AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

BPA NO.	1. CONTRACT ID CODE	PAGE	OF PAG
		1	2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
M004	SEP 19 2006	RES-04-066	

6. ISSUED BY CODE 3100

U.S. Nuclear Regulatory Commission
Div. of Contracts
Attn: Adelis M Rodriguez
Mail Stop T-7-I-2
Washington, DC 20555

7. ADMINISTERED BY (If other than Item 6) CODE 3100

U.S. Nuclear Regulatory Commission
Div. of Contracts
Mail Stop T-7-I-2
Attn: Mr. Michael Mills
Washington, DC 20555

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

3227 CHEADLE HL

SANTA BARBARA CA 931060001

CODE 094878394 FACILITY CODE

(X)	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
	10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-04-04-066
X	10B. DATED (SEE ITEM 13) 09-30-2004

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-C06-400, Obligate: $34,900.00

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) Bilateral Modification. See block 14.

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.)

See page 2 for a description of the modification.

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)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
Cora L. Diaz Senior Sponsored Projects Officer	Donald A King Contracting Officer
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED 9/19/06
16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 9/11/2006

STANDARD FORM 30 (REV. 10-83)

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

ADM002

The purpose of this modification is to:

(1) recognize a cost growth associated with task 1 and 2. The preliminary results from task 1 and 2 indicated new complexities and unanticipated phenomenon not known or reasonably anticipated at the time the original contract award. These findings motivate further measurements, analysis, and documentation to quantify and describe the effects;

(2) increase the contract ceiling and obligated amounts by $34,900 from $384,707 to $419,607.

Accordingly, the contract is modified as follows:

1. As a result of new complexities and unanticipated phenomenon the contract statement of work is revised as shown on attachment number 1 to this modification;

2. Under Subsection B.3 CONSIDERATION AND OBLIGATION – COST REIMBURSEMENT (JUNE 1988) ALTERNATE 1 (JUNE 1988) are deleted entirely and the following is substituted in-lieu thereof:

   "(a) The total estimated cost to the Government for full performance under this contract is $419,607."

   "(b) The amount presently obligated by the Government with respect to this contract is $419,607."

   "(c) It is estimated that the amount currently allotted will cover performance through December 31, 2006."

All other terms and conditions 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:	$ 83,607.00
Cumulative Total of NRC Obligations	$419,607.00

This modification obligates FY06 funds in the amount of $34,900.00.

ATTACHMENT NO. 1

Basis for the request for additional funds on Tasks 1-6:

All the activities that are described below are within the general framework of Tasks 1 and 2 of NRC Job Code Y6969, Contract Number NRC-04-04-066. However, the preliminary results from these tasks indicated new complexities and unanticipated phenomenon not known or reasonably anticipated at the time the original contract with the NRC was developed. These findings motivated further measurements, analysis, and documentation to quantify and describe the effects.

Discovery of Dose Rate Effects on Matrix Feature Hardening

A recent careful analysis of the Irradiation Varaible (IVAR) database led to an unanticipated observation of systematic effects of dose rate in low and Cu free steels. This major technical finding is very important, and is a key issue in developing Revision 3 to Regulatory Guide 1.99 and the related activities that are being conducted in support of the NRC's Office of Nuclear Regulatory Research project that is developing the technical basis for a possible revision of the PTS rule. As a result of this finding additional tensile testing and microstructural characterization was been carried out. The additional tensile tests were carried out on low Cu steels irradiated in IVAR. The additional microstructural studies include small angle neutron scattering (SANS), resistivity Seebeck coefficient (RSC), atom probe tomography (APT) and positron annihilation spectroscopy (PAS) measurements. Note the SANS, APT and PAS studies involve collaborations and/or independent and highly competitive peer reviewed proposals for access to special user facilities at NIST, ORNL and LLNL. While the access to these facilities is itself "free." Conducting these very sophisticated experiments requires substantial efforts in specimen preparation, travel to facilities to conduct the experiments, and analysis of the resulting data. Because of the importance of this issue (and those described below) the need of advanced microstructural characterization studies was greater than anticipated in the original cost proposal.

In an effort to anticipate embrittlement mechanisms that have not yet been observed in commercial reactor service, the UCSB program has been carrying out proactive studies on theoretically predicted, but until recently unconfirmed, formation of so-called late blooming, Mn-Ni-Si rich, phases (LBP). The formation of LBP could lead to embrittlement in low copper RPV steels that is greater than predicted by Regulatory Guide 1.99 Revision 2. The confirmation that LBP form and lead to large hardening in a variety of alloys for a range of irradiation conditions has motivated additional mechanical testing and, especially, the microstructural characterization studies as described

previously. The costs to perform, analyze, and document these additional tests was not included in the original contract.

BWR vs. PRW Dose Rate Effects

Model-based analysis of the IVAR database shows strong flux or dose rate effects in copper bearing alloys that is similar to that found in the analysis of the surveillance database. However, a key unresolved issue is the proper basis to interpolate between BWR and PWR conditions and, especially, a physically-based model for extrapolating surveillance data to lower dose rates. A major question is the magnitude of thermal solute diffusion coefficients at low temperatures. To address this issue UCSB initiated some long-term thermal aging studies of a set of model alloys and steels using very high sensitivity RSC techniques that can detect and quantify the earliest stages of precipitation, and to extract low temperature diffusion coefficients. Completing these requires resources not budgeted in the original contract