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The RETRAN Newsletter

June, 1997

Summary of Activities

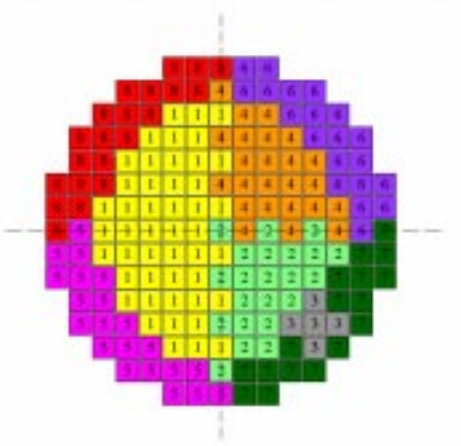
This issue of the RETRAN Newsletter contains information on the Engineering Code Pre-Processor, interesting articles from code users, and a survey asking for your opinion on the newsletter. Your contributions are greatly appreciated. We, EPRI and CSA, encourage everyone to participate in this newsletter.

Previous issues of the RETRAN Newsletter are available from the RETRAN Web Pages at http://www.csai.com/retran.

In This Issue . . .

GPU Nuclear's Plans for Uprate of TMI-1

A. Irani and N. Trikouros, GPU Nuclear



GPUN is planning a power uprate of 108% for TMI-1. The uprate project will be in two phases: Phase I will request an initial uprate of 2% which will raise the power level to 2620 MWt from 2568 MWt. A Technical Specification change request submittal is planned for 1998. Phase II will be for an additional increase of 6% power to bring the power level to 2772 MWt.

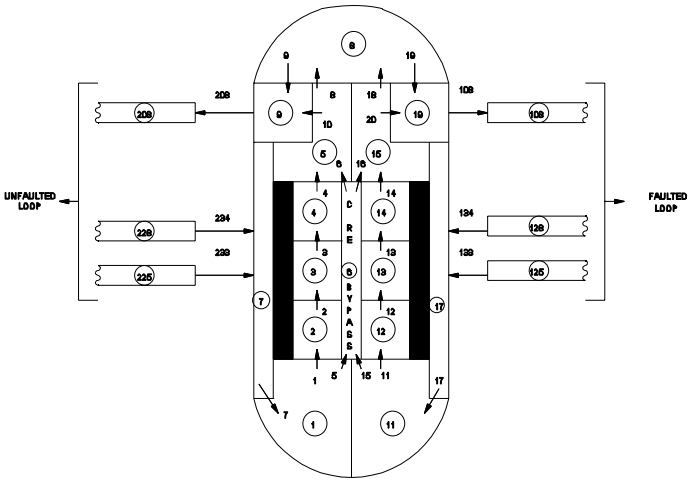
The power uprate requires a reanalysis of all of the Safety Analyses in Chapter 14 of the TMI-1 FSAR. These are being performed by GPUN (except LOCA) using the RETRAN-02 and VIPRE codes. GPU Nuclear recently received NRC approval for their reload topical reports for transient analysis using the RETRAN-02 code and core thermal-hydraulic methodology using the VIPRE-01 code. All the FSAR transients which are analyzed with RETRAN-02 are also being design verified using RETRAN-3D in the RETRAN-02 mode.

For the Phase II power uprate to 2772 MWt, the Main Steam Line Break (MSLB) and Rod Ejection Accidents (REA) are being performed using RETRAN-3D. In addition to RETRAN-3D, these two transients are also being analyzed with the TRAC-PF1/NEM code. A code-to-code comparison lends validity to the results and provides a better understanding of the model sensitivities to various parameters. GPUN intends on submitting a RETRAN-3D methods topical for NRC approval

GPU Nuclear's Plans for Uprate of TMI-1 (Cont'd)

in conjunction with application topicals for the REA and MSLB. In a meeting between the NRC and GPUN, the NRC indicated that due to manpower limitations, they would give priority to generic reviews, and anticipate an 18-month review period. To facilitate a generic review of RETRAN-3D, several utilities have sent letters of support, which will be submitted to the NRC.

A strategy to get NRC approval on an accelerated schedule for limited applications of RETRAN-3D is being contemplated by GPUN and EPRI. For example, the submittal could request the NRC to extend the RETRAN-02 Safety Evaluation Report (SER) to RETRAN-3D when it is used with the same options as RETRAN-02. This has been demonstrated by close comparison of results for a variety of transients and would require a minimal review effort. The NRC could also be requested to allow RETRAN-3D to be used for the REA accident analysis, since the 3D kinetics are provided by ARROTTA which has been previously approved by the NRC for a REA event. Finally, the NRC would be requested to provide an SER for all the new models in RETRAN-3D.



UITESA Activities with RETRAN

P. Mata, UITESA

The UITESA activities with RETRAN during this year cover several topics.

Licensing analysis: The Cofrentes licensing reload transient methodology based in RETRAN-3D is being applied to perform the licensing analyses for the Cofrentes Reload #11.

Fuel Bid Evaluation: RETRAN-3D is being used to evaluate the performance of the different fuel types to be loaded in the Cofrentes Reload #12.

Stability analysis: The definition of the stability region boundaries for Cofrentes is being performed with the RETRAN-3D. The analysis includes the benchmarking of the model against vendor data and the application to a specific Cofrentes cycle.

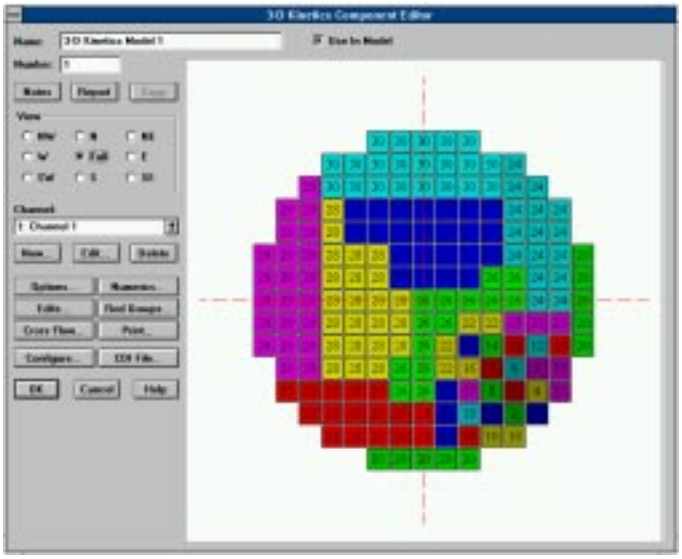
Model development: A RETRAN input model is being developed for CN Trillo (KWU type reactor).

Pre-Processor Converts RETRAN-02 Input to RETRAN-3D

R. Stewart, CSA

The most recent prerelease version of EPRI's Engineering Code Pre-Processor (ECPP) application includes a number of capabilities that have significant potential to increase the productivity of RETRAN modelers. With the newly-implemented capability to automate the conversion of RETRAN-02 models to work with RETRAN-3D, the ECPP addresses one of the more time-consuming tasks facing users going to RETRAN-3D. This capability eliminates the need for the RETRAN user to examine each line of input to determine which of the fields on the various input records require modification in order to function with RETRAN-3D.

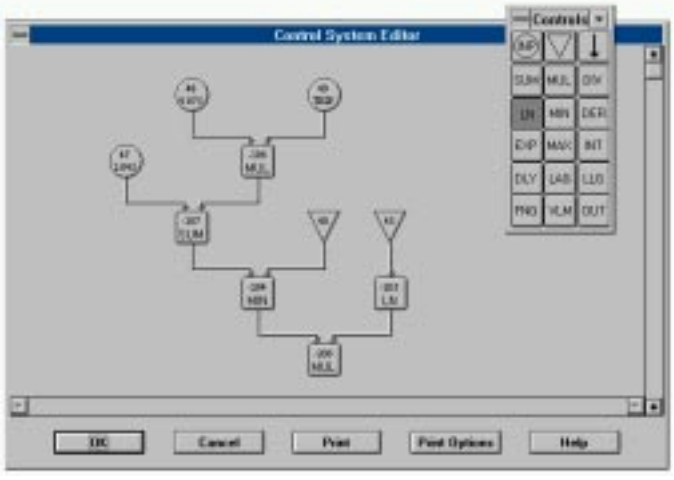
The ECPP attempts to maintain all of the modeler's choices, mapping RETRAN-02 selections to their RETRAN-3D counterparts, generating warnings for obsolete or questionable modeling options it encounters, and handling all of the underlying changes in the input formatting required for RETRAN-3D. The end result of the conversion effort includes a RETRAN-3D model and a textual report denoting any items encountered in the conversion process that may warrant the user's attention. Conversion (including steady-state initialization) of a typical 3,000- to 4,000-line RETRAN-02 model can be accomplished in a matter of minutes.



The ECPP's 3-D Kinetics Editor

Other highlights of the ECPP's growing list of capabilities include

- support for graphical construction of control systems,
- the ability to generate input for RETRAN's new three-dimensional kinetics model,
- support for generation of change decks, and
- support for user input in either British or SI engineering units.



The ECPP's Control System Editor

The ECPP is a Microsoft Windows-hosted application designed to aid in the maintenance and creation of input models for EPRI's RETRAN family of engineering codes. Although currently a Windows 3.1x application, work is in progress to provide a Windows NT/95 version of the application in the near future.

Anyone interested in the ECPP application should contact Mr. Lance Agee of EPRI (lagee@epri.com) or Ron Stewart of CSA (ros@csai.com). Information about the ECPP is also available on CSA's Web site (visit http://www.csai.com/ecpp/). Evaluation versions of the ECPP application are available upon request.

Tell Us What You Think About the RETRAN Newsletter

We are pleased to provide you with issues of the RETRAN Newsletter. We hope that you will take a few minutes to help us keep the newsletter responsive to your needs. We will publish the results in a future issue.

Please respond by mail to:

Pam Richardson
Computer Simulation & Analysis, Inc.
P. O. Box 51596
Idaho Falls, ID 83405

or by email to pam@csai.com.

1. What is your overall reaction to the newsletter and its content?

   ☐ I think it is informative and worthwhile reading.
   ☐ I am indifferent to the newsletter.

2. What about style and readability?

   ☐ It is very easy to read.
   ☐ It is fairly easy to read.
   ☐ It is hard to read.

3. What do you think of the design?

   ☐ I find it appealing.
   ☐ I do not like it.

4. What kind of articles would you like to read in the newsletter?

   ☐ Technical
   ☐ News
   ☐ Help

5. Would you prefer to receive your newsletter online?

   ☐ Yes
   ☐ No

(over)

Tell Us What You Think About the RETRAN Newsletter (Cont'd)

6. Other comments

_____

_____

_____

7. Will you contribute a summary for the September and/or December Newsletters?

September - Due September 15	☐ Yes	☐ No
December - Due December 15	☐ Yes	☐ No

8. Who in your organization should receive a copy of the newsletter? How would you like it distributed?

_____

_____

Computer Simulation & Analysis, Inc.
P. O. Box 51596
Idaho Falls, ID 83405

ATTN: Pam Richardson

Meeting for RETRAN and VIPRE Groups

The next meetings of the RETRAN and VIPRE User Groups will be held October 21-23, 1997 in Charlotte, North Carolina. Duke Energy Corporation (formerly Duke Power Company) is hosting these meetings this year.

Presentations will be made by code users as well as EPRI and the maintenance contractors, CSA (RETRAN) and Battelle Northwest Labs (VIPRE). Users are requested to prepare brief presentations summarizing their current RETRAN and VIPRE activities. Technical sessions with presentations on specific modeling applications are also planned, and users are requested to contribute to these sessions as well.

The meeting will be held at the Radison Plaza Hotel in Charlotte, NC. The room rate of $109 per night is available until September 20, ask for the EPRI/Duke Energy RETRAN Meeting. Additional information will be sent to members of the RETRAN and VIPRE Maintenance Groups in July. This information will also be placed on the RETRAN web page when it is available. If you wish to attend the meeting and your organization is not a member of the Maintenance Group, please contact Lance Agee, EPRI, to discuss your participation.

Ninth International RETRAN Meeting Scheduled

The Ninth International RETRAN Meeting has been scheduled for June 1998. It will be held in Monterey, California. The "Call for Papers" for this meeting will be made in September, 1997, and will be mailed to all organizations using the RETRAN computer programs. Additional information on the meeting will be placed on the RETRAN web site as it becomes available.

For those not familiar with the International Meeting format, abstracts of proposed papers are submitted for review by a technical program committee. Those selected are then notified and are required to bring the completed paper to the meeting in printed and electronic format. Abstracts of selected papers are printed and distributed to meeting participants prior to the meeting.

RETRAN-3D Design Review Report Available on Web

The main sections of the Summary Report for the RETRAN-3D Design Review are now available for reading from the RETRAN web site. This is an "uncontrolled" version of the actual report, and does not include the details associated with the review from the report appendices. Those wishing to receive a complete copy of the report may request one from Lance Agee, EPRI, or Pam Richardson, CSA. You will be sent an "information only" copy unless you specifically request to receive a "controlled" copy.

Summary of RETRAN-02 Trouble Reports

The following is a summary of RETRAN-02 Trouble Report/Code Maintenance Activity.

Unresolved Trouble Reports

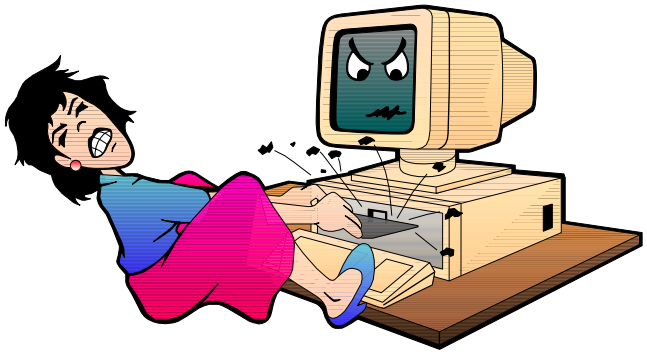
- 1 From MOD001
- 5 From MOD002
- 4 From MOD003
- 3 From MOD004
- 8 From MOD005

A list of trouble reports and the status can be obtained directly from the EPSC.

Additional information is available from the RETRAN-02 Trouble Report Page at http://www.csai.com/retran/r02trpt/index.html.

NO.	TROUBLE REPORT TYPE OF PROBLEM	CORRECTION NO.	IDENT	COMMENTS
1	Error 209 in TEMZ	***	*******	MOD001 Error
61	Delta T for Conductor with TDV	***	*******	Need Input Deck
121	OTSG Low Power Initialization	***	*******	
139	Failed Using Large Time Step	***	*******	Need Input Deck
140	Spurious Trips on High Level	***	*******	Need Input Deck
177	Overflow in WAT9	***	*******	Need Input Deck
209	Pump Coast Down Rates	***	*******	Need Correct Deck
272	Junction Properties at Break	***	*******	Need Input Deck
317	Junction Property Error	***	*******	
334	Time-Dep. Volume Input	***	*******	
342	Control Block Output near Zero	***	*******	Cannot Reproduce Error
354	Large Step Change in PHIR	***	*******	
366	Mixture/Liquid Level Difference	***	*******	Need Input Deck
376	Control Reactivity, No Motion	***	*******	
394	Anomalous Heat Trans. Behavior	***	*******	
408	OTSG Heat Transfer Problems	***	*******	
413	Incorrect Vsn No. in IBM Output	***	*******	Cannot Reproduce Error
436	Prandtl Number is Discontinuous	405	MOD005P3	
437	Heat Transfer Logic/CHF	-----	----------	Not a Code Error
438	Restart Failure/Pipe Transport	407	MOD005P3	
439	Decay Heat Input	***	*******	
440	Kinetic Energy/Time Dep Area	***	*******	
441	Anomalous Power Increase	-----	----------	Not a Code Error

Summary of RETRAN-3D Code Trouble Reports



A total of 129 trouble reports had been filed as of May 31, 1997. Of these, 105 reports have been resolved, while 24 remain unresolved. A summary of the unresolved trouble reports is shown below. Additional information for RETRAN-3D trouble reports is available at http://www.csai.com/retran/r3dtrpt/index.html.

TROUBLE REPORT NO.	TYPE OF PROBLEM	CORRECTION NO.	IDENT	COMMENTS
7	Steam separator model fails	***	*******	
30	2-loop Oconee w/5-eq. fails in steady state	***	*******	
39	Time-step error; pressure is 5997 psia	***	*******	
40	Results do not agree with data	***	*******	
41	Anomalous downcomer level	***	*******	
43	Steady-state convergence error	***	*******	
45	Restart incorrect transient values	***	*******	
47	Standard Problem One difference	***	*******	
48	Steady state fails after 6 iterations	***	*******	
		006	MOD001g	(partial fix)
51	Pressure search failure for two-phase MOC	***	*******	
52	MOC does not return to the initial temp.	***	*******	
54	MOC solution; no null transient for two-phase	***	*******	
60	Anomalous countercurrent flooding	***	*******	
116	Fails in steady-state initialization	***	*******	
119	SS fails to converge for some cases (algebraic)	***	*******	
121	Calculation failure on second time step	***	*******	
122	Problems with EOS convergence	***	*******	
*123	Sum of flows do not agree	***	*******	
*124	SS init. does not converge	***	*******	
*125	Failure due to floating point exception	***	*******	
*126	Alternative cross section input format	***	*******	
*127	Lack of convergence error	***	*******	
*128	Lower index out of range for pressure	***	*******	
*129	Code forces input on single card	***	*******	

RETRAN-3D Available for Windows NT

A prerelease version of RETRAN-3D for use on Windows NT is now available to members of the RETRAN Maintenance Group. This version is based on the MOD002.0 release, and includes several modifications required for the port to Windows NT. This version is available for testing at this time, and is not distributed for applications involving a QA version. To obtain a copy of the NT version contact Lance Agee (lagee@epri.com) or Mark Paulsen (mp-csa@csai.com).

Hurray! New RETRAN Graduates!

Two RETRAN training sessions were held at CSA's office in Idaho Falls during June. A basic RETRAN training session was held during the week of June 16, followed by an advanced RETRAN training session the next week.

The basic training session lectures covered the theoretical basis of the RETRAN code including the balance equations, constitutive, and component models. Other topics included the selection of input options, common modeling practices, the interpretation of results, and common pitfalls and their resolution. Part of each afternoon was devoted to working sessions where the attendees prepared input for sample problems designed to illustrate material covered in the previous lectures.

The lectures also presented comparisons of the RETRAN-02 and RETRAN-3D codes and the improved analysis capability of RETRAN-3D. Attendees were also given the opportunity to use the RETRAN input preprocessor and the PEGASYS plotting software during the problem sessions.

Congratulations to the following participants.

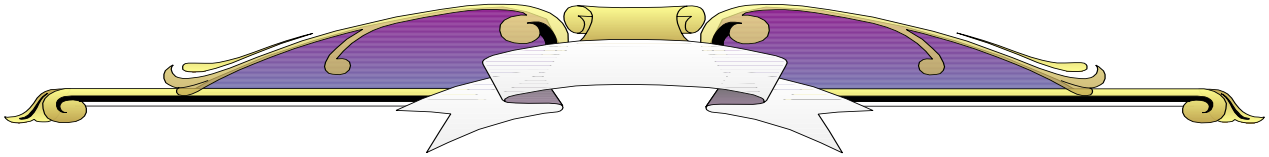
Wilford Stevenson, Commonwealth Edison
Laercio Lucena Martins, Furnas
Jan-Ru Tang, Institute of Nuclear Energy Research
Yasuharu Kawabe, Institute of Nuclear Safety System, Inc.
Dong Hyuk Lee, Korea Electric Power Research Institute
Kwangho Lee, Korea Electric Power Research Institute
Phyllis Clark, Public Service Electric & Gas
Jennifer Furl, Public Service Electric & Gas
Glenn Schwartz, Public Service Electric & Gas
Marcio Poubel Lima, Furnas/FJB
Linda Woosley, Washington Public Power Supply System

Lectures for the advanced RETRAN training session were designed for experienced users and provided information about advanced modeling methods that were beyond the scope of the basic course. The new modeling capabilities of the RETRAN-3D code were presented, including the revised balance equation set, improved solution methods, and new models. Modeling recommendations were discussed for both BWR and PWR applications. These included implications arising from the RETRAN-02 SER/TER and RETRAN-3D activities that have addressed specified SER/TER limitations. The final day of the session was devoted to the theory, use, and qualification of the multidimensional kinetics model in RETRAN-3D.

Each afternoon, participants were able to run their own plant models using RETRAN-3D, and many used the RETRAN input preprocessor to convert existing RETRAN-02 input decks to RETRAN-3D. During the afternoon work sessions, individualized consultation was provided by CSA staff members.

The following participants are congratulated for their successful completion of the session.

Hurray! New RETRAN Graduates! (Cont'd)



Laercio Lucena Martins, Furnas
Roger Boyer, Houston Lighting & Power
Mike Futschik, Houston Lighting & Power
Shih-Fang Huang, Houston Lighting & Power
Mike Wigginton, Houston Lighting & Power
Toshiya Maeda, IEA of Japan
Jan-Ru Tang, Institute of Nuclear Energy Research
Yasuharu Kawabe, Institute of Nuclear Safety System, Inc.
Ricardo Villegas, Instituto de Investigaciones Electricas
Kyungdoo Kim, Korea Atomic Energy Research Institute
Dong Hyuk Lee, Korea Electric Power Research Institute
Kwangho Lee, Korea Electric Power Research Institute
Daniel Maier, Paul Scherrer Institute
John Geosits, Pennsylvania Power & Light
Rafael de la Fuente, UITESA
James Miller, Virginia Power
Pete Kennamore, Wolf Creek Nuclear Operating Corp.

About This Newsletter

RETRAN Maintenance Program

The RETRAN Maintenance Program is part of a program undertaken by EPRI to provide for the support of the software developed in the Nuclear Power Division. The main features of the Subscription Service include:

- the code maintenance activities for reporting and resolving possible code errors,
- providing information to users through the User Group Meetings and this newsletter, and
- preparing new versions of RETRAN.

The RETRAN Maintenance Program now has 31 organizations participating in the program, including 23 member utilities, 5 organizations from outside of the U.S., and 3 nonmember utilities from the U.S. A Steering Committee, composed of representatives from the participating organizations, advises EPRI on various activities including possible enhancements for the code and the scheduling of future code releases. Information regarding the Maintenance Program can be obtained from

Lance Agee
Electric Power Research Institute
P. O. Box 10412
Palo Alto, CA 94303
lagee@epri.com or (415) 855-2106

Newsletter Contributions

The RETRAN Newsletter is published for members of the Subscription Service program. We want to use the newsletter as a means of communication, not only from EPRI to the code users, but also between code users. If this concept is to be successful, contributions are needed from the code users. The next newsletter is scheduled for September 1997 and we would like to include a brief summary of your RETRAN activities. Please provide your contribution to CSA, P. O. Box 51596, Idaho Falls, ID 83405, or to the E-mail addresses below by September 1, 1997.

Contributors will receive a RETRAN mouse pad. We are looking forward to hearing from all RETRAN licensees.

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Garry Gose	gag@csai.com
Pam Richardson	pam@csai.com

The RETRAN Web Page is located at http://www.csai.com/retran/index.html.