

UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

MAY 1 3 2002

Information Systems Laboratories, Inc. ATTN: James Meyer 11140 Rockville Pike, Suite 500 Rockville, MD 20852

SUBJECT: TASK ORDER NO. 4 ENTITLED, "AP1000 ANALYSIS" UNDER CONTRACT NO. NRC-04-02-054

Dear Mr. Meyer:

This letter definitizes Task Order No. 4 in accordance with the enclosed statement of work. The period of performance for Task Order No. 4 is May 13, 2002 through February 28, 2003. The task order estimated cost and fixed fee is set forth as follows: Estimated Costs \$252,539 Fixed Fee \$ 19,585 CPFF Total \$272,124. \$264,000 in funds is hereby allotted to this task order of which \$245,000 represents funds for the estimated cost and \$19,000 represents funds for the fixed fee. The accounting data for this task order is set forth as follows: RES ID: RES-C02-406 APPN: 31X0200 B&R:26015120127 JCN:Y6503 BOC: 252A Amount: \$264,000.

Please indicate your acceptance of Task Order No. 4 by having an official authorized to bind your organization execute three copies of this document, by signing in the space provided, and return two copies to me. You should retain the third copy for your records. All other terms and conditions of this task order remain unchanged.

Should you have any questions, regarding this task order, please contact me on (301) 415-8168.

Sincerely. Stephen M. Pool, Contracting Officer

Division of Contracts and Property Management Office of Administration

ACCEPTED: TI

STATEMENT OF WORK TASK ORDER NO. 4 REVISION NO. 1 AP1000 ANALYSIS

BACKGROUND

Phases I and II of the AP1000 review were the "Pre-Design Certification" phases. In these phases the NRC reviewed the Westinghouse proposed design and commented on Westinghouse's proposed approach to deal with various new issues. The main objective of these initial Phases was to identify any critical issues that would need to be addressed in significant depth later in the review. Phase III is the final phase of the review, and will consider the AP1000 Design Control Document and the final safety analyses for AP1000. The staff is expected to review these documents with a proposed schedule leading to approval in early 2004. To support staff decisions with respect to AP1000, large and small break calculations using TRAC-M are needed. The purpose of these calculations is to help the staff understand the expected performance of AP1000 during various hypothetical accident scenarios.

OBJECTIVE

The objective of this task order is to develop large and small break TRAC-M input decks for AP1000 and to perform sensitivity studies to examine the response of the plant to various boundary conditions and design parameters. These studies will be used to confirm that the AP1000 meets 10CFR50.46 requirements, by identifying the transient and conditions leading to the worst peak cladding temperature and equivalent clad reacted for the AP1000. In addition, the study will provide a sensitivity of AP1000 large break results to containment interaction.

WORK REQUIREMENTS

Task 1: TRAC-M Input Deck Conversion for LBLOCA Analyses

Convert the AP1000 RELAP5 input deck to TRAC-M input. Simulate and compare steady state to design parameters. Since AP1000 components CMT and PRHR may influence the calculations, these components should not be de-coupled from the deck. Renodalize for large break as necessary. The large break model for AP1000 is to include a hot assembly with appropriate total peaking factor FQ and enthalpy rise FDH, and a top-skewed power shape obtained by scaling the AP600 power shape to the AP1000 14-ft core.

Deliverables are a report and TRAC-M files. The report will document all input decks, modifications made to them, and a description of transients performed during the investigation. All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived on the NRC data bank.

Estimated Level of Effort:	5 staff-months to convert input deck, perform steady-state calculation, and check results
Estimated Completion Date:	6/30/02 for input conversion 7/15/02 for steady-state calculation

Task 2: TRAC-M LBLOCA Analyses

Perform a series of large break LOCA transients with TRAC-M. The simulations are to include:

- Double Ended Guillotine (DEG) cold leg breaks with at least 3 different discharge coefficient (C_D) values to determine the maximum peak cladding temperature (PCT)

Since the AP600 large break analysis should demonstrate compliance with 10CFR50.46 without assuming benefit from the CMTs or PRHR, any major influence on the AP1000 transient by these components should be clearly identified.

Deliverables are a report and TRAC-M files. The report will document all input decks, modifications made to them, and describe the transients performed during the investigation. All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived on the NRC data bank.

Estimated Level of Effort: 3 staff-months for DEG Cold Leg Break Spectrum

Estimated Completion Date: 9/30/02 for DEG Cold Leg Break Spectrum

Task 3: TRAC-M Input Deck Conversion for SBLOCA Analyses

Convert the AP1000 RELAP5 input deck to TRAC-M input. Simulate and compare steady state to design parameters. Since AP1000 components CMT and PRHR may influence the calculations, these components should not be de-coupled from the deck. Renodalize for a small break as necessary. Use the power shape suggested for an LBLOCA. Make the hot assembly the same as for an LBLOCA, with an appropriate total peaking factor FQ and enthalpy rise FDH.

Deliverables are a report and TRAC-M files. The report will document all input decks, modifications made to them, and a description of transients performed during the investigation. All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived on the NRC data bank.

Estimated Level of Effort:	2 staff-months to convert input deck, perform steady-state calculation, and check results
Estimated Completion Date:	9/30/02 for input conversion 10/15/02 for steady-state calculation

Task 4: TRAC-M SBLOCA Analyses

Perform a series of small break LOCA transients with TRAC-M. The simulations are to include:

- Double ended guillotine break of DVI line

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Results are to be compared to existing RELAP5 simulations of the AP1000.

Deliverables will include a report and TRAC-M files. The report will document the input decks, modifications made to them, and a description of transients performed during the investigation. All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived on the NRC data bank.

Estimated Level of Effort: 1 staff-month for DEDVI Break

Estimated Completion Date: 12/30/02 for DEDVI Break

Task 5: Coupling TRAC-M and CONTAIN

Update the version of TRAC-M coupled to CONTAIN to the version that includes the interim reflood model. Re-run the limiting cold leg three break spectrum (either split or DEG) using the coupled codes. Compare the results to simulations of the AP1000 using TRAC-M uncoupled with CONTAIN.

Deliverables will include a report comparing the AP1000 simulations and any new coding that must be generated to accommodate the latest version of TRAC-M. The report will document the input decks, modifications made to them, and a description of transients performed during the investigation. All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived on the NRC data bank

Estimated Level of Effort:	1 staff-month for TRAC-M/CONTAIN coupling 1 staff-month for three Cold Leg Breaks
Estimated Completion Date:	12/30/02 for Code Coupling 2/27/03 for Cold Leg Breaks