

**ORDER FOR SUPPLIES OR SERVICES**

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

BPA NO.

1. DATE OF ORDER <b>SEP 20 2005</b>		2. CONTRACT NO. (if any) NRC-03-03-038		6. SHIP TO:	
3. ORDER NO. T018		4. REQUISITION/REFERENCE NO. NRR0303818		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission Ofc. of Nuclear Reactor Regulation	
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Division of Contracts Contract Management Branch 2 Mail Stop T-7-I-2 Washington, DC 20555		b. STREET ADDRESS Attn: Lawrence Ruth MailStop: OWF 10A1		c. CITY Washington	
7. TO:		d. STATE DC		e. ZIP CODE 20555	
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES		b. TYPE OF ORDER		f. SHIP VIA	
b. COMPANY NAME		<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.	
c. STREET ADDRESS 11140 ROCKVILLE PIKE STE 500		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.		g. SERVICE-DISABLED VETERAN-OWNED <input type="checkbox"/>	
d. CITY ROCKVILLE		e. STATE MD		f. ZIP CODE 208522310	
9. ACCOUNTING AND APPROPRIATION DATA 520-15-113-103 J-3200 252A 31X0200.520 FFS#: NRR03038018 OBLIGATE: \$46,637		10. REQUISITIONING OFFICE NRR Ofc. of Nuclear Reactor Regulation			

11. BUSINESS CLASSIFICATION (Check appropriate box(es))			12. F.O.B. POINT N/A	
<input type="checkbox"/> a. SMALL	<input checked="" type="checkbox"/> b. OTHER THAN SMALL	<input type="checkbox"/> c. DISADVANTAGED	<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED	
<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) SEE BELOW
a. INSPECTION	b. ACCEPTANCE			16. DISCOUNT TERMS N/A

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. 018 UNDER NRC-03-03-038  TITLE: TECHNICAL SUPPORT FOR REVIEW AND EVALUATION OF ESBWR PROBABILISTIC RISK ASSESSMENT (PRA) AND SEVERE ACCIDENT ASSESSMENTS  PERIOD OF PERFORMANCE: 9/7/2005 THROUGH 11/30/2005  ESTIMATED REIMBURSABLE COSTS: \$43,301 FEE: \$3,336 TOTAL COSTS AND FEE: \$46,637  SEE ATTACHED PAGE 2 FOR DESCRIPTION OF TASK ORDER					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		\$46,637.00	17(h) TOTAL (Cont. pages)	
	21. MAIL INVOICE TO:								
	a. NAME U.S. Nuclear Regulatory Commission Division of Contracts						\$46,637.00		17(i). GRAND TOTAL
	b. STREET ADDRESS (or P.O. Box) MailStop: T-7-I-2								
c. CITY Washington		d. STATE DC		e. ZIP CODE 20555					

22. UNITED STATES OF AMERICA BY (Signature) 	23. NAME (Typed) Stephen M. Pool Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER
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This confirms verbal authorization that was provided to Information Systems Laboratories, Inc. (ISL) on 9/7/2005, to begin work under Task Order No. 18, effective 9/7/2005, with a temporary ceiling of \$15,000.

In accordance with Section G.5, Task Order Procedures, of contract number NRC-03-03-038, this definitizes Task Order No. 018. The effort shall be performed in accordance with the enclosed Statement of Work.

Task Order No. 018 shall be in effect from September 7, 2005 through November 30, 2005, with a cost ceiling of \$46,637. The amount of \$43,301 represents the estimated reimbursable costs, and the amount of \$3,336 represents the fixed fee.

The following individuals are considered to be essential to the successful performance for work hereunder: Dr. Robert Youngblood, Mr. Bruce Mrowca, and Ms. Kim Green. The Contractor agrees that such personnel shall not be removed from the effort under the task order without compliance with Contract Clause H.4, Key Personnel.

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

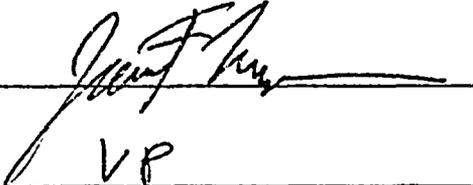
Your contacts during the course of this task order are:

Technical Matters: Lawrence Ruth  
Project Officer  
(301) 415-1211

Contractual Matters: Rachel Glaros  
Contract Specialist  
(301) 415-0115

Acceptance of Task Order No. 018 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. You should retain the third copy for your records.

ACCEPTED: Task Order No. 018

  
\_\_\_\_\_  
NAME  
  
VP  
\_\_\_\_\_  
TITLE  
  
9/20/05  
\_\_\_\_\_  
DATE

**STATEMENT OF WORK  
TASK ORDER NO. 18  
UNDER JCN J-3200**

**TITLE: TECHNICAL SUPPORT FOR REVIEW AND EVALUATION OF ESBWR  
PROBABILISTIC RISK ASSESSMENT (PRA) AND SEVERE ACCIDENT  
ASSESSMENTS**

**B&R NUMBER: 520-15-113-103**

**NRC PROJECT (PROGRAM) MANAGER: Lawrence Ruth (301 415-1211)**

**NRC PROGRAM TECHNICAL MONITORS: Nicholas Saltos (301 415-1072)  
See-Meng Wong (301 415-1125)  
Robert Palla (301 415-1095)**

**TAC NO.: MC5108, MCxxxx**

**NRR PRIORITY: 1**

**LEVEL OF EFFORT: 8 Staff-Weeks**

**PROJECTED COMPLETION DATE: 11/30/2005**

**CONTRACTOR: Information Systems Laboratory**

**BACKGROUND**

As part of its application for certification of the Economic & Simplified Boiling Water Reactor (ESBWR) design, General Electric (GE) Company performed a probabilistic risk assessment (PRA) that is to be submitted in late August 2005 to NRC for review. The ESBWR PRA submittal is a full-scope PRA of Level 1, Level 2, and a limited scope Level 3 analyses. The Level 1 PRA contains risk analyses of internal and external events (e.g., fire, flood, high winds, and seismic events) during at-power operation, as well as a plant shutdown risk model. The Level 2 PRA is supported by deterministic evaluations of severe accident issues and phenomena relevant to the ESBWR design. The ESBWR is the latest evolution of GE's boiling water reactor (BWR) technology that introduces passive safety systems and natural circulation for accident mitigation, but also has active systems for investment protection and defense-in-depth. The GE application for design certification also includes an evaluation of potential severe accident mitigation design alternatives (SAMDA) for the ESBWR design.

The technical review activities for the ESBWR PRA will be highly schedule-driven. The primary objectives of the PRA review are to: (1) determine potential ESBWR plant vulnerabilities, risk dominant accident scenarios, and potential radiological risks to the public, (2) perform technical reviews of the deterministic evaluations of severe accident issues, and (3) perform a technical review of the SAMDA evaluation. In the first phase of review, NRC staff is expected to identify areas where additional information is needed to complete the review and prepare requests for additional information (RAIs). These RAIs will address quality of the PRA, and specific

information needed to gain safety insights about the ESBWR design. The RAIs will also address information needed to identify risk-informed requirements for design certification, such as Inspection, Testing Analyses, and Acceptance Criteria (ITAAC), Regulatory Treatment of non-Safety Systems (RTNSS) and Combined Operation License (COL) actions. The review will focus on evaluating novel features that need to be properly modeled in the PRA, including thermal-hydraulic uncertainties and their impact on the PRA success criteria. In the second phase, the staff will review and evaluate the RAI responses, and prepare a Draft Safety Evaluation Report (DSER).

## **OBJECTIVE**

The objective of this task order is to obtain expert technical assistance from Information Systems Laboratory (ISL) to support and assist the staff in performing an independent evaluation of the completeness and technical adequacy of GE's PRA and deterministic severe accident assessments for the ESBWR design. The scope of the review includes : (1) initial review and preparation of requests for additional information (RAIs), (2) review of the applicant's response to the staff's RAIs, and (3) identification of risk-informed design certification requirements, such as ITAACs, RTNSS and COL actions. It is expected that the ISL contractor or subcontractor will identify RAIs, as needed, and evaluate the responses to these RAIs. In performing this evaluation, ISL has to assure proper interface between the Level 1 PRA and Level 2/3 PRA reviews.

## **TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED**

The laboratory contractor shall provide specialists with: (a) expertise and experience in the development and peer review of all levels of PRA (i.e., Levels 1, 2, and 3), including expertise in human reliability analysis (HRA) for both internal and external events during at-power as well as shutdown operations, (b) expertise and experience in thermal-hydraulic uncertainty analyses, including familiarity with thermal-hydraulic analysis codes (e.g., MAAP, RELAP, Gothic, etc.), (c) expertise and experience in the application of PRA methodologies and commercial nuclear reactor PRA results, especially external events and fire risk assessment methodologies, (d) expertise in BWR plant system designs, including the design and functional performance of passive systems, containment and severe accident systems, (e) expertise and familiarity with NRC regulations, technical specifications and inspections related to commercial nuclear power plant operations, (f) expertise and familiarity with PRA software (e.g., CAFTA). This task level SOW may require support to the staff in preparing presentations to the Advisory Committee for Reactor Safeguards (ACRS), Commission, and industry groups.

It is the responsibility of the contractor to assign technical staff, employees, subcontractors, or specialists who have the required educational background, experience, or combination thereof to meet both the technical and regulatory objectives of the work specified in this task order SOW. The NRC will rely on representations made by the contractor concerning the qualifications of the personnel assigned to this task order including assurance that all information contained in the technical and cost proposal, including resumes, is accurate and truthful.

The use of key personnel and any proposed change to key personnel on this task order contract is subject to the NRC Project Manager's approval. This includes proposed use of principal persons (i.e., key contributors) during the life of the contract.

If any work would be subcontracted or performed by consultants, ISL shall obtain the NRC Project Manager's written approval of the subcontractor or consultant prior to initiation of the subcontract effort. Conflict of interest considerations shall apply to any subcontracted effort.

## **WORK REQUIREMENTS AND SCHEDULE**

Upon acceptance of this task order, the NRC Technical Monitor will provide the ESBWR PRA submitted by GE to Information Systems Laboratory (ISL) prior to initiation of work. ISL shall provide personnel with PRA and other required expertise necessary to perform work in the following tasks:

### **Tasks**

#### **18.1 Initial Review of Level 1 PRA and Preparation of Requests for Additional Information (RAIs)**

This subtask is to assist the staff in performing an independent evaluation of the completeness and technical adequacy of GE's Level 1 PRA for the ESBWR design. The focus of this review is on identifying areas where additional information is needed (i.e., develop a list of RAIs) to assess the bases for the Level 1 PRA major assumptions, and provide insights about the ESBWR design strengths and weaknesses. As part of this review, some accident sequences would be requantified using GE's CAFTA model to identify areas where the risk analyses need to be improved, or to provide further insights on potential risk reduction through design enhancements.

#### **18.2 Initial Review of Level 2/3 PRA and Deterministic Severe Accident Assessments and Preparation of Requests for Additional Information (RAIs)**

This subtask is to assist the staff in performing an independent evaluation of the completeness and technical adequacy of GE's Level 2/3 PRA and deterministic severe accident assessments for the ESBWR design. The focus of this review is on identifying areas where additional information is needed (i.e., develop a list of RAIs) to assess the bases for the major assumptions in the Level 2/3 PRA and severe accident assessments, and provide insights about the ESBWR design strengths and weaknesses.

#### **18.3 Initial Review of SAMDAs for ESBWR Design**

This subtask is to assist the staff in performing an independent review of the completeness and technical adequacy of GE's SAMDAs for the ESBWR design. The focus of this review is on identifying areas where additional information is needed (i.e., develop a list of RAIs) to assess the completeness of design alternatives considered for the ESBWR design and the reasonableness of GE's analyses of risk reduction and costs.

It is expected that the ISL contractor will participate in technical meetings and conference calls between NRC and GE staff to perform technical assessments of specific issues identified during the course of the review (on an as-needed basis by request of the NRC technical monitor). As necessary, the ISL contractor will also provide support to NRC staff in preparing

testimonies and presentations to the Advisory Committee for Reactor Safeguards (ACRS), Commission, and industry groups.

### **LEVEL OF EFFORT**

The total level of effort is estimated at eight professional staff-weeks over a three-month period of performance. The estimate for the total level of effort is provided for the purpose of preparing a cost proposal and is expected to change as work progresses.

### **DELIVERABLES**

#### **Technical Reporting Requirements**

- 18.1 At the completion of the initial review of the Level 1 PRA within subtask 18.1, submit a draft summary of evaluations of specific issues and a list of RAIs to the Technical Monitor with a copy of the cover or transmittal letter to the Project Officer.
- 18.2 At the completion of the initial review of the Level 2/3 PRA and severe accident assessments within subtask 18.2, submit a draft summary of evaluations of specific issues and a list of RAIs to the Technical Monitor with a copy of the cover or transmittal letter to the Project Officer.
- 18.3 At the completion of the initial review of SAMDAs for the ESBWR design within subtask 18.3, submit a draft summary of evaluations of specific issues and a list of RAIs to the Technical Monitor with a copy of the cover or transmittal letter to the Project Officer.

All technical letter reports submitted for acceptance by NRC staff must meet NRC expected quality standards.

### **MEETINGS AND TRAVEL**

For the purpose of providing a proposal, the following meetings and local travel can be used:

- Five, two-person, one-day trips to NRC Headquarters in Rockville, Maryland to meet with the NRC and GE staff to discuss the results of the evaluations, and to provide support to the staff in preparing presentations to the ACRS, Commission and industry groups.

Additional travel will be coordinated with the NRC Project Manager and Technical Monitor as the need for such travel is identified to ensure it supports the timely completion of work.

### **NRC FURNISHED MATERIALS**

The NRC will provide the necessary materials to facilitate successful completion of this project.

### **OTHER APPLICABLE INFORMATION**

License Fee Recovery

The work specified in this SOW is licensee fee recoverable under 10 CFR Part 52.