UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D C. 20555-0001

APR 1 0 2003

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

SUBJECT: MODIFICATION NO. 5 TO TASK ORDER NO. 4 ENTITLED, "AP1000 ANALYSIS" UNDER CONTRACT NO NRC-04-02-054

Dear Mr. Meyer.

This letter definitizes Task Order No 4 Modification No. 5 in accordance with the enclosed statement of work. The period of performance for Task Order No. 4 is changed to run from May 13, 2002 through December 31, 2003. The task order estimated cost and fixed fee is increased as follows:

	From:	By:	To:
Estimated Costs	$322,233	$183,863	$506,096
Fixed Fee	$ 25,138	14,635	39,773
CPFF Total	$347,371	$198,497	$545,868

$198,744 in funds is hereby allotted to fully fund this task order. The accounting data for this task order mod is set forth as follows: RES ID: RES-C03-389 APPN 31X0200 B&R:36015115103 JCN.Y6503 BOC: 252A Amount: $198,744.

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
Office of Administration

ACCEPTED.

SIGNATURE	TITLE	DATE
	V.P.	4/11/03

TEMPLATE - ADM001

ADM002

Attachment

STATEMENT OF WORK
TASK ORDER NO. 4, MOD 5
AP1000 ANALYSIS

BACKGROUND

Input decks have been developed to simulate large and small break loss of coolant accidents (LOCAs) in the AP1000. These simulations are used to investigate performance of the passive safety systems and confirm regulatory decisions regarding adequacy of the design. The TRAC-M code has been successfully coupled to the CONTAIN code and the coupled TRAC-M/CONTAIN code used to simulate a large break LOCA in the AP1000. The TRAC-M code has also been used to simulate a small cold leg break LOCA in the AP1000.

OBJECTIVE

The objective of this modification to Task Order number 4 is to use TRAC-M to investigate additional loss of coolant accidents in the AP1000 using the previously developed input decks and code versions. In particular, scenarios that challenge the AP1000 safety system performance are important since they may influence regulatory decisions concerning the AP1000 Design Certification.

In order to develop confidence in small break LOCA calculations made by TRAC-M, code assessment for AP1000 scaled experiments is necessary. APEX-AP600 tests were conducted in the early to mid-90s, and included experiments simulating a double ended guillotine break of the direct vessel injection line (DVI), small cold leg breaks, and inadvertent ADS actuation. Similar tests are being conducted in the upgraded APEX-AP1000 facility. The APEX-AP1000 facility has been modified to scale adequately with the AP1000. Tests in the APEX-AP1000 will be used to investigate adequacy of the passive safety systems and develop unique experimental data on upper plenum entrainment and de-entrainment. Thus, a second objective of this modification is to assess TRAC-M using APEX-AP1000 data and identify major code deficiencies.

WORK REQUIREMENTS

Task 1: Simulate Critical SBLOCA Transients in AP1000

Previous work considered small cold leg breaks in the AP1000. Of more interest are small LOCAs that lead to minimum vessel inventory and may cause core uncovery and cladding heat up. The following small break cases are to be simulated using TRAC-M. The containment back pressure can be assumed to be atmospheric and thus TRAC-M does not have to be coupled with CONTAIN for these cases.

(A) Double-ended guillotine break of a Direct Vessel Injection (DVI) line assuming that one of the ADS-4 valves fails to open.
(B) 10-inch Cold Leg Break

(C) Inadvertent ADS Opening

Deliverables include a report and TRAC-M files. The report will document input decks used, modifications made to them and/or code changes, and a description of transients performed. The report should include comparisons of TRAC-M results for these cases to existing results produced by RELAP5 and Westinghouse analysis codes.

All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived in the NRC data bank.

Estimated Level of Effort: 3.0 staff-months
Estimated Completion Date: 9/30/03

Task 2: Simulate Large Split Breaks Using TRAC-M

Modify the existing large break input deck for the AP1000, and simulate the following large break LOCA transients using TRAC-M coupled with CONTAIN. Input for CONTAIN should assume nominal realistic containment performance.

(A) 1.0 x cold leg flow area split break
(B) 1.4 x cold leg flow area split break
(C) 0.6 x cold leg flow area split break

Deliverables include a report and TRAC-M/CONTAIN files. The report will document the input decks used, modifications made to them and/or code changes, and a description of transients performed.

All TRAC-M/CONTAIN input and output files that should be retained as determined by the NRC Project Officer will be archived in the NRC data bank.

Estimated Level of Effort: 1.5 staff-months
Estimated Completion Date: 10/30/03

Task 3: TRAC-M Input Model of APEX-AP1000 Facility

Develop TRAC-M input decks for the APEX-AP1000 facility as configured for tests to be conducted for the AP1000 design. This task will develop an input deck of this facility that includes modeling of the ADS system, the PRHR, the CMTs and their pressure balance lines, the accumulators and the IRWST. The detail and complexity of the TRAC-M model for APEX-AP1000 should be similar to that in the TRAC-M model of the AP1000 plant itself. Simplifications may be made to the core, downcomer, and lower plenum however since the APEX-AP1000 facility is not designed to investigate breaks that lead to core heatup or significant downcomer ECC bypass. The input deck is to have the flexibility to simulate DVI line breaks, small cold leg breaks, inadvertent ADS actuation, and separate effects tests of ADS-4 system performance.

Deliverables include a report and TRAC-M files. The report will document the input decks used and supporting calculations.

All TRAC-M input files that should be retained as determined by the NRC Project Officer will be archived in the NRC data bank.

Estimated Level of Effort: 4.0 staff-months
Estimated Completion Date: 10/30/03

Task 4: TRAC-M Assessment Using APEX-AP1000 Tests

The input deck developed in Task 3 is to be used to simulate the following experiments in APEX-1000:

(A) Double ended DVI line break (Test DBA-01-D) with single ADS-4 valve failure
(B) Double ended DVI line break (Test PRA-18-N) with multiple component failures
(C) Entrainment Test (Test ID is yet to be determined)

Deliverables include a report and TRAC-M files. The report will document the input decks used, modifications made to them and/or code changes, and a description of transients performed including a comparison of TRAC-M predictions to the experimental data.

All TRAC-M input and output files that should be retained as determined by the NRC Project Officer will be archived in the NRC data bank.

Estimated Level of Effort: 2.0 staff-months
Estimated Completion Date: 12/31/03