

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		BPA NO.	1. CONTRACT ID CODE	PAGE 1	OF PAGES 2
2. AMENDMENT/MODIFICATION NO. M002		3. EFFECTIVE DATE JUN 30 2004	4. REQUISITION/PURCHASE REQ. NO. RES-04-066	5. PROJECT NO. (If applicable)	
6. ISSUED BY U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Mr. Michael Mills Mail Stop T-7-I-2 Washington, DC 20555		CODE 3100	7. ADMINISTERED BY (If other than Item 6) U.S. Nuclear Regulatory Commission Div. of Contracts Mail Stop T-7-I-2 Washington, DC 20555		CODE 3100

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)		(X)	9A. AMENDMENT OF SOLICITATION NO.
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA			9B. DATED (SEE ITEM 11)
3227 CHEADLE HL			10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-04-04-066
SANTA BARBARA CA 931062050			10B. DATED (SEE ITEM 13) 09-30-2004
CODE 094878394	FACILITY CODE	X	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
 (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required) B&R No. 66015111193, JC: Y6969, BOC: 252A
APP No. 31X0200.660, RES-C06-012, \$48,707.00

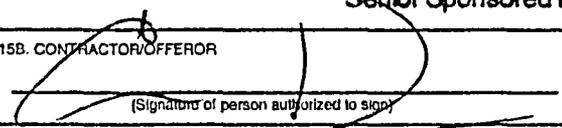
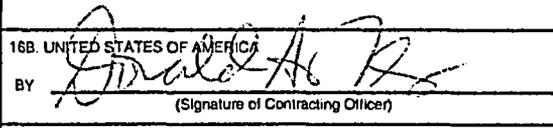
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) By Mutual Agreement of the Parties

E. IMPORTANT: Contractor is not, is required to sign this document and return 2 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
(Refer to page 2)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print) Cora L. Diaz Senior Sponsored Projects Officer		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Donald A. King	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED 6/30/04	16B. UNITED STATES OF AMERICA BY  (Signature of Contracting Officer)	16C. DATE SIGNED 6/21/04

STANDARD FORM 30 (REV. 10-83)

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

ADM002

Confirming the verbal authorization provided in the amount of \$20,000.00 on 4/26/2006, the purpose of this modification is to (1) incorporate the attached Statement of Work, and (2) provide incremental funds in the amount of \$48,707.00, thereby increasing the amount of funds obligated and the ceiling amount from \$336,000.00 to \$384,707.00 and fully funding this contract. Accordingly, the following changes are hereby made:

1. "Incorporate the attached Statement of Work.
2. Section B.3, CONSIDERATION AND OBLIGATION- - COST REIMBURSEMENT (JUNE 1988) ALTERNATE 1 (JUNE 1988), is deleted entirely and replaced with the following:
 - (a) The total estimated cost to the Government for full performance under this contract is \$384,707.00.
 - (b) The amount presently obligated by the Government with respect to this contract is \$384,707.00.
 - (c) It is estimated that the amount currently allotted will cover performance through December 31, 2006."

All other terms and conditions of this contract remain the same.

A summary of obligations, from the award date through the date of this action is given below:

Total FY 04 obligation amount:	\$135,000.00
Total FY 05 obligation amount:	\$201,000.00
Total FY 06 obligation amount:	\$ 48,707.00
Total NRC obligations:	\$384,707.00

This modification obligates FY06 funds in the amount of \$48,707.00.

STATEMENT OF WORK MODIFICATION

PROJECT TITLE: Radiation Embrittlement Analysis

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) is responsible for assuring that adequate toughness is maintained in U.S. nuclear power plant reactor pressure vessels (RPVs). As the RPVs age, the mechanical properties change due to irradiation embrittlement. These changes include increases in strength of the RPV steel and decreases in toughness. Of particular concern is the fracture toughness of these materials in the range of RPV temperatures for normal operation and accident conditions.

The surveillance Charpy specimens in plant surveillance programs were machined from the specific RPV materials of construction or very similar whenever possible. These surveillance specimens are used to measure the effect of neutron embrittlement on Charpy impact toughness versus temperature behavior. These results can then be used to estimate changes in the fracture toughness of RPV steels. For RPV materials not represented by appropriate surveillance specimens, Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," provides a generic empirical equation to predict impact toughness behavior of RPV steel.

The embrittlement correlations in RG 1.99, Revision 2 are based on limited semi-empirical, statistical analysis of a power reactor embrittlement database (PREDB) of embrittled Charpy specimens. Later research has shown that variables and variable combinations not present in the RG 1.99, Revision 2 model must be included in the embrittlement correlations. Currently, the physical model is at its final stage of verification and calibration.

This contractual action modifies an existing contract NRC-04-04-066 with University of California at Santa Barbra (UCSB) to support the NRC process required for issuance of the revision of RG 1.99, Revision 2, incorporating the embrittlement correlation based on the final physical model.

OBJECTIVE

The objective of contract NRC-04-04-066 is to develop and verify physical models based upon fundamental mechanisms for radiation embrittlement, and correlations needed to update the calculational procedures for predicting changes in toughness of irradiated pressure vessels given in Regulatory Guide 1.99 and as related to pressurized thermal shock (PTS). This modification will provide additional support for finalizing the revision of RG 1.99, Revision 2 with coordination of the effort to revise the PTS Rule.

SCOPE OF WORK

The contractor shall furnish all personnel, materials, equipment, facilities and services necessary to perform an additional task, TASK 7, which was not specified in contract NRC-04-04-066.

TASK 7: SUPPORT ISSUANCE OF THE REVISION OF RG 1.99, REVISION 2

Subtask 7.1 Provide Technical Assistance to the NRC Staff

The Contractor shall provide technical assistance to the staff on issues related to a NUREG (the technical basis document for the revision of RG 1.99, Revision 2) and the revision of RG 1.99, Revision 2 from draft to its final completion. This effort shall include (1) response to staff questions in all formats, (2) participation in meetings and telephone conferences requested by the staff, and (3) work with Oak Ridge National Laboratory (ORNL) and Modeling & Computing Services (MCS) to resolve all NRC and public comments on the draft NUREG and on the draft revision of RG 1.99, Revision 2.

Subtask 7.2 Support ACRS Meetings

The Contractor shall participate and support the staff presentation of the proposed revision of RG 1.99, Revision 2 in ACRS meetings upon staff request and address ACRS questions during and after the meeting.

Subtask 7.3 Provide support for transmitting IVAR data used for independent comparison with the Embrittlement Correlation to external parties.

As directed by the Project Manager, the Contractor shall provide support for transmitting IVAR data used for independent comparison with the Embrittlement Correlation to external parties

Subtask 7.4 Meeting Attendance

The Contractor shall attend two ACRS meetings for 1 contractor personnel for two days each in support of staff presentation of the proposed revision of RG 1.99, Revision 2. The Contractor shall also attend one ASTM E10 meeting for 1 contractor personnel for two days in support of staff presentation of the proposed embrittlement correlations in the revision of RG 1.99, Revision 2.

ESTIMATED

LEVEL OF EFFORT:

Subtask 7.1	0.05 FTE
Subtask 7.2	0.05 FTE
Subtask 7.3	0.05 FTE
<u>Subtask 7.4</u>	<u>0.024 FTE</u>
TOTAL	0.174 FTE

PERIOD OF PERFORMANCE: Signed date of contractor acceptance through 12/31/06

DELIVERABLES

1. Completion of the draft NUREG/CR documenting the technical basis for the revision of RG 1.99, Revision 2, 1 month after modification to the SOW under contract.
2. Final NUREG/CR, 5 months after modification to the SOW under contract.

Monthly Letter Status Report

A Monthly Letter Status Report (MLSR) is to be submitted to the NRC Project Manager by the

20th of the month following the month to be reported with copies provided to the following:

Mark A. Cunningham, Division Director, Mail Stop T-10D20
ATTN: Management Analyst, Mail Stop T-10D20
Branch Chief, Jennifer L. Uhle, Mail Stop T-10E10
Division of Contracts, Office of Administration, Mail Stop T-7I2

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 shall be more specifically contained in two sections as follows:

A. Project Status Section

- (1) A listing of efforts completed during the period, milestones reached, or if missed, an explanation provided.
- (2) Any problems or delays encountered or anticipated and recommendations for resolution. If the recommended resolution involves a contract modification; i.e., change in work requirements, level of effort (costs), or period of performance, a separate letter shall be prepared and submitted to the NRC Project Manager.
- (3) A summary of progress to date.
- (4) A brief summary of plans for the next report period.

B. Financial Status Section

MCS shall provide the personnel time expenditures and the amount of funds expended (cost) by category during the period and total cumulative year-to-date as follows:

	Current Month	Year-to-Date
I. Direct Staff Effort (S&P Staff Months)		
II. Direct Salaries		
Material and Services		
Travel Expenses		
Indirect Expenses		
Subcontracts		
General and Administrative		
Total Costs		
Percentage of Available Funds Spent		

PUBLICATIONS NOTE

RES encourages the publication of the scientific results from RES sponsored programs in refereed scientific and engineering journals as appropriate. If the contractor proposes to publish in the open literature or present the information at meetings 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 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 Manager 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 Manager 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.

MEETINGS AND TRAVEL

In addition to the meeting attendance requirement specified in TASK 7, the contractor may participate in professional and technical meetings at NRC request and approval in support of the completion of on-going work.

Foreign travel must be addressed separately and approval must be obtained by processing NRC Form 445, in addition to being provided as part of the approved proposal.

NRC-FURNISHED MATERIAL

No NRC-furnished material is required.

TECHNICAL DIRECTION

Technical direction will be provided by the Project Manager, Carolyn J. Fairbanks, who can be reached at:

Mail Stop:T-10E10
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001

Phone: (301) 415-6719 Fax: (301) 415-5074 Email: cxf1@nrc.gov