

**ORDER FOR SUPPLIES OR SERVICES**

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

BPA NO.

1. DATE OF ORDER <b>MAY 09 2006</b>	2. CONTRACT NO. (if any) NRC-03-03-038	6. SHIP TO:	
3. ORDER NO. T025	MODIFICATION NO.	a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation	

5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Jeffrey R. Mitchell, 301-415-6465 Mail Stop T-7-I-2 Washington, DC 20555		b. STREET ADDRESS Attn: Bernard L. Grenier, 301-415-2726 Mail Stop: O9-E3	
c. CITY Washington		d. STATE DC	e. ZIP CODE 20555

7. TO:		f. SHIP VIA	
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES, INC		8. TYPE OF ORDER	

b. COMPANY NAME ATTN: DR. JAMES P. MEYER		<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY	
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c. STREET ADDRESS 11140 ROCKVILLE PIKE, SUITE 500		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	Except for Billing Instructions on the reverse, this delivery/task order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.	

9. ACCOUNTING AND APPROPRIATION DATA 620-15-113-103 J-3271 252A 31x0200.620 Obligate \$91,400.00 Contractors DUNS: 107928806		10. REQUISITIONING OFFICE NRR	
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11. BUSINESS CLASSIFICATION (Check appropriate box(es))			12. F.O.B. POINT Destination	
<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		

13. PLACE OF		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)		16. DISCOUNT TERMS Net 30	
a. INSPECTION	b. ACCEPTANCE						

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
	Issuance of Task Order No. 25, Under Contract No. NRC-03-03-038  Title: "TRACE Input Deck Development for ESBWR Design Certification Pertaining to Anticipated Operational Occurrences (AOO) Analysis"  Period of Performance: 05/15/2006 through 10/31/2006 Estimated Reimbursable Cost: \$84,636.00 Fixed Fee: \$6,769.00 TOTAL COST AND FEE: \$91,406.00  Funding in the amount of \$91,400.00 is being provided.  See attached pages for a description of the Task Order No.25					

18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
21. MAIL INVOICE TO:						
a. NAME U.S. Nuclear Regulatory Commission Payment Team, Mail Stop T-9-H-4						17(i). GRAND TOTAL  \$91,406.00
b. STREET ADDRESS (or P.O. Box) Attn: (NRC-03-03-038 Task Order No. 25)						
c. CITY Washington		d. STATE DC	e. ZIP CODE 20555			

22. UNITED STATES OF AMERICA BY (Signature) 		23. NAME (Typed) Donald A. King Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER	
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In accordance with Section G.4, Task Order Procedures, of contract no. NRC-03-03-038, this definitizes Task Order No. 025. The effort shall be performed in accordance with the attached Statement of Work.

Task Order No. 025 shall be in effect from May 15, 2006 through October 31, 2006, with a cost ceiling of \$91,406.00. The amount of \$84,636.00 represents the estimated reimbursable costs, and the amount of \$6,769.00 represents the fixed fee.

The issuance of this task order does not amend any terms or conditions of the subject contract.

Your contacts during the course of this task order are:

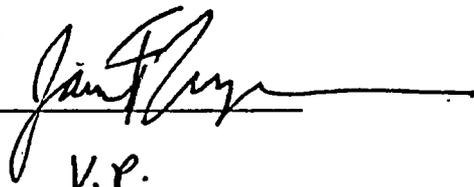
Technical Matter: Bernard L. Grenier  
Project Officer  
301-415-2726

Contractual Matters: Jeffrey R. Mitchell  
Contract Specialist  
301-415-6465

Acceptance of Task Order No. 025 should be made by having an official, authorized to bind your organization, execute three copies of this document in the space provided and return two copies to the Contract Specialist at the address identified in Block No. 5 of the OF 347. You should retain the third copy for your records.

ACCEPTANCE:

NAME

  
V.P.

TITLE

5/11/06

DATE



**DELIVERY ORDER TERMS AND CONDITIONS NOT SPECIFIED IN THE CONTRACT**

**A.1 NRC Acquisition Clauses - (NRCAR) 48 CFR Ch. 20**

**A.2 Other Applicable Clauses**

See Addendum for the following in full text (if checked)

52.216-18, Ordering

52.216-19, Order Limitations

52.216-22, Indefinite Quantity

52.217-6, Option for Increased Quantity

52.217-7, Option for Increased Quantity Separately Priced Line Item

52.217-8, Option to Extend Services

52.217-9, Option to Extend the Term of the Contract

**A.3 SEAT BELTS**

Contractors, subcontractors, and grantees, are encouraged to adopt and enforce on-the-job seat belt policies and programs for their employees when operating company-owned, rented, or personally owned vehicles.

**NRC-03-03-038  
Task Order 25  
Statement of Work**

Title: TRACE Input Deck Development for ESBWR Design Certification Pertaining to Anticipated Operational Occurrences (AOO) Analysis

TAC Number: MC8375  
Job Code: J-3271

**BACKGROUND**

GE Nuclear Energy (GE) developed the E-Simplified Boiling Water Reactor (ESBWR) design. There was a pre-application review in which GE submitted the TRACG thermal hydraulics code to analyze anticipated operational occurrences (AOOs) for the ESBWR Design in December 2004. As part of this review, the NRC Division of Safety Systems (DSS) contracted assistance from Information Systems Laboratories, Incorporated (ISL) to develop input decks for the NRC developed coupled TRACE/PARCS thermal hydraulics/neutronics code package to perform confirmatory analysis of the TRACG code. The contractor developed steady state standalone TRACE and PARCS decks for the analysis of AOO events for ESBWR. On August 24, 2005, GE formally submitted the design certification application for the ESBWR to the NRC for review. GE has revised their design from that which was analyzed during pre-application such that the TRACE/PARCS input decks will need to be updated and refined. In addition, the decks need to be coupled and tested.

**OBJECTIVE**

The objective of this task order is to obtain technical expertise from ISL to produce updated coupled TRACE/PARCS input decks based on the ESBWR design certification application to be used by the staff to analyze AOO events contained in that application.

**TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED**

One Senior Engineer on an intermittent, part-time basis with strong background using the TRACE code; experience with the on-going TRACE input deck development for ESBWR preferred.

NOTE: Work on this task order will involve the handling of proprietary information associated with GE ESBWR application.

**WORK REQUIREMENTS AND SCHEDULE**

**Tasks**

**Completion Schedule**

1. Using the input decks developed under Task Order 4 and the updated design certification values and parameters provided by GE to analyze AOOs, develop a baseline steady state and transient restart standalone TRACE input decks of the 4500MWt ESBWR in order to independently analyze: (a) generator load rejection with failure of all bypass valves to open, (b) feedwater controller failure at maximum demand, and (c) closure of all Main Steamline Isolation Valves (MSIVF). Prepare a technical letter report.

Two weeks after PI receives RAI responses with additional design information

WORK REQUIREMENTS AND SCHEDULE (CONTINUED)

<u>Tasks</u>	<u>Completion Schedule</u>
2. Using the latest cross sections generated by NRC/RES employing the TRITON code and the updated design certification values and parameters provided by GE, update the PARCS input deck developed under Task Order 4 for analyzing AOOs associated with the ESBWR 4500MWt core. Prepare a technical letter report.	One week after completion of Task 1.
3. Using the updated desks from Tasks 1 and 2, assess the following AOO input decks by performing the transient analyses. Consult with the Technical Monitor as necessary to discuss and change in the parameters or other values when the results of the analyses do not attain or yield the expected outcomes; make the agreed-upon adjustments and complete the analysis.	
a. Baseline steady state AOO; prepare a technical letter report.	Four weeks after completion of Task 2.
b. Generator load rejection with failure of all bypass valves to open; prepare a technical letter report.	Three weeks after completion of Subtask 3.a.
c. Feedwater controller failure at maximum demand; prepare a technical letter report.	Three weeks after completion of Subtask 3.b.
d. Closure of all Main Steamline Isolation Valves (MSIVF); prepare a technical letter report.	Three weeks after completion of Subtask 3.c.
4. Based on the work performed in the above Tasks and the results attained, prepare a technical letter report.	Three weeks after completion of work on Subtask 3.d.

PERIOD OF PERFORMANCE

The projected period of performance is from May 15, 2006 through October 31, 2006.

DELIVERABLESTechnical Reporting Requirements

NOTE: All reports are to be submitted electronically using WordPerfect 10 (Font Arial regular 11 point) or compatible software program to the Technical Monitor with a copy provided to the Project Officer. Input decks and PARCS associated files are to be submitted electronically or via CD to the Technical Monitor with a copy provided to the Project

Officer. In all correspondence, include the following information: JCN No., Task No., the applicant (General Electric), the facility (ESBWR), TAC No. (MC8366), and NRC/NRR Branch: Nuclear Performance and Code Review Branch, DSS, NRR.

1. At the completion of Task 1, submit a technical letter report that contains the updated steady state TRACE standalone AOO input deck, nodalization diagrams, calculation notes including a list of important assumptions; generator load rejection with failure of all bypass valves to open standalone TRACE restart input deck, nodalization diagrams, calculation notes including a list of important assumptions; feedwater controller failure at maximum demand standalone TRACE restart input deck, nodalization diagrams, calculation notes including a list of important assumptions, closure of all Main Steamline Isolation Valves (MSIVF) standalone TRACE restart input deck, nodalization diagrams, and calculation notes including a list of important assumptions.
2. At the completion of Task 2, submit a technical letter report that contains the PARCS input deck, diagram of core mapping, calculation notes, and a copy of the most recent version of the PARCS code used to do the analysis.
3. At the completion of Subtask 3.a., submit a technical letter report that contains the table of steady state parameters, coupled TRACE/PARCS input deck, description of changes made if any, updated nodalization diagrams if different, and calculation notes on the updates.
4. At the completion of Subtask 3.b., submit a technical letter report that contains the applicable plots of thermal hydraulic parameters vs. time, updated input deck, if necessary a description of changes made if any, updated nodalization diagrams if different and calculation notes on the updates.
5. At the completion of Subtask 3.c., submit a technical letter report that contains applicable plots of thermal hydraulic parameters vs. time, updated input deck if necessary, a description of changes made if any, updated nodalization diagrams if different, and calculation notes on the updates.
6. At the completion of Subtask 3.d., submit a technical letter report that contains applicable plots of thermal hydraulic parameters vs. time, updated input deck if necessary, description of changes made if any, updated nodalization diagrams if different, and calculation notes on the updates.
7. At the completion of work on Task 4, submit a technical letter report that contains the full results of the work performed in Tasks 1, 2 and 3 in the following format and content:
  - Assumptions.
  - Nodalization diagrams.
  - Table of steady-state parameters. The table shall include but not necessarily be limited to: k-eff, steam dome pressure, feedwater temperature, feedwater flow, downcomer flow, downcomer level, core inlet subcooling, core exit void fraction.
  - Plots of important steady state thermal hydraulic parameters such as void fraction in the hot channel as a function of core height, axial power distribution.

- Evaluation of the event scenario for each of the three AOO events. This shall include a narrative description of the AOO event including: the reactor scram signal, time of peak pressure, etc.
- Plots of important thermal hydraulic and neutronic phenomena for each of the three AOO events. Plots should include all important phenomena for evaluating the AOO events and should include at a minimum a plot of the following parameters vs. time: neutron flux, power, inlet flow, CPR, level in the core/chimney and downcomer, void fraction, core temperature and pressure, and steam dome pressure.

Include as an attachment, CDs which contain input decks, output files, and restart files used to perform the above evaluations.

#### Monthly Business Letter Report

A spending plan by Task is to be included in the standard monthly business letter report, as follows:

A budget is to be developed for each Task based on the agreed upon allocation of the level of effort among the Tasks using the following format:

Authorized Cost Ceiling: \$ \_\_\_\_\_ Funds Obligated to date: \$ \_\_\_\_\_

#### Monthly Business Letter Report (Continued)

<u>Tasks</u>	<u>Planned Budget</u>	<u>Expenditures for the Period</u>	<u>Task Expenditures Cumulative</u>	<u>Percentage vs. Budget</u>
1.	\$	\$	\$	%
2.	\$	\$	\$	%
3.	\$	\$	\$	%
4.	\$	\$	\$	%
Total	\$ _____	\$ _____	\$ _____	%

Any increase greater than 15 percent for any Task will be reported immediately to the Technical Monitor and the Project Officer.

#### MEETINGS AND TRAVEL

None.

#### NRC-FURNISHED MATERIALS

The updated information required to perform the work under this task order is contained in the GE ESBWR application which was provided to the ISL Project Manager under Task Order 4, contract no. NRC-03-03-038, as follows:

In August 2005:

- CD-ROM containing ESBWR Design Control Document (DCD)
- CD-ROM containing TRACG input decks for AOO analysis

In December 2005:

- Updated TRITON cross sections generated by NRC/RES

Additional design information requested of GE under Task Order 4 (JCN J-3149) will be provided to the PI via e-mail from the Technical Monitor upon receipt of responses from GE.

#### OTHER APPLICABLE INFORMATION

##### License Fee Recovery

The work specified in this SOW is license fee recoverable and must be charged to TAC number MC8375.

##### Assumptions and Understandings

The schedule and level of effort assumption for Task 1 is based on the fact that minimal effort is required to input the most recent GE design information.

The schedule and level of effort for Task 2 assumes NRC/RES TRITON cross section set will not need to be updated and gives allowance for minor error checking and troubleshooting and does not account for any effort involved in major alterations.

##### Assumptions and Understandings (Continued)

The schedule and level of effort assumption for Subtask 3.a. is based on the fact that most of the effort will be in coupling and troubleshooting the steady state TRACE/PARCS input decks and at that point it would be straightforward to couple and run the transient restart decks. The level of effort and schedule assumption for Subtasks 3.b, 3.c. and 3.d. are based on the fact that work only involves performance of the assessments.

It is understood that TRACE/PARCS/TRITON is a relatively new code package which is still under development and has not been fully assessed and tested. Input deck preparation and troubleshooting will be unpredictable. Staff estimates for schedule and level of effort assume the contractor will face some issues but are not comprehensive in the event of major issues such as the need for new cross sections to be generated and incorporated into the PARCS input. If level of effort assumptions are to be exceeded at the Task level greater than 15 percent, the Technical Monitor and the Project Officer are to be informed immediately.

The assumptions for schedule and level of effort for Task 4 assumes that the assessment of the decks will be straightforward and the input decks will not need to have major modifications.

The assumptions for schedule and level of effort for all tasks assume that complete information has been provided by GE. This also assumes the timely response of GE for requests made for additional design information as part of previous task orders.

All assumptions for level of effort also assume that there are no major issues faced with the TRACE/PARCS/TRITON code package.