

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 2

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

BPA NO.

1. DATE OF ORDER 04-14-2008		2. CONTRACT NO. (if any) NRC-04-06-068		6. SHIP TO:	
3. ORDER NO. NRC-T005		MODIFICATION NO.		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission	
4. REQUISITION/REFERENCE NO. RES-06-068T005 (AAMS) RES-C08-148 (FFS #)		b. STREET ADDRESS Attn: Shawn Marshall, 301-415-5861 Mail Stop: T10-K8 11545 Rockville Pike			
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: H. (Eddie) Colón, Jr., 301-492-3620 Mail Stop: TWB 01-B10M Washington, DC 20555				c. CITY Rockville	d. STATE MD
7. TO:				e. ZIP CODE 20852	
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES				f. SHIP VIA	
b. COMPANY NAME				8. TYPE OF ORDER	
c. STREET ADDRESS 11140 ROCKVILLE PIKE STE 500				<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY REFERENCE YOUR _____ Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.	
d. CITY ROCKVILLE	e. STATE MD	f. ZIP CODE 208523106		10. REQUISITIONING OFFICE RES	
9. ACCOUNTING AND APPROPRIATION DATA 860-15-111-205 N6647 252A 31X0200.860 Obligate: \$359,990.00 RES-C08-148 (FFS Commitment #) Contractors DUNS: 150135445				12. F.O.B. POINT Destination	
11. BUSINESS CLASSIFICATION (Check appropriate box(es))					
<input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. EMERGING SMALL BUSINESS <input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED					
13. PLACE OF		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) N/A	
a. INSPECTION	b. ACCEPTANCE			16. DISCOUNT TERMS Net 30	

17. SCHEDULE (See reverse for Rejections)

See CONTINUATION Page

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	TASK ORDER NO. 005 ENTITLED "DEVELOPMENT OF PLANT INPUT MODELS FOR TRACE CODE" This confirms the verbal authorization provided to ISL on 4/11/2008 to begin work under the subject task order, effective 4/14/2008, with an initial temporary ceiling of \$90,000.00, which was increased via email dated 6/25/2008 by \$30,000.00 to \$120,000.00. In accordance with Section G.4 entitled "Task Order Procedures" of the subject contract, this order definitizes Task Order No. 005, which shall be performed in accordance with the enclosed Statement of Work. Task Order No. 005 shall be effective April 14, 2008 through October 15, 2008 with a total cost ceiling of \$359,990.00. The amount of \$334,974.00 represents the reimbursable costs, and the amount of \$25,016.00 represents the fixed fee.					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
	21. MAIL INVOICE TO:						
	a. NAME Department of Interior National Business Center						17(i). GRAND TOTAL
	b. STREET ADDRESS (or P.O. Box) Attn: Fiscal Services Branch - D2270 7301 W. Mansfield Avenue						
c. CITY Denver		d. STATE CO	e. ZIP CODE 80235-2230		\$359,990.00		

22. UNITED STATES OF AMERICA
BY (Signature)

[Signature]

23. NAME (Typed)
Heriberto Colón, Jr.
Contracting Officer
TITLE: CONTRACTING/ORDERING OFFICER

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITIONS NOT USABLE

SUNSI REVIEW COMPLETE

JUL 16 2008

OPTIONAL FORM 347 (REV. 4/2006)
PRESCRIBED BY GSA/FAR 48 CFR 101-11.6

ADMOO2

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

PAGE NO.
2

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER

04-14-2008

CONTRACT NO.

NRC-04-06-068

ORDER NO.

NRC-T005

ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
	<p>The issuance of this task order does not amend any other terms or conditions of the subject contract.</p> <p>Please indicate your acceptance of this Task Order. ACCEPTED:</p> <p>Name/ Title <u>Bruce Mrowka / V.P.</u></p> <p>Signature <u>B. Mrowka</u></p> <p>Date <u>7/8/08</u></p>					

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

**STATEMENT OF WORK FOR TASK ORDER NO. 005
UNDER NRC CONTRACT NO. NRC-04-06-068
JOB CODE N6647**

TITLE: Development of Plant Input Models for TRACE Code

BACKGROUND

The TRACE code is being developed by the NRC to perform large and small break loss of coolant accident (LOCA) and system transient analyses for a wide range of nuclear plants. This code will be used as an audit tool for analyses submitted by NRC licensees. Plant safety analyses in support of licensing require a broad range of accident and transient scenarios to be analyzed to help understand the limiting conditions for safe operation of the plant.

In response to a pending NRR user need, RES modified the scope of task order 4 and replaced North Anna and Palo Verde with higher priority extended power updates (EPU) plants Monticello and Nine Mile Point 2 while continuing work on Seabrook. Task order 6 (this task order) continues the development of higher priority plant input models.

OBJECTIVE

The objective of this task order is to resume and redefine the scope of work for North Anna, and to initiate development of two or three additional "look alike" models from among five EPU plants: Point Beach, Turkey Point, St. Lucie 1&2 and Crystal River 3. The development of "look alike" input models for Crystal River 3 or Turkey Point and St. Lucie 1 is contingent on the review of available plant input decks for their sister plants and the characterization of input data differences between these plants and their sister units.

SCOPE OF WORK

Task 1: Characterization of Input Data Requirements and Differences

The four additional plants are Point Beach (Westinghouse, 2-loop), Turkey Point (Westinghouse, 3-loop), St. Lucie 1 (C-E, 2-loop, 14X14), St. Lucie 2 (C-E, 2-loop, 16X16) and Crystal River 3 (B&W, lowered loop, 15X15). Although the staff does not currently have plant specific decks for these units, up-to-date inputs are available for their sister plants Ginna, H.B. Robinson, Calvert Cliffs and Oconee. Ginna has TRAC-P and RELAP5 small break LOCA (SBLOCA) input decks with documentation; the latter was the deck used by NRR for its confirmatory EPU analyses. H.B. Robinson, Calvert Cliffs and Oconee have TRACE as well as TRAC-P and RELAP5 large break LOCA (LBLOCA) and SBLOCA decks with documentation.

A review of current plant modeling and documentation is required. The contractor shall review available plant specific documents, e.g., plant dockets, updated final safety analysis reports (UFSARs), NUREG CR-5640, etc. to accomplish this task. The review shall focus on systems and components that are most important for the modeling of

LBLOCA and SBLOCA. For the subject PWR units the review shall focus on reactor power, fuel design, primary loop flowrates, temperatures and pressures, primary loop piping, accumulator, pressurizer, reactor coolant pump, emergency core cooling system (ECCS), residual heat removal (RHR), power operated relief valve / safety relief valves (PORV / SRV), main steam isolation valves (MSIVs), containment model, setpoints and operator action guidelines. The review shall also address key parameters of PWR models for LOCA simulation as described in Attachment 1 entitled "PWR Steady-State Parameter Checklist". The contractor shall summarize the review findings in a letter report.

The contractor shall characterize and rank the differences between the four plants (Point Beach, Turkey Point, St. Lucie 1 and Crystal River 3) and their sister units (Ginna, H.B. Robinson, Calvert Cliffs and Oconee) in a letter report in terms of impact on LOCA analyses.

The contractor shall identify additional data requirements necessary to prepare complete TRACE code input models to be used for future staff analyses of LBLOCA (excluding Point Beach) and SBLOCA. If the contractor anticipates the need for additional information, this information shall be identified and requested during this initial review. The project manager will specify an approach for handling the missing information for subsequent input deck preparation.

Task 2: Prepare TRACE Code Plant Input Models

The contractor shall continue the development of the North Anna steady state deck started with task order 4 and stopped with task order 4, modification 1, and develop a transient deck simulating "Feed and Bleed" operation. Feed and bleed has been considered as one method of removing decay heat from PWRs following total loss of feedwater (LOFW). Feed and bleed is a procedure in which coolant is injected into the primary system by a safety and/or non-safety grade system (feed), absorbs the core decay heat and is released to the containment (bleed) through the PORVs. The specific steps taken in the feed-and-bleed procedure consists of locking open the pressurizer PORVs, 2) initiating safety injection (SI) flow, and tripping the reactor coolant pumps (RCPs). For this task two cases shall be run: 1) both PORVs available (locked open) and 2) one of the two PORVs shall be assumed to be inoperable (locked close).

The contractor shall prepare a "look alike" TRACE SBLOCA EPU model for Point Beach in two phases. In the first phase, the contractor shall produce a TRACE deck for the sister plant Ginna by converting the available RELAP5 EPU deck and using TRAC-P deck information if necessary. The staff will provide the TRACE, RELAP5 and TRAC-P decks. In the second phase, the contractor shall generate the "looks-like" Point Beach SBLOCA TRACE model upon receiving project manager written approval for individual modifications proposed to transition from the "sister" plant to the "looks-like" plant as identified in the Task 1 letter report. Depending on the content of the letter report from Task 1, the project manager will select one of the following two options for developing plant decks for St. Lucie and Crystal River 3 or Turkey Point.

Option 1: Crystal River 3 and St. Lucie 2

(Refer to Email from NRC PO dated 5/15/2008 Selecting Option 1)

If as consequence of the Task 1 letter report, the project manager decides that the "sister" plant models for Turkey Point and St. Lucie 1 are sufficiently similar to H.B. Robinson and Calvert Cliffs, respectively, so that no further "looks-like" plant models are needed, the contractor shall proceed to generating the plant models for St. Lucie 2. The project manager will identify in writing the changes to be made to the St. Lucie 1 "looks-like" deck. Furthermore, the contractor shall use TRACE Oconee decks to generate the "looks-like" plant models for Crystal River 3 for both SBLOCA and LBLOCA based on written guidance from the project manager. If necessary, the staff will provide preliminary RELAP5 and TRAC-P decks for Oconee to aid the deck updates.

Option 2: Turkey Point and St. Lucie 1&2

If the project manager decides that there are sufficient substantive differences between H.B. Robinson and Turkey Point, and Calvert Cliffs and St. Lucie 1, respectively, to warrant further work to achieve "looks-like" plant models and indicates so in writing, the contractor shall implement the modifications selected by the project manager from the letter report of Task 1. The contractor shall thus generate "looks-like" models for SBLOCA and LBLOCA for both Turkey Point and St. Lucie 1. Furthermore, the contractor shall modify the "looks-like" St. Lucie 1 plant models to generate SBLOCA and LBLOCA St. Lucie 2 plant models. If necessary, the staff will provide preliminary RELAP5 and TRAC-P decks for H. B. Robinson and Calvert Cliffs to aid the deck updates.

All changes shall be documented in the calculation notebook for North Anna and in SNAP "notes viewer" format for the other plants. The TRACE calculation notebook and input model development shall follow the TRACE PWR and BWR Input Model Calculation Notebook Development outline and guidance documents referenced in this SOW. Input model development shall also adhere to the guidance provided in the User's Manual for the TRACE 5.0 code. The contents for the calculation notebooks shall be similar to the one used in the CE System 80 Calculation Notebook [INEL-94/0247 Volume 1 (ML071770210) and Volume 2 (ML071770349)] (provided with task order 4). The contractor shall prepare well-structured and formatted SNAP input files in addition to the ASCII input files for the TRACE code. All TRACE input files, AVScript files, calculation notebook files, SNAP input files and other extraneous scripts or files necessary to reproduce the work shall be archived in the NRC data bank.

Task 3: Run Demonstration Calculations, Prepare Plant Reports and Resolve Open Items

The contractor shall run representative analyses of SBLOCA for Point Beach and the Feed-and-Bleed transient for North Anna as specified under Task 2. Upon receiving project manager approval the contractor shall run LBLOCA and SBLOCA for either St. Lucie 1&2 and Crystal River 3 models developed as per Task 2, Option 1 or Turkey Point and St. Lucie 1&2 models developed as per Task 2, Option 2. Plant specific reports documenting the analyses shall be fully completed during the contract period.

The cases associated with these TRACE code runs shall use AVScript input files and code input files prepared for each plant. Where applicable, results for each plant shall be compared to previous code cases. All calculations shall be documented in a TRACE Model User Description and Analysis Report written in Framemaker which shall follow the TRACE User Description and Analysis Report Outline document referenced in this SOW. All figures present in the Framemaker assessment report documents shall exist as separate files on disk and linked to the files using the Aimport by reference feature of Framemaker. Exceptions to this requirement shall be approved by the project manager.

The goal is that all models run on Microsoft Windows platforms within acceptable CPU times without user intervention.

- For the steady state, real-time execution is preferred (CPU time = modeling time). No steady state run should take longer than five times the modeling time to converge.
- For LBLOCAs the CPU time should not exceed fifty times the modeling time. In addition, the code should be able to sustain a timestep range of 0.005 - 0.02 sec during blowdown, 0.0025 - 0.005 sec during refill and early reflood and 0.01 - 0.02 sec during middle and late reflood (after accumulators empty).
- For SBLOCAs the CPU time should not exceed ten times the modeling time. In addition, the code should be able to sustain a timestep range of 0.025 - 0.1 seconds through the entire event.
- The execution time of the feed-and-bleed transient should be comparable to SBLOCA. Execution time should not take longer than eight hours of CPU time to complete.

The above criteria assume that all TRACE modeling guidelines are followed. Exceptions to this requirement shall be approved by the project manager.

This task shall include time set aside to respond to the staff's questions and to resolve issues raised during preliminary and final acceptance reviews.

North Anna, June 30, 2008
Point Beach: August 15, 2008

Option 1*:

(Refer to Email from NRC PO dated 5/15/2008 Selecting Option 1)

St. Lucie 1&2: August 30, 2008

Crystal River 3: preliminary August 30, 2008; final look alike September 30, 2008

Option 2*:

Turkey Point: August 30, 2008

St. Lucie 1&2: August 30, 2008

* Based on project manager selection made for Task 2.

DELIVERABLES/SCHEDULE AND/OR MILESTONES

1. As described in the SOW Task 1, ISL will prepare and provide a letter report to the staff within three weeks after start of the contract. The letter report will summarize the review of current plant modeling and documentation, characterize and rank the differences between the four plants (Point Beach, Turkey Point, St. Lucie 1 and Crystal River 3) and their sister units (Ginna, H.B. Robinson, Calvert Cliffs and Oconee) in terms of impact on LOCA analyses and identify additional data requirements necessary to prepare complete TRACE LOCA input models to be used for representative analyses.
2. TRACE "look alike" input models will be developed for Point Beach and, depending on project manager selection, for St. Lucie 1&2 and Crystal River 3 or Turkey Point. Depending on Task 1 findings the development may proceed in two phases: deck conversion and update. The "look alike" input decks will be delivered at the end of each phase to facilitate timely review and testing by the staff. As specified in SOW Task 2, prior written approval by the project manager will be required to proceed with the deck updates for St. Lucie 1 and Crystal River 3 or Turkey Point. In addition, the approval of the project manager is required to make any major changes in the functionality of the plant decks. A North Anna model and "Feed and Bleed" transient will be provided with documentation of the features that are important for the "Feed and Bleed" simulation documented in a calculation notebook.
3. Four plant specific TRACE Model User Description and Analysis Reports documenting the results from the demonstration TRACE calculations as described in Task 3 will be provided, as well as all modified AVScripts, TRACE input files, and SNAP input files with "Notes Viewer" documentation will be prepared and provided to the staff. Final deliverables will be completed in stages:

North Anna, June 30, 2008
Point Beach: August 15, 2008

Option 1*:

(Refer to Email from NRC PO dated 5/15/2008 Selecting Option 1)

St. Lucie 2: August 30, 2008

Crystal River 3: preliminary August 30, 2008; final look alike September 30, 2008

Option 2*:

Turkey Point: August 30, 2008

St. Lucie 1&2: August 30, 2008

* Based on project manager selection made for Task 2.

ORGANIZATIONAL CONFLICT OF INTEREST DISCLOSURE

List any work in the proposal that is similar to that previously performed or is to be performed by the contractor on behalf of another sponsor that might give rise to an apparent (perceived) or actual organizational conflict of interest, including duplication of effort.

NRC-FURNISHED MATERIAL

Existing TRACE input decks for three representative sister plants (Calvert Cliffs, H.B. Robinson and Oconee) and a Ginna TRAC-P (rated power) and Ginna RELAP5 EPU model are to be furnished by the NRC during the performance of this work. If necessary, the NRC can also provide TRAC-P and RELAP5 source decks for Calvert Cliffs, H.B. Robinson and Oconee. Existing input decks and documentation will be provided by the staff. Additional information may also be available on the NRC's TRACE Developer Information Exchange website. Additional required data identified by the contractor in Tasks 1 and 3 and requested from the staff is to be furnished by the NRC as it becomes available. If plant-specific information needed for modeling is unavailable, the contractor shall use generic information or models from a similar plant and note this as a limitation of the model.

TECHNICAL DIRECTION

Technical direction will be provided by the project manager Kirk Tien and technical monitor Istvan Frankl, who can be reached at:

Shawn Marshall (NRC Project Officer)
Mail Stop: T10-K8
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Phone: (301) 415-5861
FAX: (301) 415-5062
email: Shawn.Marshall@nrc.gov

Istvan Frankl (Technical Monitor)
Mail Stop: T10-K8
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Phone: (301) 415-0729
FAX: (301) 415-5062
email: Istvan.Frankl@nrc.gov

ADMINISTRATIVE CONTACT:

Sandra Nesmith
(301) 415-6437
Sandra.Nesmith@nrc.gov

REFERENCES AND ATTACHMENTS

The following guidance and outline documents are referenced in this SOW and shall be used for preparation of the deliverable documents:

1. Attachment 1: PWR Steady-State Parameter Checklist
2. TRACE PWR Input Model Calculation Notebook Development*
3. TRACE BWR Input Model Calculation Notebook Development*
4. TRACE Model User Description and Analysis Report Outline*
5. Original Contract (ML060650512)*
6. CE System 80 Calculation Notebook [INEL-94/0247 Vol.1 (ML071770210) and Vol. 2 (ML071770349)].*
7. NUREG CR-5640 - Overview and Comparison of US LWRs

* Previously provided under Task Order 4 by NRC's Project Officer, Kirk Tien, to Dan Prelewicz (ISL)