

ORDER FOR SUPPLIES OR SERVICES

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

BPA NO.

1. DATE OF ORDER 5/16/05	2. CONTRACT NO. (if any) NRC-04-04-065	6. SHIP TO:	
3. ORDER NO. T003	MODIFICATION NO.	a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission ATTN: Michael B. Rubin	
4. REQUISITION/REFERENCE NO. RES-04-065		b. STREET ADDRESS M/S: T-10K8	

5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Division of Contracts Mail Stop: T-7-1-2 Contract Management Branch 2 Washington, DC 20555		c. CITY Washington	d. STATE DC	e. ZIP CODE 20555
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7. TO:		f. SHIP VIA		
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES		8. TYPE OF ORDER		

b. COMPANY NAME		<input type="checkbox"/> a. PURCHASE		<input checked="" type="checkbox"/> b. DELIVERY	
c. STREET ADDRESS 11140 ROCKVILLE PIKE STE 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 MD 208522310		e. STATE		f. ZIP CODE	

9. ACCOUNTING AND APPROPRIATION DATA B&R: 56015111203 Job Code: N6111 BOC: 252A 31X0200.560 FFS No: RES-C05-021 OBLIGATE: \$115,909.00		10. REQUISITIONING OFFICE RES Office of Nuclear Regulatory Research			
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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)		16. DISCOUNT TERMS N/A	
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)
	<p>SEE ATTACHED PAGE 2 OF 2 FOR DESCRIPTION OF TASK ORDER NO. 003 UNDER NRC-04-04-065</p> <p>Title: Break Size Redefinition Supporting Calculations Period of Performance: 4/6/05 through 9/30/05</p> <p>Reimbursable Costs: \$107,378.00 Fixed Fee: \$8,531.00 Total Costs and Fee: \$115,909.00</p> <p>This task order is fully funded.</p> <p>Contractor Signature Required on Page 2 of 2</p>					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		\$115,909.00		17(h) TOTAL (Cont. pages)
	21. MAIL INVOICE TO:								
	a. NAME U.S. Nuclear Regulatory Commission Div. of Contracts, Mail Stop: T-7-1-2								
	b. STREET ADDRESS (or P.O. Box) ATTN: NRC-04-04-065, Task Order No. 003								
c. CITY Washington			d. STATE DC		e. ZIP CODE 20555		NTE \$115,909.00		17(i) GRAND TOTAL

22. UNITED STATES OF AMERICA BY (Signature) 	23. NAME (Typed) Sharon D. Stewart Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER
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**STATEMENT OF WORK
NRC-04-04-065
TASK ORDER No. 003**

TITLE: Break Size Redefinition Supporting Calculations

I. BACKGROUND

NRC staff is currently revising the Code of Federal Regulations, 10CFR50.46, the ECCS rule, to allow a "risk-informed" treatment of several parameters. One of the major changes that is being considered is a reduction in the maximum break size that is assumed in a loss of coolant accident (LOCA) analysis. Rather than assuming a double-ended guillotine break in one of the major reactor coolant system (RCS) pipes, the maximum break may be restricted to an area of less than 2.0 ft² or even less. While the precise definition of this new maximum has not yet been determined, it is clear that the smaller break area will have a significant effect on LOCA analysis and potentially provide applicants with opportunities to enhance plant operation. In addition, since size alternate break locations such as leaks directly from the reactor vessel may be risk significant, the new rule must also take these locations into account.

One of the key problems in formulating a new rule affecting break size is estimating what might occur with plant operation once the rule is changed and industry takes advantage of the new features. To help formulate the rule change and regulatory guides that will clarify the staff positions, the staff must anticipate what an analysis under the new rule might be like. Calculations to investigate the impact of break size reduction and different locations must be performed before the rule is finalized.

II. OBJECTIVE OF PROPOSED WORK

This work was begun under contract NRC-04-02-054 Task Order 13. However the overall ceiling was reached for that contract. Therefore, the balance of the work will be completed under this contract. The background and objectives remain the same. Only the work scope for the remaining work is defined in this SOW.

The objective of the entire project is to quantify the effect of break size reduction and alternate break locations on margin to existing and alternate acceptance criteria. Questions that must be addressed include:

- a. What magnitude of power uprate, diesel delay time, and peaking factor increases would a risk-informed treatment of maximum break size and locations enable? Is LOCA still limiting, or would DNB limited events or some other scenario become more limiting? If DNB events or another scenario becomes more limiting, would this meet the desired intent of the SRM which is to focus attention on more risk-significant accidents?
- b. Do existing thermal-hydraulic codes remain adequately validated at modified plant operating conditions? That is, do we have experimental data to support the peak linear heat rates that may be enabled by the new maximum break size? Similarly, are transients in integral facilities such as ROSA, Semiscale, BETHSY and others still representative of new transients? Are new integral effects tests necessary to support the proposed changes to the regulations?

- c. Do existing thermal-hydraulic codes have adequate capability to analyze LOCA behavior in the range envisioned by the new rule?
- d. If the staff defines the maximum credible break size as $X \text{ ft}^2$, does increasing it to $X + 10\%$ send results "over a cliff", or is there margin for error in selection of the new maximum break size?
- e. What would be the consequence of a double-ended large break LOCA if the plant is uprated and equipment availability is not as restrictive?

To assist the staff in addressing these and other questions, an analysis program is needed to examine the impact of the risk-informing breaks to the RCS. For this investigation, assume that the maximum credible break size can be a 12-inch equivalent diameter break in the primary RCS piping. To satisfy the objective that risk-significant breaks anywhere in the RCS be considered, breaks of major branch lines will also be considered.

III. SCOPE OF WORK:

The numbering of the tasks is the same as was used in the previous contract. Therefore, the numbers for completed tasks do not appear in this work scope

Task 3: Risk-Informed LOCA Reference Case

- (a) Assuming loss of off-site power and the loss of one diesel generator make the following calculations with best estimate decay heat. The plant operating condition will be assumed to be "as is," with no benefit derived from the smaller break size.
 - a. 4-inch, 10-inch and 12-inch cold leg breaks
 - b. Pressurizer surge line break. Safety Injection line break
 - d. Steam generator manway failure (base case completed)
 - e. CRDM failure
 - f. Instrumentation tube failure

These calculations will establish a reference point for safety margin with the current plant operating condition. The calculations consider the range of cold leg breaks likely to be most limiting, and also breaks of major branch lines and vessel penetrations.

All computer code input and output files that should be retained as defined by the NRC project officer will be archived on the NRC data bank.

Deliverable: Letter Report documenting the results for the SBLOCA reference plant cases.
Estimated Completion date: 6/15/05

Task 4: Risk-Informed LOCA Case

(a) Review the list of plant operational changes being considered by the Westinghouse Owners Group and NEI for the candidate plants in the sensitivity study. From this, make an educated guess at what changes could be accommodated if some or all of the calculations in the previous step became the new design basis. A possible condition would be a total power increase of 10% and diesel delay time of 60 seconds. A new steady-state will be generated for each plant and DNB margin evaluated. (If the minimum DNBR is not satisfied, reduce power or peaking factor.) Refer to this as the "risk-informed" plant.

As in Task 3, the following cases are to be run:

- a. 4-inch and 10-inch cold leg breaks
- b. Pressurizer surge line break
- c. Safety Injection line break
- d. Steam generator manway failure
- e. CRDM failure
- f. Instrumentation tube failure

All computer code input and output files that should be retained as defined by the NRC project officer will be archived on the NRC data bank.

Deliverable: Letter Report documenting the results for the SBLOCA risk-informed plant cases.
Estimated Completion Date: 9/15/05

IV. REPORTING REQUIREMENTS

Letter reports are due upon completion of Tasks 3 and 4.

Monthly Letter Status Report

A MLSR is to be submitted to the NRC Project Officer and Technical Monitor by the 20th of the month following the month to be reported with copies provided to the following:

Division Management Analyst, (Kim Jones, Mail Stop T-10 E32)
Contracting Officer, Division of Contracts, Office of Administration (Mail Stop T-7- I-2)

The MLSR will identify the title of the project, the job code, the Principal Investigator, the period of performance, the reporting period, summarize each month's technical progress, list monthly spending, total spending to date, and the remaining funds and will contain information as shown in Exhibit 10 of NRC Management Directive 11.7. Any administrative or technical difficulties which may affect the schedule or costs of the project shall be immediately brought to the attention of the NRC Project Officer.

NRC has developed a new document management system, Agencywide Documents Access and Management System (ADAMS). DOE mail will not be placed in ADAMS. All documents mailed from DOE to NRC (e.g., letters, technical reports, NRC Form 189s, MLSRs, 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. NRC Form 173, will be accepted by the OCFO with or without the "Addressee Only" designation.

V. MEETINGS AND TRAVEL REQUIREMENTS

Regular status meetings will be held at either the NRC or ISL office. One trip from Idaho Falls, ID to the NRC office in Rockville.

VI. PERIOD OF PERFORMANCE

The period of performance is April 6, 2005, through September 30, 2005.

VII. TECHNICAL DIRECTION

Technical direction will be provided by the Project Officer (Michael Rubin) and the Technical Monitor (G. Norman Lauben), who can be reached at:

Mail Stop: (T-10K8)
U. S. Nuclear Regulatory Commission
Washington DC 20555-0001
Phone: (301) 415-6762
Fax: (301) 415-5160
Email (gnl1@nrc.gov)

PUBLICATIONS NOTE

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 a 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 NRC Project Manager shall either approve the material as submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the NRC 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 not identify the NRC's sponsorship of the work.

NEW STANDARDS FOR CONTRACTORS WHO PREPARE NUREG-SERIES MANUSCRIPTS

The U.S. Nuclear Regulatory Commission (NRC) began to capture most of 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, prints instructions for obtaining a free copy of Adobe Acrobat Reader on the back cover insert of the jewel box.