ORDER FOR SUPPLIES OR SERVICES

IMPORTANT: Mark all packages and papers with contract and/or order numbers. BPA NO.

1. DATE OF ORDER: SEP 09 2005
2. CONTRACT NO. (If any): NRC-04-04-062
3. ORDER NO.: TASK ORDER 002 MODIFICATION NO.
4. REQUISITION/REFERENCE NO.: RES-C05-452 RES-04-062

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

6. SHIP TO:
a. NAME OF CONSIGNEE: U.S. Nuclear Regulatory Commission
Attn: Ronald Emrit
b. STREET ADDRESS: Mail Stop: T10-K44
11555 Rockville Pike
c. CITY: Rockville
d. STATE: MD
e. ZIP CODE: 20852

7. TO:
a. NAME OF CONTRACTOR: INFORMATION SYSTEMS LABORATORIES, INC
b. COMPANY NAME: ATTN: DR. JAMES F. MEYER
c. STREET ADDRESS: 11140 ROCKVILLE PIKE, SUITE 500
d. CITY: ROCKVILLE
e. STATE: MD
f. ZIP CODE: 20852

f. SHIP VIA

8. TYPE OF ORDER
[ ] a. PURCHASE
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.

[X] b. DELIVERY
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
Note:$240,000.00 previously obligated as part of the minimum guarantee under the basic contract is to be allotted for Task Order No. 2

10. REQUISITIONING OFFICE: RES

11. BUSINESS CLASSIFICATION (Check appropriate box(es))
[ ] a. SMALL
[ ] b. OTHER THAN SMALL
[ ] c. DISADVANTAGED
[ ] g. SERVICE-DISABLED VETERAN-OWNED
[ ] d. WOMEN-OWNED
[ ] e. HUBZone
[ ] f. EMERGING SMALL BUSINESS

12. F.O.B. POINT: Destination

13. PLACE OF
a. INSPECTION
b. ACCEPTANCE

14. GOVERNMENT B/L NO.

15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)

16. DISCOUNT TERMS

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. 2 Entitled "Assistance for Testing Design Objectives Defined in Technology-Neutral Framework for New Plant Licensing" This confirms the verbal authorization provided to ISL on July 25, 2005 to begin work under the subject task order, effective July 25, 2005 with a temporary ceiling of $50,000.00. In accordance with Section G.3 entitled "Task Order Procedures" of the subject contract, this order definitizes Task Order No. 2. This effort shall be perfomed in accordance with the enclosed Statement of Work. Task Order No. 2 shall be effective July 25, 2005 through December 31, 2005 with a total cost ceiling of $274,548.00. The amount of $255,331.00 represents the reimbursable costs the amount of $19,217.00 represents the fixed fee.					

18. SHIPPING POINT
19. GROSS SHIPPING WEIGHT
20. INVOICE NO.

SEE BILLING INSTRUCTIONS ON REVERSE

21. MAIL INVOICE TO:
a. NAME: U.S. Nuclear Regulatory Commission
Payment Team, Mail Stop T-9-H-4
b. STREET ADDRESS (or P.O. Box): Attn: (NRC-04-04-062-002)
c. CITY: Washington
d. STATE: DC
e. ZIP CODE: 20555

17(h) TOTAL (Cont. pages)

17(i). GRAND TOTAL

22. UNITED STATES OF AMERICA BY (Signature)

23. NAME (Typed)
Stephen M. Pool
Contracting Officer
TITLE: CONTRACTING/ORDERING OFFICER

SUPPLEMENTAL INVOICING INFORMATION

If desired, this order (or copy thereof) may be used by the Contractor as the Contractor's invoice, instead of a separate invoice, provided the following statement, (signed and dated) is on (or attached to) the order: "Payment is requested in the amount of $_____. No other invoice will be submitted." However, if the Contractor wishes to submit an invoice, the following information must be provided: contract number (if any), order number, item number(s), description of supplies or services, sizes, quantities, unit prices, and extended totals. Prepaid shipping costs will be indicated as a separate item on the invoice. Where shipping costs exceed $10 (except for parcel post), the billing must be supported by a bill of lading or receipt. When several orders are invoiced to an ordering activity during the same billing period, consolidated periodic billings are encouraged.

RECEIVING REPORT

Quantity in the "Quantity Accepted" column on the face of this order has been: ☐ inspected, ☐ accepted, ☐ received by me and conforms to contract. Items listed below have been rejected for the reasons indicated.

SHIPMENT NUMBER	PARTIAL		DATE RECEIVED	SIGNATURE OF AUTHORIZED U.S. GOV'T REP.	DATE
	FINAL				
TOTAL CONTAINERS		GROSS WEIGHT	RECEIVED AT	TITLE	

REPORT OF REJECTIONS

ITEM NO.	SUPPLIES OR SERVICES	UNIT	QUANTITY REJECTED	REASON FOR REJECTION

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

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

DATE OF ORDER	CONTRACT NO.	ORDER NO.
	NRC-04-04-062	TASK ORDER 002

ITEM NO. (A)	SUPPLIES OR SERVICES (B)	QUANTITY ORDERED (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)	QUANTITY ACCEPTED (G)
	Funds in the amount of $240,000.00 were transferred from the Base Award to this Task Order. The issuance of this task order does not amend any other terms or conditions of the subject contract. Please indicate your acceptance of this Task Order No. 2. Accepted Name _____ Title V.P. Date 9/14/05					
	TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))					

TASK 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.

STATEMENT OF WORK
NRC-04-04-062 TASK ORDER NO. 2
JOB CODE Y6912

TITLE: **Assistance for Testing Design Objectives Defined in Technology-Neutral Framework for New Plant Licensing**

I. BACKGROUND

The Commission, in its Policy Statement on Regulation of Advanced Nuclear Power Plants, stated its intention to "improve the licensing environment for advanced nuclear power reactors to minimize complexity and uncertainty in the regulatory process."

The staff noted in its Advanced Reactor Research Plan to the Commission, that a risk-informed regulatory structure applied to license and regulate advanced (new) reactors, regardless of their technology, could enhance the effectiveness, efficiency, and predictability (i.e., stability) of new plant licensing.

The regulatory structure for current LWRs has evolved over five decades. Most of this evolution occurred without the benefit of insights from probabilistic risk assessments (PRAs) and severe accident research. It is expected that future applicants will rely on PRAs as an integral part of their license applications. Further, many of the current regulations are more of a prescriptive nature. It is further expected that the regulations for these new reactors will be risk-informed and performance-based. Both deterministic and probabilistic results and insights will be used in the development of the regulations governing these reactors. Consequently, a risk-informed performance-based approach for a new regulatory structure that provides guidance about how to use PRA results and insights will help ensure safety by focusing the regulations on where the risk is most likely while maintaining basic safety principles, such as defense-in-depth and safety margin.

The NRC's past LWR experience, especially the recent efforts to risk-inform and performance-base the regulations, has shown the potential value of a top-down approach to developing a regulatory structure. Such an approach could facilitate the implementation of performance-based regulation, as well as ensure a greater degree of coherence among the resulting regulations than found among current regulations.

The objective of this program is to develop and implement a risk-informed performance-based regulatory structure that is technology-neutral that demonstrates that the NRC mission of protecting the public health and safety is met. This regulatory structure has four parts:

(1) development of a technology-neutral framework for the regulatory structure,
(2) development of proposed content of technology-neutral requirements,
(3) development of guidance for applying the framework on a technology-specific basis (i.e., technology-specific framework), and
(4) development of technology-specific regulatory guides.

To date, the staff is focusing on Part 1, development of a technology-neutral framework. The objective of the technology-neutral framework is to provide an approach that will (1) enhance the regulatory structure effectiveness and efficiency, and (2) reduce unnecessary regulatory burden. The framework will provide the necessary guidance and criteria for developing a risk-informed performance-based regulatory structure. This regulatory structure is technology-neutral and if desired, can be applied to LWRS. Therefore, insights gained from this regulatory structure can be applied to enhance the effectiveness and efficiency of the current regulatory structure and identify areas for potential reduction in unnecessary regulatory burden. To meet this objective, a hierarchal approach has been used. One major element of the framework is development of design objectives which provide the process and criteria for identification and selection of the accidents that the design, construction and operation need to withstand and for the safety classification of the structures, systems and components (SSCs).

In SECY-03-0047, the staff recommended to the Commission to allow the use of PRA in the identification of events to be considered in the design and allow a probabilistic approach for the safety classification of SSCs, which the Commission approved in their June 26, 2003 staff requirements memorandum.

Criteria and guidelines on these issues have been developed in the framework. Before the framework is implemented (e.g., development of the risk-informed performance-based technology-neutral regulations), testing of the criteria and guidelines is desirable. This testing is necessary to ensure that an efficient and effective regulatory process will be achieved.

II. OBJECTIVE

The objective of this task is to test the design objective criteria and guidelines developed in the technology-neutral framework such that it will reduce unnecessary regulatory burden, and result in a more effective and efficient process that will provide a stable and predictive regulatory structure.

III. SCOPE OF WORK

Test Criteria for Design Objectives

The contractor will support the staff in testing the criteria developed in the framework for: (1) identification and selection of design basis events; and (2) safety classification of SSCs.

Subtask 1: Test Criteria Using Current Licensed LWR

The contractor will test the criteria against two current LWRs. That is, using the plant-specific, full-scope PRAs, the contractor will identify and select the design bases events and identify the SSCs that would be classified as safety related (i.e., risk significant). The contractor will evaluate the results by comparing them against the current DBAs and the current safety related SSCs to identify similarities and differences. The contractor will evaluate the bases and

significance of the differences from a risk perspective. The contractor will perform this test on both a BWR and PWR, using the NUREG-1150 studies (i.e., Surry and Peach Bottom).

In testing the criteria and guidelines, insights into the following issues should be provided:

(1) This issue relates to the identification and categorization of the events to be used in establishing the licensing basis events. This issue can be summarized under the following questions:

What are the events?
What is meant by event scenarios, initiators, event/accident sequences?
What is the end state?
What is the technical basis/justification for defining the frequency categories?
How are the categories characterized or labeled?

In utilizing a probabilistic approach to identify the design events to establish the licensing basis, a definition of what is meant by an event is needed. Is the event a single initiating event? Is this initiating event an equipment failure or operator action that taken together with additional failures or actions ultimately puts the plant in an adverse condition requiring the reactor to be shutdown or is the event an event scenario or sequence? If it is an event scenario or sequence consisting of a series of events should they result in a specific end state such as loss of core cooling or significant fuel damage? If the scenario or sequence results in a specific end state what are these states and can they be defined in a technology-neutral way?

Are these events a result of internal causes within the plant boundary? If so single internal events are considered that require additional events to occur in order to result in an undesirable end state. If external causes are also included then single initiating events (e.g. a seismic event) can result in multiple failures that lead directly to an undesirable end state without the need for additional failures or operator actions.

(2) This issue relates to the relationship between design licensing events and major safety functions and raises the following questions:

Should there be a design licensing event established for each major safety function? Can major safety functions be defined at a technology-neutral level?

The issue here is related to defining major safety functions that may differ significantly between designs. For example, removal of decay heat is a major safety function in current operating reactors, but is not expected to be one in other designs where it can be accomplished by purely passive means, e.g.,radiative cooling or natural circulation. There should be a design licensing event for every major safety function but it appears that these will have to be selected at the technology specific level. Should the reactor specific PRA be used to identify these licensing events?

(3) This issue relates to the change of design licensing events over time. This issue can be summarized under the following questions:

Is this issue addressed by a living PRA?
Should a reactor specific PRA be used to identify the design licensing events?
How to address that the design licensing events may change over time?

In order to address this concern it appears that a reactor specific living PRA is required?

If this is the case then the following additional questions arise in regard to this issue. Is it reasonable to require licensees to have a living PRA as a matter of course? How frequently and in what manner would the living PRA have to be updated? If, when updating the living PRA, it becomes apparent that the design licensing events have to be changed how would the change be accomplished?

(4) This issue relates to establishing operating limits for the new reactor technologies and leads to the following questions:

How are these limits to be established?
What would be their role with regard to the frequent events category?

It seems that operating limits could only be established at the technology-specific level. Can one develop a scheme similar to that of establishing technical specification for currently operating reactors? Would this scheme involve selecting events from the frequent category that represent small deviations from normal operations? How much experience is needed in order to gain confidence in such a scheme? Is there another approach for establishing operating limits at the technology specific level?

(5) This issue relates to how the design licensing event selection ensures a risk-informed rather than a risk-based approach:

What guiding principles are needed to ensure defense-in-depth is met and adequate safety margins exist?

Is the current defense-in-depth model, including the protective strategies and the defense-in-depth principles in the framework, sufficient to ensure defense-in-depth and safety margins are adequate? Is this approach sufficient to make it risk-informed? Can the type of acceptance criteria, and the level of confidence with which they are met, be used to further ensure a risk-informed approach?

(6) This issue relates to the development of acceptance criteria for the event sequence categories and leads to the following questions:

What form should the acceptance criteria take?
How to demonstrate compliance with the acceptance criteria?

The dose verses frequency curve proposed in the Framework establishes dose limits for the frequent and infrequent categories as part of the acceptance criteria. Are these dose levels adequate? At what level of confidence should the acceptance criteria be met, or put another way, how should uncertainties be accounted for?

(7) This issue addresses cliff-edge events and is summarized in the following questions:

How should cliff edge event be treated?
Can the frequency/confidence curve be used to identify and develop an approach for handling cliff edge events?

The concern here is that by eliminating some low frequency events from further consideration (i.e., events 10^{-7}/RY) a potentially high consequence event could be missed. The concern becomes greater if the estimated frequency of the high consequence event is uncertain and it is eliminated based on a mean estimate of the likelihood of occurrence. One possible way to address cliff edge events could be to plot low frequency high consequence events together with an estimate of the associated uncertainties on the dose frequency curve shown above.

Estimated completion date: December 31, 2005

Subtask 2: Overall Technical Support

As the framework is further developed, specifically with regard to the above technical issues (i.e., identification and selection of design bases events and SSC safety classification), the contractor will attend the technical meetings and participate in technical discussions. As a result of the meetings and discussions, the contractor may be assigned action items that are related to and in support of the above task.

Estimated completion date: December 31, 2005

IV. REPORTING REQUIREMENTS

Refer to Section F.5 "PLACE OF DELIVERY—REPORTS (JUNE 1988)" under the Contract and replace paragraph (a) with the following (applies only for this task):

"(a) Ronald Emrit
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research
Mail Stop: T-10-E50
Washington, DC 20555

Kimberly Jones
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research
Mail Stop: T-10-E32
Washington, DC 20555

Amarjit Singh
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research
Mail Stop: T-10-E50
Washington, DC 20555"

NOTE: The NRC has implemented a new document management system, Agency wide Documents Access and Management System (ADAMS). For the present, contractors' mail will not be placed in ADAMS. All documents mailed to the NRC (e.g., letters, technical reports, monthly letter reports, and other mail) should have "Addressee Only" on the envelope to keep it from being entered into ADAMS. Send mail for the addressee and cc's as separate mailings.

V. DELIVERABLES AND DELIVERY SCHEDULE

At the completion of each subtask, when requested by the NRC Technical Monitor, the contractor will submit to the NRC a letter report of the contractor's input. The contractor will meet the following milestones and deliverables (i.e., reporting requirements):

MILESTONE	DELIVERABLE	DUE DATE
Initial test of the criteria: identification of the design bases events and SSC safety classification using the criteria. Contractor will brief staff within 2 weeks of submitting the report	Technical Report	9-15--05
Preliminary assessment of the criteria: evaluation of design bases events and safety classification using the Framework criteria against the predefined design basis accidents and safety related SSCs as specified in 10 CFR Part 50. Contractor will brief staff within 2 weeks of submitting the report.	Technical Report	10-15-05
Interim assessment of the criteria: observations and conclusions (i.e., insights) regarding the items specified above. Contractor will brief staff within 2 weeks of submitting the report.	Technical Report	11-15-05
Final assessment: based on staff internal review and comments, resolve staff comments	Final Draft Technical Report	12-31-05

VI. MEETINGS AND TRAVEL REQUIREMENTS

The contractor will travel to NRC headquarters for the meetings, as needed. Technical meetings will include the following:

(1) team meetings (average of 2-days per month)
(2) public meetings (three 1-day meetings)
(3) ACRS briefings (two half-day Full Committee and two 1-day Subcommittee meetings)

VII. PERIOD OF PERFORMANCE

The period of performance for this task order is from the July 25, 2005 through December 31, 2005.

VIII. TECHNICAL DIRECTION

Technical direction will be provided by the following NRC staff:

Amarjit Singh
Mail Stop: T10-E50
Phone: 301-415-0250
AXS4@NRC.GOV

IX. PUBLICATIONS

RES encourages the publication of the scientific results from RES-sponsored programs in refereed scientific and engineering journals as appropriate. If the laboratory proposes to publish in the open literature or present the information at meeting in addition to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the NRC Project Manager. The RES Project Manager shall either approve the material as submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the RES Project Manager may disapprove or delay presentation or publication of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved. Additional information regarding the publication of NRC sponsored research is contained in NRC Management Directives 3.8, "Unclassified Contractor and Grantee Publications in the NUREG Series," and 3.9, "NRC Staff and Contractor Speeches, Papers, and Journal Articles on Regulatory and Technical Subjects."

If the presentation or paper is in addition to the required technical reports and the RES Project Manager determines that it will benefit the RES project, the Project Manager may authorize payment of travel and publishing costs, if any, from the project funds. If the Project Manager determines that the article or presentation would not benefit the RES project, the costs associated with the preparation, presentation, or publication will be borne by the contractor. For any publication or presentations falling into this category, the NRC reserves the right to require that such presentation or publication will not identify the NRC's sponsorship of the work.

NEW STANDARDS FOR CONTRACTORS WHO PREPARE NUREG-SERIES MANUSCRIPTS

The NRC will begin to capture its official records electronically on January 1, 2000. The NRC will capture each final NUREG-series publication in its native application. Therefore, commencing January 1, 2000, please submit your final manuscript that has been approved by your NRC Project Officer in both electronic and camera-ready copy.

All format guidance, as specified in NUREG-0650, Revision 2, will remain the same with one exception. You will no longer be required to include the NUREG-series designator on the bottom of each page of the manuscript. The NRC will assign this designator when we send the camera-ready copy to the printer and will place the designator on the cover, title page, and spine. The

designator for each report will no longer be assigned when the decision to prepare a publication is made. The NRC's Publishing Services Branch will inform the NRC Project Officer for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, prepare the text in WordPerfect 8, and use any of the following file types for charts, spreadsheets, and the like.

File Types to be Used for NUREG-Series Publications	
File Type	**File Extension**
WordPerfect®	.wpd
Microsoft® PowerPoint®	.ppt
Corel® QuattroPro®	wb3
Corel® Presentations	.shw
Lotus® 1-2-3	.wk4
Portable Document Format	.pdf

This list is subject to change if new software packages come into common use at NRC or by our licensees or other stakeholders that participate in the electronic submission process. If a portion of your manuscript is from another source and you cannot obtain an acceptable electronic file type for this portion (e.g., an appendix from an old publication), the NRC can, if necessary, create a tagged image file format (file extension .tif) for that portion of your report. Note that you should continue to submit original photographs, which will be scanned, since digitized photographs do not print well.

If you chose to publish a compact disk (CD) of your publication, place on the CD copies of the manuscript in both (1) a portable document format (PDF); (2) a WordPerfect 8/9 file format, and (3) an Adobe Acrobat Reader, or, alternatively, print instructions for obtaining a free copy of Adobe Acrobat Reader on the back cover insert of the jewel box.

X. QUALITY ASSURANCE

Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554) directs the Office of Management and Budget (OMB) to issue government-wide guidelines (Federal Register, Volume 67, No. 36, pp. 8452 - 8460) that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies." NRC Information Quality Guidelines are provided in the Federal Register, Vol. 67, No. 190, pp. 61695 - 61699.

XI. NRC-FURNISHED MATERIAL

No materials are to be furnished by the NRC during the performance of the work required by this Task Order.

XII. TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

The contractor shall provide personnel that have detailed knowledge and understanding of: (1) the NRC risk-informed regulatory structure, as applied to the licensing and regulation of advanced (new) reactors; (2) PRA technology; and (3) NUREG-1150. It is the responsibility of the contractor to assign its technical staff, employees, subcontractors, or specialists who have the required educational background, experience, or combination thereof to meet both the technical objectives of the work specified in this Statement of Work. 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. In addition, the contractor and personnel assigned to this work must be approved for handling and working with proprietary information.