

August 19, 2002

MEMORANDUM TO: Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

FROM: Ashok C. Thadani, Director Original signed by A. Thadani
Office of Nuclear Regulatory Research

SUBJECT: REQUEST FOR DEVELOPMENT OF ADVANCED BWR FUEL
CHANNEL MODELS IN TRAC-M CODE

The purpose of this memorandum is to inform you of the Office of Nuclear Regulatory Research's plans for development of advanced BWR fuel channel models in the TRAC-M code. Consistent with the requests in Reference 1, RES will:

1. Modify the CHAN component to allow for the inclusion of both water rods and part length fuel rods and update the legacy TRAC-BF1 input processor accordingly. Implement a suitable non-proprietary Minimum Critical Power Ratio correlation. Make necessary modifications to the ASCII and XTV output packages and restart capability for this revised CHAN component.
2. Develop a generic radiation view factor and beam length calculation package which can be applied to model GE-9 through GE-14 fuels and other existing ABB and Framatome BWR fuels. Implement the package into the TRAC-M input processor so that the code can automatically calculate the view factors and beam lengths for a given fuel pin/water rods layout.
3. Modify the kinetics feedback mechanism to take into account the water rods and part length fuel rods, including necessary changes to the direct gamma heating and kinetics power mapping.
4. Implement the ABB and Framatome fuel models into the input process and enable the radiation heat transfer package to calculate the view factors with central moderator region.

To accelerate availability of TRAC-M code versions with the requested modifications, a developmental version of the code will be provided for each of the four items given above. Though RES cannot meet the requested completion dates, a schedule for the release of these developmental versions was worked out in consultation with your staff. This schedule requires that developmental versions be provided in advance of the completion of the associated code documentation and in advance of the formal implementation of the updates in TRAC-M. The schedule for each of the four items, with one date for availability of the code version and another for complete SQA documentation, is as follows:

| | <u>Code Version</u> | <u>Documentation</u> |
|----------------------------------|---------------------|----------------------|
| 1. CHAN component modifications: | 11/30/2002 | 3/31/2003 |

- | | | | |
|----|---------------------------------|-----------|-----------|
| 2. | Generic radiation view factors: | 1/31/2003 | 5/31/2003 |
| 3. | Kinetics feedback: | 2/28/2003 | 6/30/2003 |
| 4. | ABB and Framatome Fuel: | 3/31/2003 | 7/31/2003 |

In addition to the above listed items, based on discussions with your staff, RES will be improving the ability of TRAC-M to run plant models that were obtained by converting TRAC-G input decks to the TRAC-BF1 format. These improvements will be completed by 12/31/2002. Finally, in support of the ESBWR effort, RES is initiating a program to begin TRAC-M assessment of PUMA data and is developing plans to upgrade constitutive models that prove deficient.

REFERENCE

[1] Memorandum from S.J. Collins, Director, NRR to A.C. Thadani, Director, RES, "User Need Request- Development of Advanced BWR Fuel Channel Models in TRAC-M Code," ML021890690, July 2002.

- 2. Generic radiation view factors: 1/31/2003 5/31/2003
- 3. Kinetics feedback: 2/28/2003 6/30/2003
- 4. ABB and Framatome Fuel: 3/31/2003 7/31/2003

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