THE MODIFIED CONVERGENCE CRITERIA WERE COMPARED WITH THOSE DELETED IN THE UPDATE LISTING AND A FORTRAN LISTING OF QDOT WAS VISUALLY EXAMINED.

#### VERIFICATION:

THE MODIFICATION WAS VISUALLY VERIFIED BY EXAMINING THE CODING WHICH ENCOUNTERED THE ERROR, CODING FROM THE MOD02 VERSION OF RETRAN (PRIOR TO THE CONVERGENCE CHANGES), AND THE MODIFIED CODING.

REPORTED BY :	GEORGE SAWTELLE	(EI)	DATE: 07/30/84
CORRECTED BY :	M.P. PAULSEN	(EI)	DATE: 03/13/86
VERIFIED BY :	B.E. GRIEBENOW	(EI)	DATE: 03/24/86

\*\*\*\*\* MODIFICATION NUMBER 311 \*\*\*\*\*

#### ERROR DESCRIPTION:

IN SUBROUTINE TEMP WHICH SOLVES THE ONE-DIMENSIONAL TRANSIENT HEAT CONDUCTION EQUATION THERE WAS A PROBLEM WITH THE CONVERGENCE OF THE HEAT FLUX SOLUTION. CDC HAS SUGGESTED THAT THE QUANTITIES COMPARED TO THE EPSILON FOR THE CONVERGENCE TEST SHOULD BE DIVIDED BY THE HEAT FLUX. THE SUGGESTED SOLUTION IS GIVEN ON FICHE "NON-CONVERGENCE PROBLEM" WHICH IS ATTACHED. IT IS REQUESTED THAT ENERGY INCORPORATED VERIFY THAT THE GIVEN CORRECTION IS VALID. THE CORRECTION INVOLVES ADDING THE FOLLOWING TWO STATEMENTS TO THE TEMP PROGRAM AFTER SEQUENCE NUMBER TEMP1175:

CVL = CVL/FLUXL  
CVR = CVR/FLUXR

#### MODIFICATION DESCRIPTION:

WE HAVE REVIEWED THE PROPOSED CORRECTION SUBMITTED WITH THIS TROUBLE REPORT. THE SUGGESTED MODIFICATION BASICALLY USES A NORMALIZED VALUE OF FLUX FOR THE CONVERGENCE ALGORITHM AS OPPOSED TO A DIRECT (NOT NORMALIZED) VALUE CURRENTLY IN THE CODE. A CHANGE SUCH AS THIS ALSO REQUIRES A CORRESPONDING MODIFICATION OF THE CONVERGENCE CRITERIA. CHANGES SUCH AS THESE CAN NOT BE MADE WITHOUT SUFFICIENT EVALUATION TO DETERMINE THE APPROPRIATE VALUE OF THE CONVERGENCE CRITERIA AND THE EFFECT OF THE CHANGE FOR A VARIETY OF TRANSIENTS.

THE "... FAILED TO CONVERGE..." MESSAGE HAS BEEN EXTENDED TO PROVIDE ADDITIONAL INFORMATION. THIS INFORMATION WILL ALLOW USERS TO EVALUATE THEIR SPECIFIC SITUATION (E.G. HOW CLOSE THE SOLUTION IS TO CONVERGENCE). THESE CHANGES ARE MADE IN MODIFICATION NUMBER 311 WHICH WILL BE INCLUDED IN THE MOD004C UPDATE.

#### MODELING ALTERNATIVES:

REVIEW THE OUTPUT TO SEE IF THE RESULTS ARE WRONG. IF THIS APPEARS TO BE THE CASE, THE RUN CAN BE RESTARTED WITH EITHER A CHANGE IN THE TIME STEP CARDS OR BY USING A DIFFERENT HEAT TRANSFER MAP.

#### CHECK OUT:

THE UNCONTROLLED ROD WITHDRAWAL SAMPLE PROBLEM WAS RUN TO TEST THE NEW DIAGNOSTICS THAT WERE ADDED.

#### VERIFICATION:

THE MODIFICATION WAS VISUALLY VERIFIED USING THE ORIGINAL AND THE MODIFIED CODING. A REFERENCE WAS ADDED TO THE DEBUGS TO REFER BACK TO THE EQUATIONS IN THE THEORY MANUAL (PAGE VIII-80, EQUATIONS VIII.3-59A AND B).

REPORTED BY : D.E. TICKLE (APS)

DATE: 10/31/85

CORRECTED BY : M.P. PAULSEN (EI)

DATE: 02/07/86

VERIFIED BY : B.E. GRIEBENOW (EI)

DATE: 04/18/86

\*\*\*\*\*  
MODIFICATIONS 312-314 ARE IN UPDATE MOD004D  
\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 312 \*\*\*\*\*

#### MODIFICATION REQUEST:

ADD CODING TO PROVIDE AN EDIT OF THE CONTROL SYSTEM INITIAL CONDITIONS.

#### MODIFICATION DESCRIPTION:

THIS MODIFICATION WILL ALLOW THE CONTROL BLOCK INITIAL CONDITIONS TO BE EDITED AFTER STEADY-STATE. SUBROUTINES MODIFIED INCLUDE INCNT1, INCNT2, JVEDIT, AND STSTAT. COMDECK FILID(02) WAS ALSO MODIFIED.

THE NUMBER OF ITERATIONS FOR INITIAL CONTROL SYSTEM CALCULATIONS IS NOW INPUT AS WORD-4 ON CARD 701000. DEFAULT IS ONE ITERATION, WHICH WILL GIVE RESULTS IDENTICAL TO PREVIOUS VERSIONS. THE USER'S MANUAL SHOULD BE CHANGED TO REFLECT THIS MODIFICATION. THE DATA TAPE STRUCTURE WAS NOT CHANGED.

#### MODELING ALTERNATIVES:

NONE.

# CHECKOUT:

THE UCRW SAMPLE PROBLEM WAS EXECUTED WITH NO INPUT CHANGES TO INSURE IDENTICAL INITIALIZATION WHEN COMPARED TO PREVIOUS RUNS. THE INITIALIZATION AGREED WITH THE MOD004C OUTPUT. THE DECK WAS THEN RUN WITH THE INPUT CHANGED TO 15 ITERATIONS OF THE CONTROL SYSTEM CALCULATIONS DURING STEADY-STATE.

# VERIFICATION:

METHODS 1 AND 2 USED FOR VERIFICATION. THE CODING WAS VISUALLY CHECKED, VIA THE UPDATE LISTING. THEN THE ATWS DECK WAS RUN ON RETRANO2, MOD004C FOR A BASELINE CALCULATION. THIS BASELINE DECK WAS THEN UPDATED WITH THE UPDATE CARDS FOR THE CONTROL SYSTEM EDIT AND EXECUTED. THE RESULTS WERE THE SAME AS THE BASELINE RESULTS, WITH THE ADDITIONAL CONTROL SYSTEM OUTPUT. A THIRD RUN USED THE OPTION OF ADDITIONAL CONTROL SYSTEM ITERATIONS WHICH AGAIN DUPLICATED THE RESULTS OF RUN 2.

REQUESTED BY :	JAMES MCFADDEN	(EI)	DATE:	04/23/86
MODIFIED BY :	B.E. GRIEBENOW	(EI)	DATE:	05/09/86
VERIFIED BY :	K.R.KATSMA	(EI)	DATE:	05/12/86

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 313 \*\*\*\*\*

# MODIFICATION REQUEST:

A NEW CONTROL ROD MODEL HAS BEEN DEVELOPED FOR THE ONE-DIMENSIONAL NEUTRONICS MODEL IN RETRAN AND IS THE SUBJECT OF A DESIGN REVIEW FOR PENNSYLVANIA POWER AND LIGHT COMPANY. THIS MODEL IS TO BE ADDED TO RETRAN-02 AS A SEPARATE OPTION WITH CHANGES IN EXISTING CODING OF MOD003 LIMITED TO THOSE REQUIRED FOR MERGING THE NEW MODEL INTO THE CODE.

# MODIFICATION DESCRIPTION:

## \*\*COMDECK UPDATE\*\*

FILID-45, THE SPACE TIME KINETICS COMMON MASK WAS MODIFIED. "RODLIM" WAS ADDED TO SUBFILE TYPREA, LOCATION 94. THIS PARAMETER IS A USER INPUT VALUE THAT WILL BE USED TO LIMIT THE ROD MOTION IN THE CORE, ACCORDING TO THE VALUE IN FEET THAT THE USER SUPPLIES. THE ADDITION OF THIS PARAMETER WILL NOT AFFECT RESTART.

## \*\*SUBROUTINE UPDATES\*\*

### SUBROUTINE CORQ

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODEL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.



SUBROUTINE EDATA1

LOGIC FOR THE SPACE TIME KINETICS FLAG, MODEL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE EDATA5

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE ENERGY

LOGIC FOR THE SPACE TIME KINETICS FLAG, MODEL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE EDIT

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE GOGO

CALLS TO THE CROSS SECTION PROCESSING AND EDITING ROUTINES  
WERE MODIFIED, DEPENDING ON THE VALUE OF MODEL.

SUBROUTINE INCORE

LOCAL FLAG, NODEL, WAS MODIFIED TO HANDLE THE CASE OF 4 OR 5.

SUBROUTINE INMODH

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE INITLZ

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE INTSTP

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE INXSEC

LOGIC WAS MODIFIED TO PREVENT EDITING OF INPUT DATA AT RESTART TIME

SUBROUTINE INPOWER

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODOL WAS MODIFIED TO ALLOW CONDITIONS GREATER THAN 4.

SUBROUTINE PREGO

LOGIC WAS MODIFIED TO CALL THE CORRECT ARRAY EDITOR DEPENDING  
ON THE VALUE OF NODEL.

SUBROUTINE QX1I

SUBROUTINE RESHAP

SUBROUTINE RESOPT

SUBROUTINE RETRAN

### SUBROUTINE SETUP

SUBROUTINE SHAPER

SUBROUTINE STATIC

SUBROUTINE STEPIT.

SUBROUTINE STSTAT

SUBROUTINE SVOID

LOGIC FOR THE SPACE TIME KINETICS FLAG, NODEL WAS MODIFIED TO



\*/ ALLOW CONDITIONS GREATER THAN 4.

\*/ SUBROUTINE TIME

\*/ LOGIC FOR THE SPACE TIME KINETICS FLAG, MODEL WAS MODIFIED TO  
\*/ ALLOW CONDITIONS GREATER THAN 4.

\*/ SUBROUTINE TSTP

\*/ LOGIC FOR THE SPACE TIME KINETICS FLAG, MODEL WAS MODIFIED TO  
\*/ ALLOW CONDITIONS GREATER THAN 4.

\*/ \*\*SUBROUTINE ADDITIONS\*\*

\*/ SUBROUTINE CXGEN1

\*/ SUBROUTINE CXGEN1 COMPUTES CHANGES OF REACTIVITY FEEDBACK VARIABLES  
\*/ WITH RESPECT TO S-S VALUES AND UPDATES CROSS SECTIONS FOR THE  
\*/ 1-D KINETICS CALCULATION. CXGEN1 IS COMPATIBLE WITH THE NEW MULTI-  
\*/ STATE ROD MODEL.

\*/ SUBROUTINE CXGENI

\*/ SUBROUTINE CXGENI COMPUTES INITIAL VALUES OF CROSS SECTIONS FOR  
\*/ THE 1-D KINETICS CALCULATION. CXGENI IS ONLY USED IN THE "NEW"  
\*/ ROD MODEL.

\*/ SUBROUTINE DEFIN1

\*/ DEFIN1 COMPUTES THE GEOMETRY, CALCULATES AND EDITS THE BUCKLING  
\*/ VALUES, STORES STARTING FISSION SOURCE, AND EDITS EXTERNAL SOURCES,  
\*/ IF APPLICABLE. DEFIN1 IS COMPATIBLE WITH THE NEW MULTI-STATE ROD  
\*/ MODEL.

\*/ SUBROUTINE INQ11

\*/ INQ11 RESERVES QX1FIL FOR SPACE-DEPENDENT KINETICS INFORMATION  
\*/ AND READS THE PROBLEM CONTROL, DELAYED NEUTRON, COMPOSITION, AND  
\*/ CROSS SECTION DATA, DEFINES THE GEOMETRY FOR THE PROBLEM,  
\*/ CALCULATES AND EDITS THE BUCKLING VALUES, STORES THE STARTING  
\*/ FISSION SOURCE, EDITS THE EXTERNAL SOURCES, AND RESERVES  
\*/ SUBFILES IF REQUIRED. INQ11 IS COMPATIBLE WITH THE NEW MULTI-STATE  
\*/ ROD MODEL.

\*/ SUBROUTINE INXSC1

\*/ SUBROUTINE INXSC1 READS THE NEW CROSS SECTION DATA FILE.  
\*/ INXSC1 IS COMPATIBLE WITH THE NEW MULTI-STATE ROD MODEL.

\*/ SUBROUTINE SHAPR1

\*/ SUBROUTINE SHAPR1 COMPUTES THE STATIC EIGENFUNCTION  
\*/ AND STEADY STATE EIGENVALUE. SHAPR1 IS COMPATIBLE WITH THE  
\*/ STARTING GUESS OF A FLUX DISTRIBUTION THAT WAS INSTALLED  
\*/ WITH THE MULTI-STATE ROD MODEL UPDATE

SUBROUTINE RDRE1

RDRE1 WILL COMPUTE REGIONAL AND TOTAL REACTIVITY DUE TO CONTROL ROD MOVEMENT FOR THE NEW MULTI-STATE ROD MODEL. THE CURRENT MODEL IS SIMPLY A DUMMY ROUTINE.

SUBROUTINE REPR1

REPR1 IS A GENERAL ARRAY PRINTER. REPR1 IS COMPATIBLE WITH THE NEW MULTI-STATE ROD MODEL.

SUBROUTINE RODMV1

RODMV1 COMPUTES THE CONTROL FRACTION FOR A REGION GIVEN A USER DEFINED INITIAL DISTRIBUTION. THE TIME ZERO VALUES ARE MODIFIED ACCORDING TO THE DISTANCE A ROD BANK HAS MOVED (DD)  
RODMOV1 CONTAINS THE LOGIC FOR THE NEW MULTI-STATE ROD MODEL.

SUBROUTINE XSEC1

SUBROUTINE XSEC1 EVALUATES UNCONTROLLED AND CONTROLLED CROSS SECTIONS IN TERMS OF FEEDBACK VARIABLES AND THEN AVERAGES THEM (USING THE DYNAMIC CONTROL FRACTION) TO FORM THE FINAL CROSS SECTIONS FOR QX1.  
XSEC1 IS COMPATIBLE WITH THE NEW MULTI-STATE ROD MODEL.

END OF MODIFICATION DESCRIPTION

MODELING ALTERNATIVES:

N/A

CHECKOUT:

TTQX1 SAMPLE PROBLEM (NULL TRANSIENTS) AND RESTART FROM THE NULL TRANSIENT. COMPARISONS WERE MADE WITH A SIMILAR PROBLEM EXECUTED ON RETRAN-02 MOD3 FOR THE "OLD" MODEL AND A PRERELEASE VERSION OF RETRAN-03 FOR THE "NEW" ROD MODEL.

VERIFICATION:

Verified by

(1) Visually inspecting the update changes and

(2) Review of sample problems run with updated code compared to unmodified code. This update merged a model from RETRAN-03 PRE30 into RETRAN-02 MOD4C. Sample problems were compared to RETRAN-03 PRE30 results as far as applicable and the RETRAN-02 MOD4C model was verified as still working properly.

REQUESTED BY : J. H. MCFADDEN

DATE: 04/23/86

MODIFIED BY : G. C. GOSE (EI)

DATE: 05/01/86

VERIFIED BY : J. A. McCLURE (EI)

DATE: 05/19/86

INPUT CHANGES

THE NEW ROD MODEL IS ACTIVATED BY SPECIFYING THE VALUE OF MODEL, THE KINETICS OPTION, AS 5. MODEL = 4 IS THE "OLD" Y-FUNCTION MODEL. WHEN MODEL = 5 (THE NEW ROD MODEL) THE USER MAY SPECIFY A ROD INSERTION LIMIT (IN FEET) WHICH WILL LIMIT THE ROD MOTION. THIS WORD, REPRESENTED RODLIM IS WORD 4 (R) ON CARD 315000.

#### TREE STRUCTURE CHANGES

CHANGED TREE STRUCTURE IN ONE-D KINETICS MODULES TO ACCOMODATE PARALLEL CONTROL ROD MODELS. THIS STRUCTURE REQUIRED A MODIFICATION TO SUBROUTINE RESOPT. THE ROUTINES AND ASSOCIATED SEGMENTS ARE LOADED DEPENDING ON MODEL = 4, OR 5. THE EXTERNALS CXGEN (OLD MODEL) OR CXGEN1 (NEW MODEL) ARE DECLARED IN RESOPT.

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 314 \*\*\*\*\*

#### MODIFICATION REQUEST:

MODIFY THE RETRAN CODING AS NECESSARY TO ALLOW THE RETRAN-02 SOURCE TO BE COMPILED ON CDC SYSTEMS USING THE FTN5 COMPILER AND ON IBM SYSTEMS USING THE VS COMPILER. COMPARISONS OF MOD003 ANALYSES (F4 AND F77 VERSIONS) PROVIDE THE BASIS FOR THE CHANGES.

#### MODIFICATION DESCRIPTION:

THIS MODIFICATION ALLOWS THE USE OF THE FTN5 COMPILER ON CDC SYSTEMS AND THE VS COMPILER ON IBM SYSTEMS WITH RETRAN-02. MODIFICATIONS TO THE CODE INCLUDE ADDING SEPERATORS TO FORMAT STATEMENTS, CHANGING HOLERITH STRINGS TO QUOTED STRINGS, AND CHANGING DIMENSIONING OF DIMENSION STATEMENTS. MANY FORMAT STATEMENTS STILL USE DOUBLE QUOTES (") AS STRING DELIMITERS. THIS IS ACCEPTABLE ON CDC SYSTEMS, BUT IS NOT ACCEPTABLE ON IBM SYSTEMS. TO REPLACE THESE DOUBLE QUOTES WITH APOSTROPHES, IBMSRC MUST BE USED TO GENERATE A NEW IBM SOURCE. IBMSRC IS ALSO NEEDED TO ADD DECK SEQUENCING INFORMATION TO THE SOURCE LIST.

THE PROGRAMMER'S MANUAL SHOULD BE REVISED TO ALLOW USE OF THE FTN5 AND VS COMPILERS. THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT CHANGES.

#### MODELING ALTERNATIVES:

NONE.

#### CHECKOUT:

THE MODIFICATION WILL BE TESTED BY RUNNING THE TEN SAMPLE PROBLEMS, AS WELL AS SOME RESTART AND REEDIT PROBLEMS. A NEW ENVIRONMENTAL LIBRARY WILL BE REQUIRED TO USE THE FTN5 AND VS COMPILERS AND WILL BE TESTED AT THE SAME TIME. THE MODIFICATION IS BASED ON COMPARISON OF MOD003 ANALYSES USING THE FTN5 AND VS COMPILERS, WITH THE ORIGINAL MOD003 RELEASE SAMPLE PROBLEMS.

## / VERIFICATION:

/ THE MODIFICATIONS WERE VERIFIED BY COMPILING RETRAN-02 MOD003 WITH  
 / THE CHANGES AND RUNNING THE TEN SAMPLE PROBLEMS. THE OUTPUT OF  
 / THE SAMPLE PROBLEMS RUN USING THE FTN5 AND VS COMPILER GENERATED CODE  
 / WERE THEN COMPARED TO PREVIOUS RESULTS.

/ REQUESTED BY : JAMES MCFADDEN (EI) DATE: 04/23/86  
 / MODIFIED BY : K.T. COBLE (EI) DATE: 02/27/86  
 / M.P. PAULSEN (EI) 02/27/86  
 / L.R. FEINAUER (EI) 03/28/86  
 / VERIFIED BY : K.T. COBLE (EI) DATE: 02/28/86  
 / L.R. FIENAUER (EI) 04/14/86

/ \*\*\*\*\*  
 / \*\*\*\*\*  
 / MODIFICATIONS 315-320 ARE IN UPDATE MOD004  
 / \*\*\*\*\*  
 / \*\*\*\*\*  
 / \*\*\*\*\* MODIFICATION NUMBER 315 \*\*\*\*\*

## / ERROR DESCRIPTION:

/ THE CHOKED FLOW VALUE FOR THE ISOENTHALPIC MODEL INCREASES  
 / DISCONTINUOUSLY WHEN CROSSING THE SATURATION LINE FROM SUBCOOLED  
 / TWO-PHASE FLOW. (TROUBLE REPORT 308)

## / MODIFICATION DESCRIPTION:

/ ALL THE CHOKED FLOW MODELS USE POLYNOMIALS FIT TO THE DATA TO  
 / OBTAIN THE CRITICAL MASS FLUX AS A FUNCTION OF UPSTREAM PRESSURE  
 / AND ENTHALPY. DIFFERENT POLYNOMIALS ARE USED IN THE SUBCOOLED AND  
 / TWO PHASE REGIONS. THE ISOENTHALPIC EXPANSION MODEL IS NOT  
 / SMOOTHED AT THIS TRANSITION AND DEPENDING ON THE PRESSURE WHERE THE  
 / TRANSITION IS MADE, THE ENDS OF THE TWO CURVES MAY NOT MATCH AND  
 / THE TRANSITION MAY BE DISCONTINUOUS. THE DISCONTINUITY IS WORST  
 / IN THE 900 PSI RANGE (APPROXIMATELY 10 PERCENT). THE OTHER  
 / CHOKING MODEL OPTIONS (ICHOKE=0 OR 2) USE DIFFERENT CHOKING  
 / MODELS ON EACH SIDE OF THE SATURATION LINE AND THE TRANSITION  
 / IS SMOOTHED.

/ SUBROUTINE CHOKEM WAS MODIFIED TO SMOOTH THE ISOENTHALPIC EXPANSION  
 / POLYNOMIALS FOR THE SUBCOOLED AND SATURATED REGIONS. THIS WAS DONE  
 / ONLY FOR THE POLYNOMIALS VALID IN THE RANGE OF 100 TO 2800 PSIA.  
 / FOR A GIVEN INPUT ENTHALPY A LINEAR WEIGHTING WAS DONE BETWEEN THE  
 / CRITICAL MASS FLUX AT SATURATION ENTHALPY AND THE CRITICAL MASS FLUX  
 / 10 BTU/LB SUBCOOLED IF THE ENTHALPY FELL WITHIN THIS RANGE.  
 / \*\*\*\*\* CHANGED TO 20 BTU/LB DURING VERIVICATION (KRK) \*\*\*\*\*

/ FOR THE OTHER TWO CHOKING MODELS (ICHOKE=0 OR 2), THE POLYNOMIALS  
 / FOR SUBCOOLED AND TWO-PHASE CRITICAL MASS FLUX ARE SMOOTHED ON THE  
 / SUBCOOLED SIDE. THE ENTHALPY AT WHICH SMOOTHING BEGINS H1 (THE AMOUNT  
 / OF SUBCOOLING) IS DETERMINED BY ANOTHER POLYNOMIAL. HOWEVER ONCE  
 / THE POINT IS FOUND THE CRITICAL MASS FLUX SMOOTHING SHOULD BE LINEAR  
 / BETWEEN THIS ENTHALPY AND THE SATURATION ENTHALPY. AN ERROR WAS FOUND  
 / IN THIS LOGIC IN THAT THE SMOOTHING WAS BEING DONE BETWEEN H1 AND THE

INPUT ENTHALPY INSTEAD OF THE SATURATION ENTHALPY.

SUBROUTINE CHOKEM WAS MODIFIED FOR THIS ERROR CORRECTION AND NO INPUT CHANGES ARE REQUIRED NOR WAS THE TAPE STRUCTURE WAS CHANGED. THE THEORY MANUAL WILL HAVE TO BE CHANGED TO REFLECT THESE MODIFICATIONS.

#### MODELING ALTERNATIVES:

NONE.

#### CHECK OUT:

THE DECK THAT ENCOUNTERED THE PROBLEM WAS USED TO CHECK THE MODIFICATIONS. IN ADDITION PLOTS OF THE CRITICAL FLOW POLYNOMIALS FOR THE THREE CHOKING OPTIONS WERE MADE BEFORE AND AFTER THE CORRECTIONS.

#### VERIFICATION:

THE CALCULATIONS MADE BEFORE AND AFTER THE CODE MODIFICATIONS WERE REVIEWED. IT WAS NOTED THE THE SUBCOOLED SMOOTHING RANGE OF 10 BTU/LB REMOVED OVER 90 PERCENT OF THE DISCONTINUITY, BUT FOR SOME PRESSURE-ENTHALPY COMBINATIONS A SMALL DISCONTINUITY STILL EXISTED. THE SMOOTHING RANGE WAS THEN EXTENDED TO 20 BTU/LB REDUCING THE ERROR TO LESS THAN APPROXIMATELY 4 PERCENT. (FOR THE WORST CASE, A DISCONTINUITY OF 4 PERCENT WOULD BE EXPECTED WHEN CROSSING THE SATURATION LINE). THE CODE MODIFICATION WAS THEREFORE CHANGED TO USE A SMOOTHING REGION OF 20 BTU/LB.

THE CODING WAS REVIEWED TO CHECK THE CODE UPDATES FOR THE SMOOTHING CHANGE FOR THE ISOENTHALPIC CURVES. ALSO THE CHANGE FOR ICHOKE EQUAL 0,2 WAS CHECKED, REPLACING H (INPUT) BY HSAT.

REPORTED BY	: JOHN WESTACOTT (EI)	DATE: 03/27/86
CORRECTED BY	: CRAIG PETERSON (EI)	DATE: 05/16/86
VERIFIED BY	: K.R.KATSMAN (EI)	DATE: 05/21/86

\*\*\*\*\* MODIFICATION NUMBER 316 \*\*\*\*\*

#### ERROR DESCRIPTION:

THE AVERAGE METAL TEMPERATURE VALUE IN THE MAJOR EDIT IS NOT CONSISTANT WITH THE NODAL TEMPERATURES.

#### MODIFICATION DESCRIPTION:

THE AVERAGE METAL TEMPERATURE CALCULATION IN RETRAN ASSUMES THE FUEL ROD WILL CONSIST OF SOLID CYLINDRICAL GEOMETRY WITH THE FUEL AS THE FIRST REGION. THE AVERAGE METAL TEMPERATURE IS BASED ON A VOLUME WEIGHTED AVERAGE OF THE NODAL TEMPERATURES IN THE FIRST REGION ONLY AND IS USED FOR DOPPLER FEEDBACK IN THE KINETICS MODEL. THE CALCULATION IS NOT CORRECT FOR SLAB



GEOMETRY, GEOMETRY IN WHICH THE HEATED REGION IS NOT THE FIRST REGION OR GEOMETRY IN WHICH THERE ARE MORE THAN ONE HEATED REGION.

THE MODEL WAS GENERALIZED TO BE APPLICABLE TO SLAB GEOMETRY AND CYLINDRICAL GEOMETRY OTHER THAN SOLID RODS. IN ADDITION, MORE THAN ONE HEATED REGION CAN EXIST IN THE CONDUCTOR AND THE REVISED MODEL WILL INCLUDE BOTH REGIONS IN THE AVERAGE METAL TEMPERATURE CALCULATION.

SUBROUTINE TAVE WAS COMPLETELY REVISED. THE ARGUMENT LIST FOR TAVE WAS CHANGED TO REMOVE UNUSED VARIABLES CONSEQUENTLY THE CALLS TO TAVE FROM COND AND SINITL WAS ALSO CHANGED. THE UNITS COMMON BLOCK WAS MOVED INTO SUBROUTINE INGEOM SO A VALUE OF PI CONSISTANT (SAME NUMBER OF SIGNIFICANT FIGURES) WITH THE REST OF THE CODE WOULD BE USED. NO INPUT, DATA TAPE, OR MANUAL CHANGES ARE REQUIRED.

#### MODELING ALTERNATIVES:

THERE ARE NO MODELING ALTERNATIVES IF THIS PROBLEM IS ENCOUNTERED.

#### CHECK OUT:

THE ORIGINAL DECK SENT WITH THE ERROR REPORT WAS NOT THE ONE THAT ENCOUNTERED THE ERROR SINCE THAT DECK HAD INPUT ERRORS THAT WERE NOT IN THE OUTPUT SENT WITH THE TROUBLE REPORT. HOWEVER, THE ERROR IS A GENERIC ONE CONSEQUENTLY A HOT CHANNEL MODEL WITH THE SAME FUEL GEOMETRY WAS USED TO CHECK THE ERROR CORRECTION.

HAND CALCULATIONS AND DEBUG EDITS WERE USED TO INSURE THE REVISED AVERAGE FUEL TEMPERATURE WAS BEING DONE CORRECTLY. FOR GEOMETRIES WITH THE FUEL AS THE SECOND REGION, WITH FUEL AS THE FIRST AND SECOND REGION AND SOLID ROD GEOMETRY WITH FUEL AS THE FIRST REGION.

#### VERIFICATION:

THE MODIFICATION OF THE CODE WAS VERIFIED VISUALLY AND BY HAND. THE ORIGINAL CODING WAS REVIEWED, AND COMPARED TO THE MODIFIED CODING. THE ARGUMENT LIST WERE CHANGED AND SR TAVE WAS RE-WRITTEN. THE REVISED CODING IN TAVE WAS CHECKED.

THE CHECKOUT RUNS MADE FOR THE MODIFICATION WERE THEN REVIEWED. CHECKOUT RUNS WERE MADE FOR 3 GEOMETRY TYPES (FIRST REGION FUEL, SECOND REGION FUEL, AND SPLIT FUEL REGIONS IN ROD). ALL RUNS WERE FOR CYLINDRICAL GEOMETRY. THE RESULTS WERE CHECKED FROM THE DE-BUG DATA PRINTED OUT. THE CODING WILL WORK FOR RETANGULAR GEOMETRY ALSO, ALTHOUGH NO RETANGULAR GEOMETRIES WERE NOT EXECUTED.

REPORTED BY : SAM WOOD (UNC)  
CORRECTED BY : CRAIG PETERSON (EI)  
VERIFIED BY : K.R.KATSMA

DATE: 03/30/86  
DATE: 05/16/86  
DATE: 05/21/86

\*\*\*\*\*

\*\*\*\*\* MODIFICATION NUMBER 317 \*\*\*\*\*

ERROR DESCRIPTION:

FUNCTION STATEMENTS THAT CONTAIN VARIABLE NAMES IDENTICAL TO VARIABLES NAMES IN SUBROUTINE ARGUMENT LIST OR COMMON BLOCKS WILL GIVE LEVEL 12 COMPILER ERRORS WHEN COMPILED ON THE FORTVS (FORTRAN 77) COMPILER.

MODIFICATION DESCRIPTION:

CODING WAS CHANGED IN SUBROUTINES CXGEN AND PCHF TO ELIMINATE THE PROBLEM. THE FUNCTION ARGUMENT LIST WERE CHANGED SUCH THAT THE ARGUMENTS ARE NOT IDENTICAL TO VARIABLES IN COMMON OR THE SUBROUTINE ARGUMENT LIST.

THE DATA TAPE STRUCTURE IS NOT CHANGED  
THERE ARE NO INPUT CHANGES  
THERE ARE NO MANUAL CHANGES

MODELING ALTERNATIVES:

NONE

CHECK OUT:

THE ERROR WAS ENCOUNTERED WHEN ATTEMPTING TO COMPILE RETRAN02, MOD004D ON IBM, USING THE FORTRAN 77 COMPILER (FORTVS). THE CODING WAS MODIFIED AND THE COMPILATION SUCCESSFULLY COMPLETED.

VERIFICATION:

THE CODE MODIFICATION WAS VERIFIED BY VISUAL INSPECTION OF THE ORIGINAL IBM CODING WHICH CAUSED FORTRAN ERRORS, THE MODIFIED CODING WHICH CORRECTED THE ERRORS, AND THE CDC CODING CORRESPONDING TO THE IBM MODS. THE CHANGES CORRECT THE PROBLEM IN THE MANNER THEY WERE INTENDED.

REPORTED BY .:	K.R.KATSMA (EI)	DATE: 05/23/86
	PROBLEM REPORT 310	
CORRECTED BY :	K.R.KATSMA	DATE: 05/27/86
VERIFIED BY :	L.R.FEINAUER (EI)	DATE: 07/29/86

\*\*\*\*\* MODIFICATION NUMBER 318 \*\*\*\*\*

ERROR DESCRIPTION:

THE NEW EDIT OF CONTROL SYSTEM INFORMATION (MODIFICATION NO. 312) HAS AN ERROR IN THE "SIGNAL REGION" EDIT ON IBM SYSTEMS. THE LINE



COUNTER TO SEPARATE SECTIONS OF THE EDIT IS IN ERROR.

# MODIFICATION DESCRIPTION:

SUBROUTINE INCNT2 WAS MODIFIED FOR PROPER STORAGE OF CONTROL INPUT REGION NUMBERS. THE REGION NUMBER TO BE EDITTED IN JVEDIT WAS NOT PROPERLY STORED IN SUBROUTINE INCNT2. THIS WAS DUE TO THE FACT THAT IBM STORES INTEGERS IN THE LOWER HALF OF A WORD. THEREFORE, THE WORD WHICH STORES THE REGION NUMBER WAS SHIFTED TO THE RIGHT TO STORE THE INTEGER IN THE BOTTOM OF THE WORD. THIS ERROR OCCURED ON IBM MACHINES ONLY.

SUBROUTINE JVEDIT WAS CHANGED TO GIVE PROPER SPACING AND PAGING WHEN EDITTING CONTROL INPUT DATA ACTUALLY BEING USED. THE INC2 VALUE TO BE EDITTED FOR CONTROL BLOCKS WAS ALSO MODIFIED.

THERE ARE NO INPUT OR MANUAL CHANGES AND THE DATA TAPE STRUCTURE WAS NOT CHANGED.

# MODELING ALTERNATIVES:

NONE.

# CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY RUNNING THE TTWOB SAMPLE PROBLEM ON THE IBM MACHINE. THE REGION NUMBERS FOR THIS PROBLEM WERE NOT EDITTED CORRECTLY WHEN USING MOD004D. THE MODIFICATION CORRECTED THE ERROR.

THE TTWOB SAMPLE PROBLEM WAS ALSO RUN ON CDC TO ENSURE THAT THE MODIFICATIONS WORKED CORRECTLY ON THAT MACHINE.

# VERIFICATION:

A FORTRAN LISTING OF THE MODIFICATION WAS VISUALLY VERIFIED TO TO BE CORRECT AND THE OUTPUT OF THE CHECKOUT RUNS WAS ALSO REVIEWED.

REPORTED BY :	J. H. MCFADDEN	(EI)	DATE: 07/27/86
	(SEE TROUBLE REPORT #312)		
CORRECTED BY :	B.E. GRIEBENOW	(EI)	DATE: 07/30/86
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 07/31/86

\*\*\*\*\* MODIFICATION NUMBER 319 \*\*\*\*\*

# ERROR DESCRIPTION:

THERE WERE SEVERAL MINOR CODE ERRORS IDENTIFIED IN THE DESIGN REVIEW OF THE REVISED CONTROL ROD MODEL. THIS MODEL WAS MODIFIED AND INCLUDED IN THE MOD004D UPDATE. CORRECT THOSE ERRORS WHICH ARE IN MOD004D.

# MODIFICATION DESCRIPTION:

A NEW CONTROL ROD MODEL WAS DEVELOPED FOR THE ONE-DIMENSIONAL NEUTRONICS MODEL IN RETRAN AND WAS THE SUBJECT OF A DESIGN REVIEW. THE FOLLOWING MODIFICATIONS RESOLVE SOME OF THE FINDINGS OF THAT REVIEW.

MODELING ALTERNATIVES:

NOT APPLICABLE

CHECK OUT:

SINCE THESE UPDATES ARE PRIMARILY "CLEANUP" THE CHECKOUT WAS MADE BY INSPECTION TO SEE THAT THE APPROPRIATE CARDS HAVE BEEN CHANGED.

VERIFICATION:

THE LISTING OF THE UPDATE INPUT AND CHANGES WAS REVIEWED AND THE FORTRAN LISTING OF THE MODIFIED SUBROUTINES WAS VISUALLY REVIEWED TO VERIFY THE CHANGES.

REPORTED BY :	G. C. GOSE	(EI)	DATE: 07/27/86
	(SEE TROUBLE REPORT #313)		
CORRECTED BY :	G. C. GOSE	(EI)	DATE: 07/29/86
VERIFIED BY :	J. A. MCCLURE	(EI)	DATE: 07/31/86

\*\*\*\*\* MODIFICATION NUMBER 320 \*\*\*\*\*

MODIFICATION REQUEST:

MODIFY THE RETRAN FILE DESCRIPTION CARDS FOR FILES 2, 12 AND 45 TO BE CONSISTENT WITH THE MOD004 VERSION OF THE CODE.

MODIFICATION DESCRIPTION:

SUBROUTINE RMAIN WAS MODIFIED TO INDICATE CHANGES IN COMDECKS. COMDECK FILES 2, 12, AND 45 HAD VARIABLES ADDED. THESE ADDED VARIABLES ARE DOCUMENTED IN RMAIN WITH THIS MODIFICATION.

THERE ARE NOW INPUT CHANGES OR DATA TAPE STRUCTURE CHANGES ASSOCIATED WITH THIS MODIFICATION. VOLUME 2 OF THE RETRAN-02 MANUAL SHOULD BE UPDATED TO INDICATE THE ADDED VARIABLES.

MODELING ALTERNATIVES:

NOT APPLICABLE.

CHECKOUT:

THE MODIFICATION WAS CHECKED OUT BY COMPARING THE MODIFIED LISTING OF SUBROUTINE RMAIN WITH A PREVIOUS VERSION.

VERIFICATION:

THE UPDATE LISTING AND A FORTRAN COMPILATION LISTING OF  
SUBROUTINE RMAIN WAS VISUALLY REVIEWED TO VERIFY THE  
CHANGES.

REQUESTED BY : J. H. MCFADDEN (EI) DATE: 07/31/86  
MODIFIED BY : B.E. GRIEBENOW (EI) DATE: 07/31/86  
VERIFIED BY : L.R. FEINAUER (EI) DATE: 07/31/86

\*\*\*\*\*  
\*\*\*\*\* MODIFICATION NUMBER 321 \*\*\*\*\*

ERROR DESCRIPTION:

PLOT DEBUG STATEMENTS ARE WRITTEN DURING RETRAN PLOT JOBS ON  
MOD004D EVEN IF DEBUGS ARE NOT REQUESTED.

MODIFICATION DESCRIPTION:

A VARIABLE WAS MISSPELLED IN SUBROUTINE PLOTR DURING THE MOD004D  
UPDATE. THIS ERROR WILL NOT AFFECT ANY RETRAN RESULTS OR PLOTS,  
THE MISSPELLED VARIABLE IS A LOGICAL FLAG FOR PLOT DEBUGS. THE  
VARIABLE SPELLING IS CORRECTED WITH THIS MODIFICATION.

THE DATA TAPE STRUCTURE WAS NOT CHANGED, THERE ARE NO INPUT OR  
MANUAL CHANGES

MODELING ALTERNATIVES:

NONE.

CHECK OUT:

THE MODIFICATION WAS CHECKED OUT BY RUNNING A PLOT JOB TO  
PLOT THE OUTPUT OF SAMPLE PROBLEM ONE.

VERIFICATION:

THE MODIFICATION WAS VERIFIED BY VISUAL INSPECTION OF THE  
ORIGINAL MOD004D CODING IN SUBROUTINE PLOTR AND THE MODIFIED  
CODING.

REPORTED BY : B.E. GRIEBENOW (EI) DATE: 08/05/86  
(SEE TROUBLE REPORT #314)  
CORRECTED BY : B.E. GRIEBENOW (EI) DATE: 08/07/86  
VERIFIED BY : M.P. PAULSEN (EI) DATE: 08/08/86

\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\* RETRAN CDC ENVIRONMENTAL LIBRARY MODIFICATIONS FOLLOW \*\*\*\*\*  
\*\*\*\*\*

\*\*\*\*\*  
\*\*\*\*\* MODIFICATION 11 IS IN UPDATE MOD26 \*\*\*\*\*

\*/ \*\*\*\*\*  
 \*/  
 \*/ \*\*\*\*\* MODIFICATION NUMBER 11 \*\*\*\*\*  
 \*/

\*/ ERROR DESCRIPTION:

\*/ DUMPS WITH AN ERROR NUMBER 16 FROM THE FTB PACKAGE WHEN TRYING TO  
 \*/ PLOT FULL 50 SEC. OF DATA FROM TAPE. FAILS TO ACHIEVE FIELD LENGTH  
 \*/ REDUCTION (SEE TROUBLE REPORT 241).  
 \*/

\*/ MODIFICATION DESCRIPTION:

\*/ THE ERROR CORRECTION IS IN SUBROUTINE REDUCE OF THE CDC ENVIRONMENTAL  
 \*/ LIBRARY ONLY. THE MODIFICATION CONSISTS OF ADDITIONAL CODING TO  
 \*/ PREVENT FTB 16 AND 47 ERRORS.  
 \*/

\*/ MODELING ALTERNATIVES:

\*/ NONE FOR CDC PLOT JOBS - INCREASE FIELD LENGTH FOR RETRAN RUNS ON CDC.  
 \*/ NOT A PROBLEM ON IBM SYSTEMS.  
 \*/

\*/ CHECK OUT:

\*/ A SAMPLE PROBLEM THAT ENCOUNTERED THE SAME ERROR AS REPORTED IN  
 \*/ TROUBLE REPORT WAS USED TO CHECK THE CORRECTIONS. THE DECK IS  
 \*/ IN FILE SCG>RET>QA>DECKS>PR241.CHECK.  
 \*/

\*/ VERIFICATION:

\*/ THE MODIFICATION WAS VISUALLY VERIFIED BY EXAMINING THE MODIFIED  
 \*/ CODING. THE MODIFICATION WAS VISUALLY VERIFIED TO CORRECT THE  
 \*/ ERROR IN THE CHECKOUT PROBLEM USED TO REPRODUCE THE REPORTED ERROR.  
 \*/

\*/ REPORTED BY : BOB JARVIS (HL&P) DATE: 04/25/84  
 \*/ CORRECTED BY : M.P. PAULSEN (EI) DATE: 07/23/84  
 \*/ VERIFIED BY : GREG RICE (EI) DATE: 04/01/85  
 \*/

\*/ \*\*\*\*\*  
 \*/

\*/ \*\*\*\*\*  
 \*/ MODIFICATION 12 IS IN UPDATE MOD27  
 \*/ \*\*\*\*\*  
 \*/

\*/ \*\*\*\*\* MODIFICATION NUMBER 12 \*\*\*\*\*  
 \*/

\*/ ERROR DESCRIPTION:

\*/ THE PLOTTER OPTION IN RETRAN CANNOT PRODUCE PLOTS WHERE THE USER HAS  
 \*/ ONE OR MORE Y-AXIS ON THE RIGHT OR WHERE THE FIRST Y-AXIS IS ON THE  
 \*/ RIGHT WHEN THERE IS MORE THAN ONE Y-AXIS ON THE SAME GRAPH.  
 \*/

\*/ ALSO, IF THE AXIS DIVISION IS  $0.8 * (10^{**N})$  AND IF N IS 0 OR LESS,  
 \*/ SOME INCORRECT ROUNDING OCCURS AND MAKES FOR A CONFUSING LABELING OF  
 \*/ EITHER AXIS.  
 \*/

\*/ MODIFICATION DESCRIPTION:

APPROPRIATE UPDATES ARE HEREIN INCLUDED TO REPAIR THE ABOVE ERRORS.

# MODELING ALTERNATIVES:

NOT APPLICABLE

# CHECK OUT:

THE DECK THAT ENCOUNTERED THE ERROR WAS USED TO CHECK THE ERROR CORRECTION.

# VERIFICATION:

THE MODIFICATION WAS VERIFIED BY VISUALLY OBSERVING THE ERRONEOUS OUTPUT, THE ORIGINAL AND MODIFIED CODING, AND THE CORRECT RESULTS OF THE CHECKOUT RUN.

REPORTED BY :	A.W. LAM	(CECO)	DATE: 09/10/85
CORRECTED BY :	A.W. LAM	(CECO)	DATE: 09/10/85
	S.W. JAMES	(EI)	DATE: 01/09/86
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 02/27/86

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 \*\*\*\*\*  
 MODIFICATION 13 IS IN UPDATE MOD28  
 \*\*\*\*\*  
 \*\*\*\*\*  
 \*\*\*\*\* MODIFICATION NUMBER 13 \*\*\*\*\*

# MODIFICATION REQUEST:

MODIFY THE LIBRARY AS NECESSARY FOR THE LIBRARY TO BE CONSISTENT WITH THE FTN5 COMPILED VERSION OF RETRAN-02. (SEE SOFTWARE REVISION NO. 314 FOR RETRAN-02)

# MODIFICATION DESCRIPTION:

THIS MODIFICATION ALLOWS THE USE OF THE FTN5 COMPILER ON CDC SYSTEMS WITH RETRAN-02. MODIFICATIONS TO THE LIBRARY INCLUDE ADDING SEPERATORS TO FORMAT STATEMENTS, CHANGING HOLERITH STRINGS TO QUOTED STRINGS, CHANGING DIMENSIONING OF DIMENSION STATEMENTS, AND CHANGING THE SPECIFICATION OF OCTAL NUMBERS IN DATA STATEMENTS.

THE PROGRAMMER'S MANUAL SHOULD BE REVISED TO ALLOW USE OF THE FTN5 COMPILER. THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO INPUT CHANGES.

# MODELING ALTERNATIVES:

NONE.

# CHECKOUT:

THE MODIFICATIONS WILL BE TESTED BY RUNNING THE TEN SAMPLE PROBLEMS, AS WELL AS SOME RESTART AND REEDIT PROBLEMS. THE MODIFICATION IS BASED ON COMPARISON OF MOD003 ANALYSES USING THE FTN5 COMPILER, WITH THE ORIGINAL MOD003 RELEASE SAMPLE PROBLEMS.



\*/ VERIFICATION:

\*/ THE MODIFICATIONS WERE VERIFIED BY COMPILING RETRAN-02 MOD003 WITH  
 \*/ THE CHANGES AND RUNNING THE TEN SAMPLE PROBLEMS. THE OUTPUT OF  
 \*/ THE SAMPLE PROBLEMS USING THE FTN5 COMPILER WAS THEN COMPARED TO  
 \*/ PREVIOUS RESULTS.

\*/ REQUESTED BY : JAMES MCFADDEN (EI) DATE: 04/23/86  
 \*/ MODIFIED BY : K.T. COBLE (EI) DATE: 02/27/86  
 \*/ M.P. PAULSEN (EI) 02/27/86  
 \*/ VERIFIED BY : K.T. COBLE (EI) DATE: 02/28/86

\*/ RETRAN IBM ENVIRONMENTAL LIBRARY MODIFICATIONS FOLLOW

\*/ MODIFICATIONS 14-15 ARE IN UPDATE MOD30

\*/ MODIFICATION NUMBER 14

\*/ ERROR DESCRIPTION:

\*/ THE CODE PRINTS ERROR MESSAGES HAVING TO DO WITH THE INPUT ON  
 \*/ 500000 AND 510000 CARDS WHEN DATA IS CONTINUED ON MORE THAN ONE  
 \*/ CARD. ( SEE TROUBLE REPORT NUMBER 211 )

\*/ MODIFICATION DESCRIPTION:

\*/ SUBROUTINE MODER IN THE IBM ENVIRONMENTAL LIBRARY WAS  
 \*/ MODIFIED TO CORRECT AN ERROR. A COUNTER WAS NOT CHECKED  
 \*/ CORRECTLY FOR THE NUMBER OF ITEMS ON THE CARD. THE DATA TAPE  
 \*/ STRUCTURE WAS NOT CHANGED. THERE WERE NO INPUT CHANGES REQUIRED.  
 \*/ THERE ARE NO MANUAL CHANGES NECESSARY.

\*/ MODELING ALTERNATIVES:

\*/ USE CONTINUATION CARDS RATHER THAN THE NEXT CARD SEQUENCE NUMBER

\*/ CHECK OUT:

\*/ THE CORRECTION WAS CHECKED OUT BY EXECUTING THE DECK  
 \*/ WHICH ORIGINALLY ENCOUNTERED THE PROBLEM.

\*/ VERIFICATION:

\*/ THE MODIFICATION WAS VERIFIED BY VISUALLY EXAMINING THE CODING CHANGE  
 \*/ AND COMPARING IT WITH THE CODING FOR THE SAME SUBROUTINE IN THE CDC  
 \*/ ENVIRONMENTAL LIBRARY.

\*/ REPORTED BY : D. A. TROTT (EI) DATE: 10/31/83  
 \*/ CORRECTED BY : D. A. TROTT (EI) DATE: 10/31/83  
 \*/ VERIFIED BY : M.P. PAULSEN (EI) DATE: 03/08/85

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 \*\*\*\*\* MODIFICATION NUMBER 15 \*\*\*\*\*

ERROR DESCRIPTION:

REEDIT OF A DATA TAPE CREATED DURING A RESTART FOB WILL ONLY EXECUTE WITH A MINOR EDIT FREQ. OF 1. ANY OTHER VALUE OF NMIN PRODUCES ERROR "UNABLE TO REACH DATA RECORD 'NMIN + 1'" (SEE TROUBLE REPORT 264).

MODIFICATION DESCRIPTION:

THE IBM BUFSKIP SUBROUTINE SEPARATES DATA RECORDS BY THE HOLLERITH FIELD 'DATA REC'. THIS SEPARATOR IS NORMALLY WRITTEN IN A SHORT RECORD FOR RETRAN JOBS. WHEN BUFSKIP IS SEARCHING FOR A DATA RECORD THE HOLLERITH FIELD 'DATA REC' IS USED TO LOCATE THE BEGINING OF OF NEW RECORDS. SINCE THE 'DATA REC' FIELD IS NORMALLY WRITTEN IN A SHORT RECORD, THE TEST ON MATCHING THE FIRST 8 BYTES OF A RECORD WITH 'DATA REC' IS ONLY PERFORMED IF THE RECORD IS SHORT. WHEN RESTART TAPES ARE COPIED DURING RESTART JOBS, THE DATA RECORD HEADER IS WRITTEN WITH SOME OF THE FOLLOWING RECORD AS A LARGER RECORD, THUS THE RECORD LENGTH TEST FAILS AND NO ATTEMPT IS MADE TO MATCH THE HEADER FIELD. THE CORRECTION IS TO DELETE THE RECORD LENGTH TEST AND CHECK ALL RECORDS FOR THE 'DATA REC' HEADER. THE SUBROUTINE MODIFIED WAS BUFSKIP, AN ENTRY POINT IN BUFOUT.

THE UPDATE WILL ALLOW PREVIOUSLY GENERATED TAPES TO BE REEDITED AND HAS NO EFFECT ON RESTART OF PLOT JOBS.

MODELING ALTERNATIVES:

REQUEST MINOR EDITS AT A FREQUENCY OF 1.

CHECK OUT:

A RESTART OF THE TTWOB SAMPLE PROBLEM WAS USED TO GENERATE A DATA TAPE AND THE REEDIT ERROR WAS DUPLICATED. THE ERROR CORRECTION WAS THEN MADE AND THE TTWOB REEDIT MADE WITH A MINOR EDIT FREQUENCY OF 2 (STARTED AT RECORD 1). THE SAME JOB WAS THEN RERUN WITH THE REEDIT STARTING AT RECORD 20.

VERIFICATION:

THE MODIFICATION WAS VISUALLY VERIFIED BY EXAMINING THE MODIFIED CODING AND BY VISUALLY EXAMINING THE RESULTS FROM THE CORRECTION RUNS MADE USING THE CORRECTION. (THE COMMENTS WERE OMITTED FROM THE FINAL UPDATE).

REPORTED BY	: BILL BECK	(EI)	DATE: 09/17/84
CORRECTED BY	: J.A. MCCLURE	(EI)	DATE: 12/12/84
VERIFIED BY	: M.P. PAULSEN	(EI)	DATE: 03/13/85

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MODIFICATION 16 IS IN UPDATE MOD31

\*\*\*\*\* MODIFICATION NUMBER 16 \*\*\*\*\*

ERROR DESCRIPTION:

THE PLOTTER OPTION IN RETRAN CANNOT PRODUCE PLOTS WHERE THE USER HAS ONE OR MORE Y-AXIS ON THE RIGHT OR WHERE THE FIRST Y-AXIS IS ON THE RIGHT WHEN THERE IS MORE THAN ONE Y-AXIS ON THE SAME GRAPH.

ALSO, IF THE AXIS DIVISION IS  $0.8 * (10^{**N})$  AND IF N IS 0 OR LESS, SOME INCORRECT ROUNDING OCCURS AND MAKES FOR A CONFUSING LABELING OF EITHER AXIS (SEE TROUBLE REPORT 297).

MODIFICATION DESCRIPTION:

SUBROUTINES PLOTMC AND XPLOTA WERE MODIFIED TO CORRECT THE REPORTED ERRORS. THE CORRECTIONS SUGGESTED BY A.W. LAM OF COMMONWEALTH ED. WERE MADE.

MODELING ALTERNATIVES:

PLOT ALL AXES ON THE LEFT.  
REQUEST AN INCREMENT OTHER THAN 0.8.

CHECK OUT:

THE DECK THAT ENCOUNTERED THE ERROR WAS USED TO CHECK THE ERROR CORRECTION.

VERIFICATION:

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REPORTED BY :	A.W. LAM,	(CECO)	DATE: 09/10/85
CORRECTED BY :	A.W. LAM,	(CECO)	DATE: 09/10/85
VERIFIED BY :	M.P. PAULSEN	(EI)	DATE: 02/27/86

MODIFICATION 17 IS IN UPDATE MOD32

\*\*\*\*\* MODIFICATION NUMBER 17 \*\*\*\*\*

MODIFICATION REQUEST:

MODIFY THE LIBRARY AS NECESSARY FORM THE LIBRARY TO BE CONSISTENT WITH THE VS COMPILED VERSION OF RETRAN-02 (SEE SOFTWARE REVISION NO. 314 FOR RETRAN-02).

MODIFICATION DESCRIPTION:

\*/ THIS MODIFICATION ALLOWS THE USE OF THE VS COMPILER ON IBM SYSTEMS  
\*/ WITH RETRAN-02. MODIFICATIONS TO THE CODE INCLUDE ADDING SEPERATORS  
\*/ TO FORMAT STATEMENTS, CHANGING DIMENSIONING OF DIMENSION STATEMENTS,  
\*/ AND DELETING CALLS TO INFILQ.

\*/ THE PROGRAMMER'S MANUAL SHOULD BE REVISED TO ALLOW USE OF THE VS  
\*/ COMPILER. THE DATA TAPE STRUCTURE WAS NOT CHANGED. THERE ARE NO  
\*/ INPUT CHANGES.

\*/ MODELING ALTERNATIVES:

\*/ NONE.

\*/ CHECKOUT:

\*/ THE MODIFICATIONS WILL BE TESTED BY RUNNING THE TEN SAMPLE PROBLEMS,  
\*/ AS WELL AS SOME RESTART AND REEDIT PROBLEMS. THE MODIFICATION IS  
\*/ BASED ON COMPARISON OF MOD003 ANALYSES USING THE VS COMPILER, WITH  
\*/ THE ORIGINAL MOD003 RELEASE SAMPLE PROBLEMS.

\*/ VERIFICATION:

\*/ THE MODIFICATIONS WERE VERIFIED BY COMPILING RETRAN-02 MOD003 WITH  
\*/ THE CHANGES AND RUNNING THE TEN SAMPLE PROBLEMS. THE OUTPUT OF  
\*/ THE SAMPLE PROBLEMS USING THE VS COMPILER WAS THEN COMPARE TO  
\*/ PREVIOUS RESULTS.

\*/ REQUESTED BY : JAMES MCFADDEN (EI) DATE: 04/23/86  
\*/ MODIFIED BY : M.P. PAULSEN (EI) 02/27/86  
\*/ L.R. FEINAUER (EI) 03/28/86  
\*/ VERIFIED BY : L.R. FIENAUER (EI) 04/14/86

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