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**The EBR-II Shutdown Heat Removal Testing
Program Results and Plans***

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by

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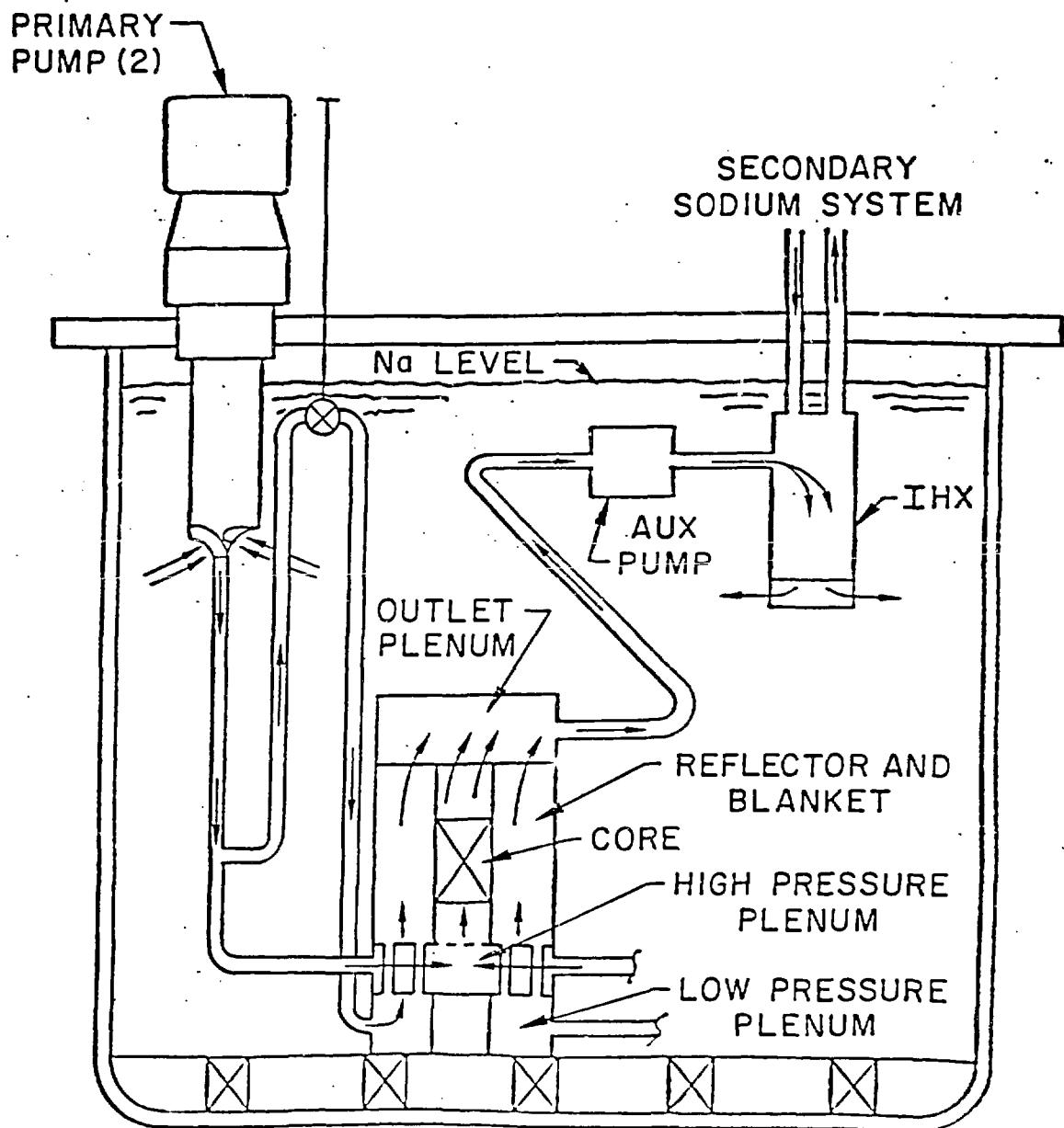
EBR-II SHRT PROGRAM

STATEMENT OF WORK

INVESTIGATE, WITH TESTS AND ANALYSIS, THE CAPABILITY OF LMR'S TO PASSIVELY REMOVE DECAY HEAT (VIA NATURAL CIRCULATION) AND TO PASSIVELY SHUT DOWN (WITHOUT SCRAM) FOR A LOSS OF FLOW OR LOSS OF HEAT SINK ACCIDENT.

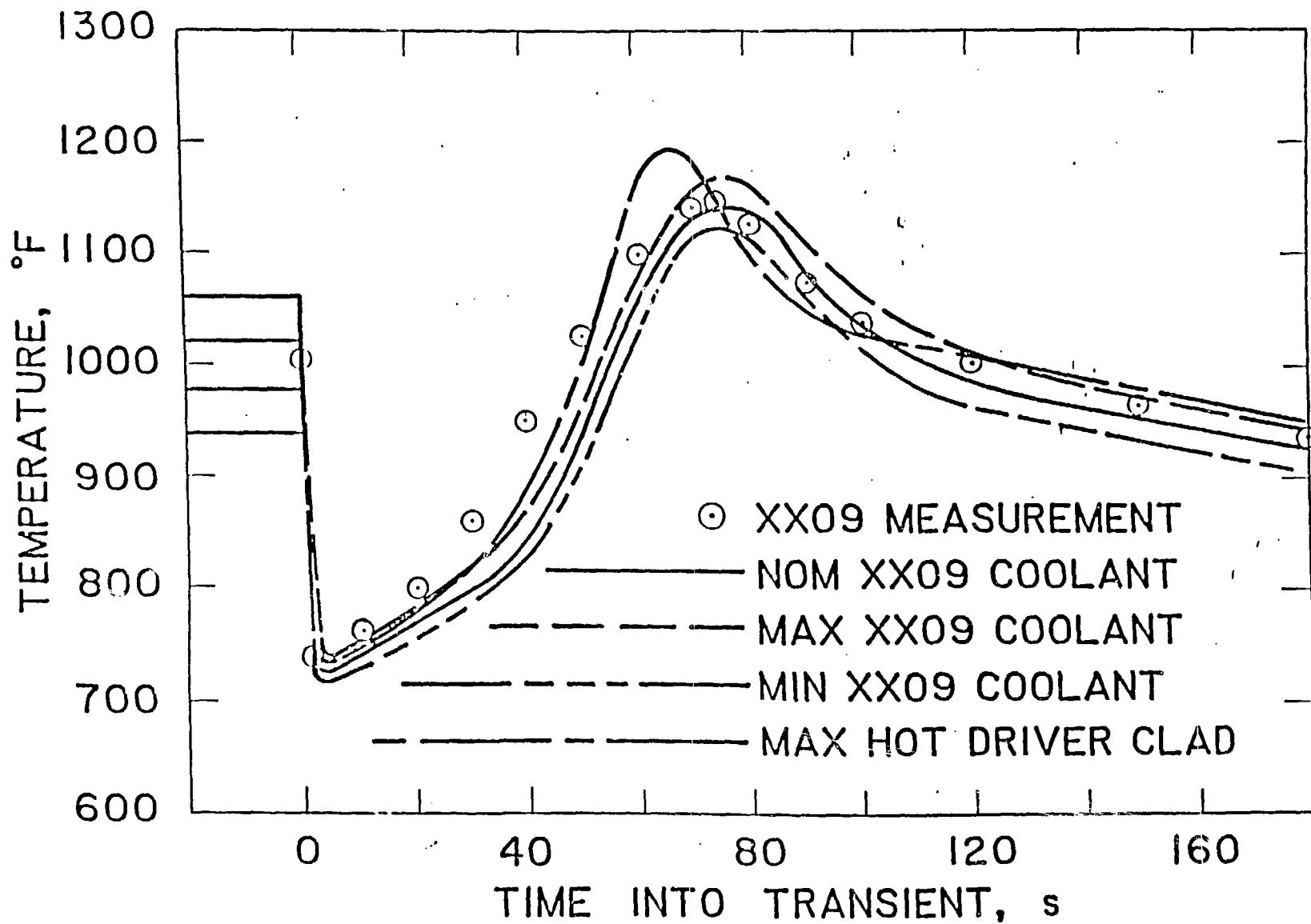
SPECIFICALLY THE OBJECTIVES ARE TO:

- DEMONSTRATE PASSIVE DECAY HEAT REMOVAL BY NATURAL CIRCULATION
- DEMONSTRATE PASSIVE SHUTDOWN FOR LOSS OF FLOW ACCIDENTS
- DEMONSTRATE PASSIVE SHUTDOWN FOR LOSS OF HEAT SINK ACCIDENTS
- PROVIDE INFORMATION TRANSFER:
 - BENCHMARK DATA FOR CODE VALIDATION
 - GUIDANCE IN DESIGN OF REACTOR AND PLANT SYSTEMS



NATURAL CIRCULATION TESTS

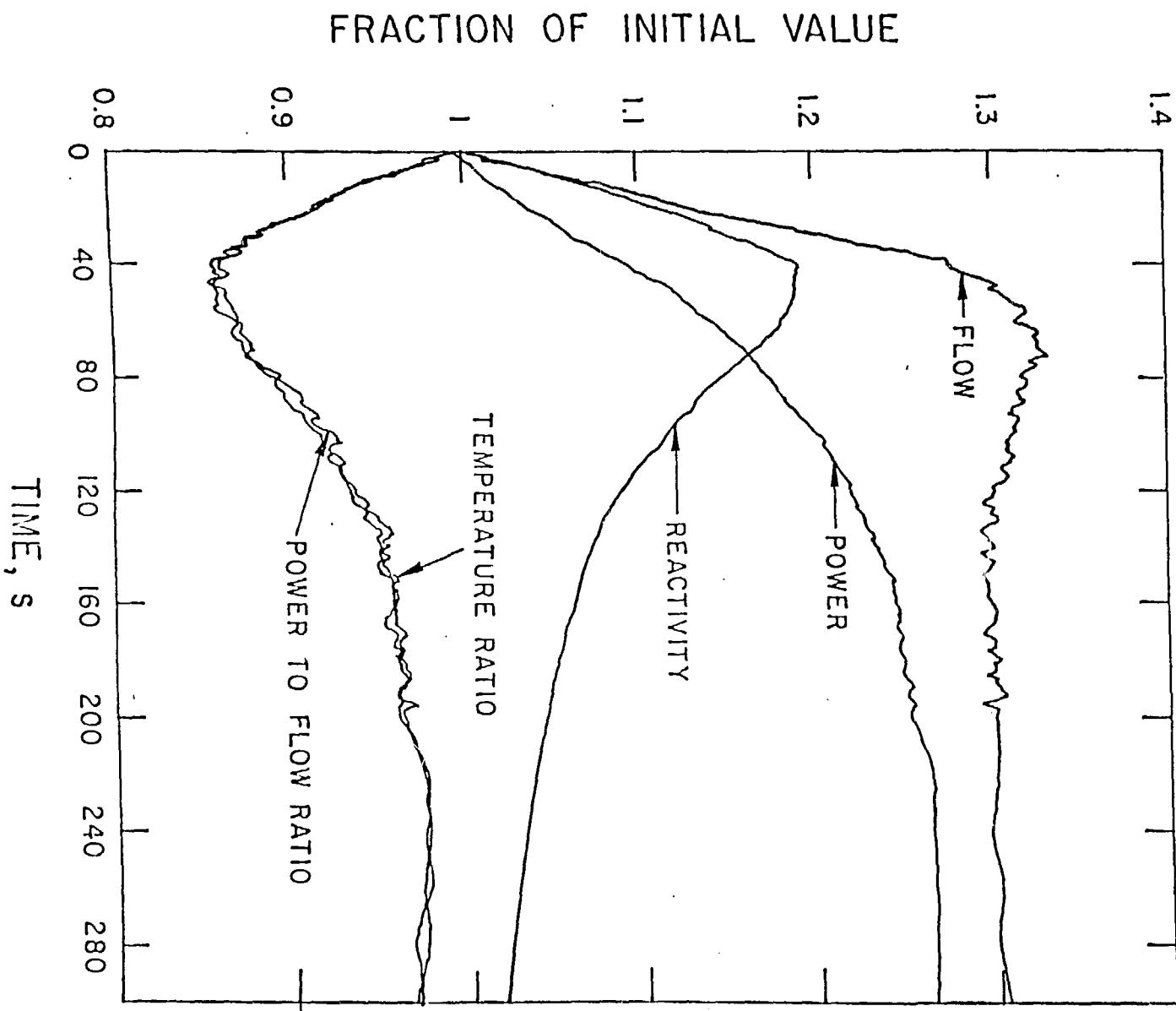
- **OBJECTIVE** - DEMONSTRATE PASSIVE DECAY HEAT REMOVAL CAPABILITIES BY NATURAL CIRCULATION (GROUPS I-III)
- TESTING COMPLETED IN JUNE 1984
- MOST SEVERE TEST CONDUCTED FROM 100% POWER AND FLOW
 - SIMULTANEOUS SCRAM AND LOSS OF ALL PUMPING POWER
- EXCELLENT AGREEMENT BETWEEN PRETEST PREDICTIONS AND MEASUREMENTS
- OBJECTIVE HAS BEEN MET
- RESULTS SHOW NATURAL CIRCULATION IS A PREDICTABLE, DEPENDABLE MEANS OF DECAY HEAT REMOVAL. SUPPORT DECISIONS TO SIMPLIFY DESIGN BY ELIMINATING SAFETY RELATED PONY MOTORS AND CONTROLS



LOSS OF FLOW WITHOUT SCRAM TESTS

- OBJECTIVES - DEMONSTRATE INHERENT, PASSIVE, SHUTDOWN CAPABILITIES FOR LOSS OF FLOW
- FLOW PERTURBATION TESTING COMPLETED IN JUNE 1984 (GROUP IV)
 - POWER FOLLOWED FLOW PERTURBATIONS VERY CLOSELY
 - DATA USEFUL FOR VALIDATION OF FEEDBACK MODELS
- LOSS OF FLOW TESTS FROM PART POWER WERE CONDUCTED IN MAY 1985 (GROUP V)
- LOSS OF FLOW TESTS FROM EXTENDED POWER ARE BEING PLANNED FOR FEBRUARY 1986 (GROUP VI)

MEASUREMENTS OF FLOW PERTURBATION TEST FROM
70% POWER AND FLOW



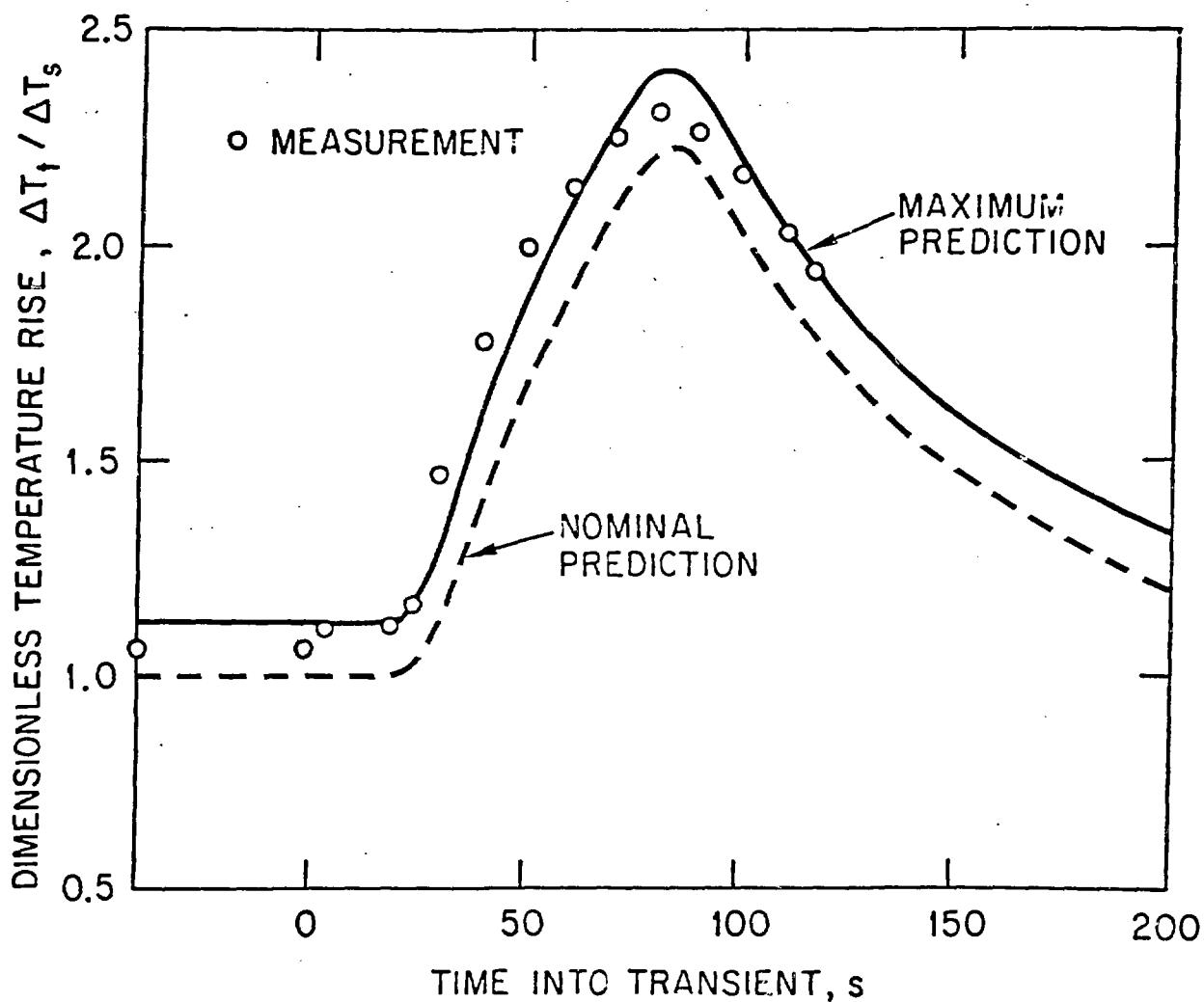
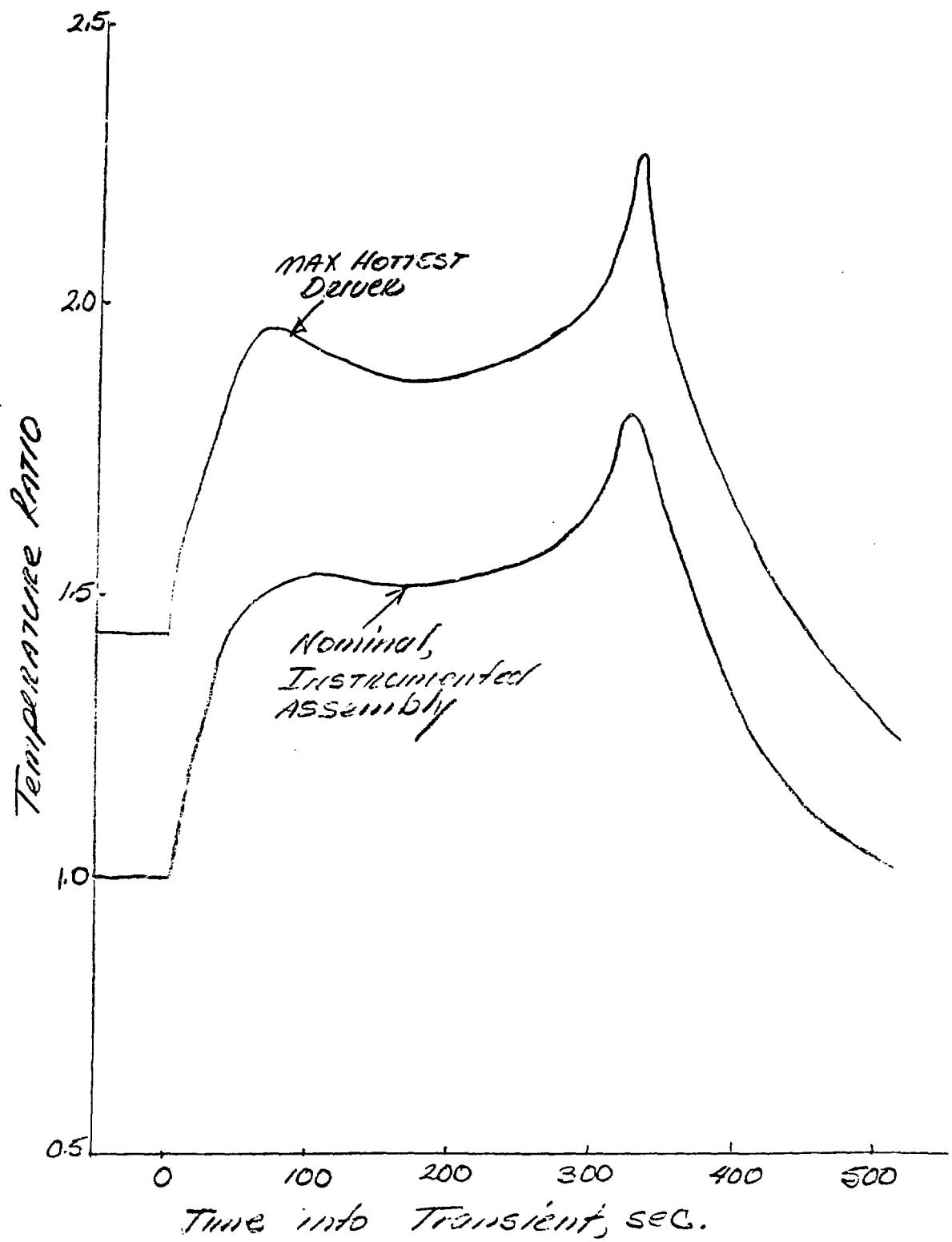


Fig. 1. Measured and Predicted Temperatures of INSAT XX09
Located Near Top of the Core

PLANS FOR NEXT GROUP OF LOSS-OF-FLOW WITHOUT SCRAM TESTS

- GROUP VI-A - COMPLETE LOSS-OF-FLOW WITHOUT SCRAM
 - CONDUCT TEST FROM UP TO 100% POWER BY
 - 1) SHUTTING OFF AUXILIARY PUMP
 - 2) BYPASSING LOF SCRAMS
 - 3) CONTROLLING FLOW TO ZERO FORCED FLOW
 - CONDUCTED WITHIN TECH SPEC TEMPERATURE LIMITS FOR ANTICIPATED EVENT
 - VARIABLES FROM TEST TO TEST ARE POWER/FLOW/SECONDARY FLOW/COASTDOWN RATE (300-400 SEC RANGE)
- GROUP VI-B - STATION BLACKOUT WITHOUT SCRAM
 - CONDUCT TEST FROM TBD POWER BY
 - 1) PLACING AUXILIARY PUMP ON BATTERY POWER SUPPLY
 - 2) BYPASSING LOF SCRAMS
 - 3) SHUTTING OFF 2400 V POWER TO PUMP DRIVE SYSTEM
 - TO BE CONDUCTED WITHIN TEMPERATURE LIMITS TO BE SHOWN SAFE BY SPECIAL FUELS TEST (HOT LEAD DRIVER TEST)
 - VARIABLES FROM TEST TO TEST ARE POWER/COASTDOWN RATE (100-200 SEC RANGE)



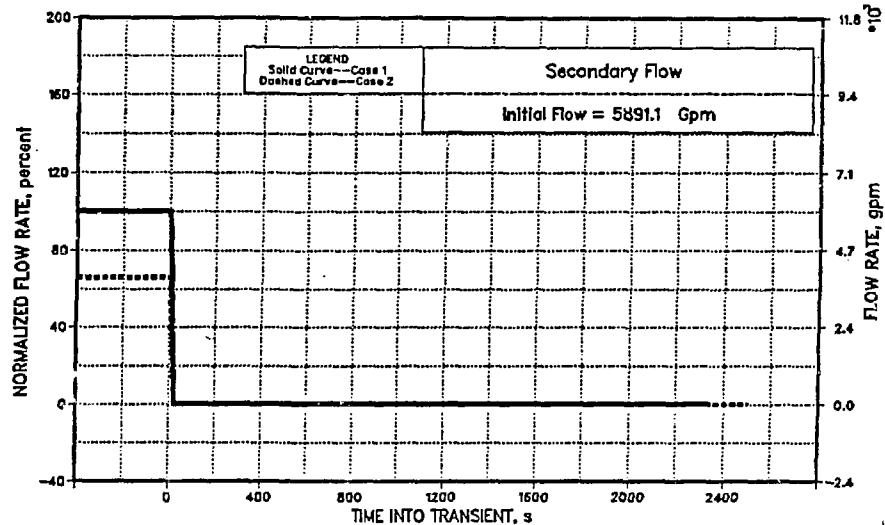
LOSS OF HEAT SINK WITHOUT SCRAM TESTS

- OBJECTIVES - DEMONSTRATE INHERENT SHUTDOWN CAPABILITIES FOR LOSS OF HEAT SINK
- PRELIMINARY TESTING COMPLETED
 - REACTOR INLET TEMPERATURE PERTURBATIONS JUNE 1984 (GROUP IV)
 - SECONDARY FLOW MULTIFREQUENCY PERTURBATIONS MAY 1985 (GROUP VII)
 - STEAM PRESSURE REDUCTION TESTS MAY 1985 (GROUP VII)
 - DATA SHOWS SIGNIFICANT POWER REDUCTION FOR INLET TEMPERATURE INCREASES
 - DATA USED TO VALIDATE FEEDBACK MODELS
- FULL LOSS OF HEAT SINK TESTS BEING PLANNED FOR SPRING 1986 (GROUP VII)

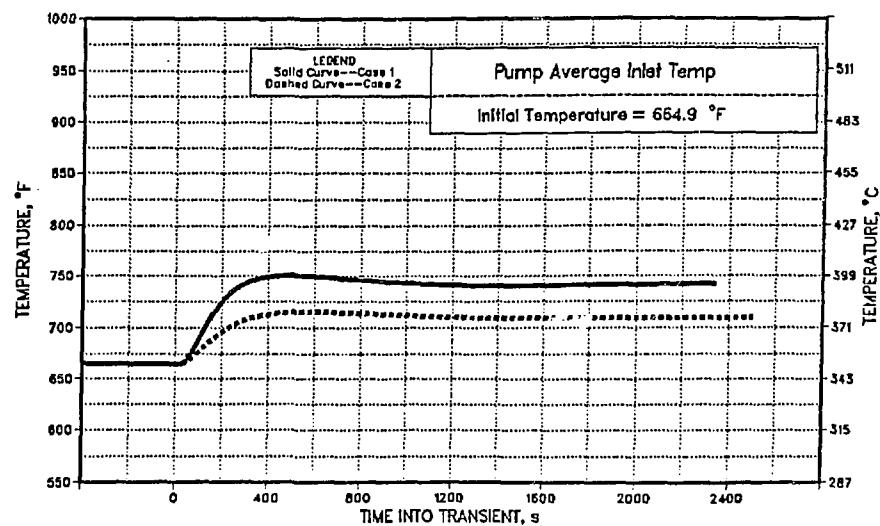
LOSS OF HEAT SINK TEST PREDICTIONS

-- 100% POWER
 -- 50% POWER

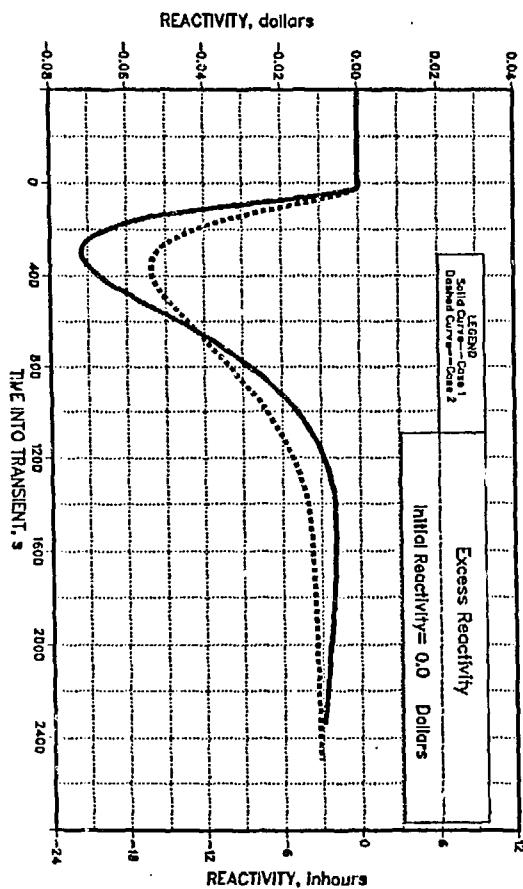
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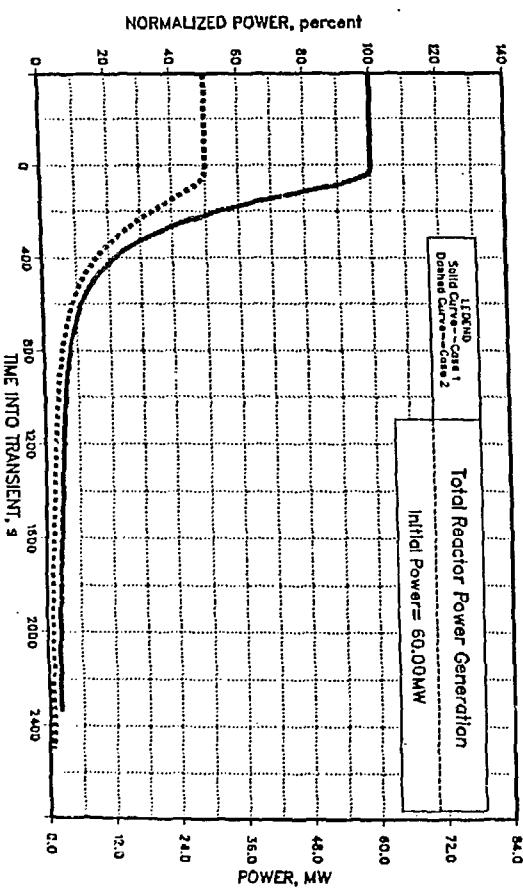
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