Three Mile Island - 2 Technical Support

On-Call Technical Assistance

L. C. Oakes, et. al.

#### Problem:

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Provide on-call expert technical assistance to diagnose problems and lend advice as information becomes available from the TMI site. Principal areas of concern are instrumentation and control, thermohydraulics, noise diagnostics, reactor systems and neutronics.

### Description of Work Performed:

Calculations, investigations, and experiments with subsequent recommendations were made in the following areas:

- 1. On-site team performing noise diagnostics and other measurements.
- Study to predict or explain the pressure pulse response observed on the primary system pressure sensors.
- 3. Calculations to examine adequacy of natural convection for core cooling.
- Evaluation of available data to determine if boiling is occuring in the core.
- Search for substitute methods for measuring pressurizer level, should all existing sensors fail.
- Evaluate failure modes and predicted radiation life of pressurizer level sensors.
- Evaluate failu. modes of core thermocouples to help establish validity of core temperature measurements.
- Confirm and evaluate sequence of events to predict probable extent of damage.

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- 9. Evaluate feasability of using a Resistance-Temperature Device (RTD) as a level probe in the pressurizer.
- Examine failure modes of Rhodium self-rowered neutron detectors to explain anomalous readings.
- Evaluate dynamic hydraulic conditions at the pressurizer differential pressure cells to find explanation for unexpected behavior.
- 12. Calculate the potential for cooling the core by flooding the outside of the reactor vessel if natural convection cannot be established.
- 15. Evaluate or propose ways in which noise analysis might be used to infer water level in the reactor vessel.
- Propose methods for deriving a direct readout of subcooling for display to operators.
- Explore what can be learned about thermal-hydraulics from in-core neutron detectors. Eg. water level, boiling, pressure, etc.
- 16. Evaluate implications and probable causes of high count rates on startup neutron detectors. Determine if related to reactivity in the core.
- 17. Participate in boiling tests at the Blowdown Heat Transfer experiment to acquire baseline data for determination of boiling at TMI.
- Provide on-site assistance in rigging substitute pressurizer level measurements with RTD or pressurizer heaters.

Work Requested By:

NRC.

### Results Report ! To:

NRC at TMI and Bethesda; summary reports have been prepared for individual tasks.

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### Work Performed By:

J. L. Anderson S. J. Ball R. S. Booth R. M. Carroll F. H. Clark M. H. Fontana D. N. Fry M. B. Herskovitz R. C. Kryter J. T. Mihalczo J. E. Mott (TEC) L. C. Oakes P. J. Otaduy J. R. Penland (SAI) J. C. Robinson (TEC) R. L. Shepard W. H. Sides, Jr. C. M. Smith R. S. Stone G. L. Zigler (SAI) R. E. Hedrick (SAI)

Estimated Cost:

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