

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE NRC-04-92-040	PAGE OF PAGES 1 3
2. AMENDMENT/MODIFICATION NO. Twelve (12)	3. EFFECTIVE DATE SEP 20 1996	4. REQUISITION/PURCHASE REQ. NO. RFPA dtd. 6/24/96	5. PROJECT NO. (If applicable) RES-C96-118
6. ISSUED BY U.S. Nuclear Regulatory Commission Division of Contracts Washington, DC 20555	CODE	7. ADMINISTERED BY (If other than Item 6) U.S. Nuclear Regulatory Commission Division of Contracts Washington, DC 20555	CODE
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP code) The Pennsylvania State University Office of Sponsored Programs 110 Technology Center University Park, PA 16802 Technical Contact: A.J. Baratta Telephone: (814) 865-0044		9A. AMENDMENT OF SOLICITATION NO.	
		9B. DATED (SEE ITEM 11)	
		10A. MODIFICATION OF CONTRACT/ORDER NO. NRC0492040	
		10B. DATED (SEE ITEM 13) 8/3/92	
CODE	FACILITY CODE		

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. Offerors 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: 66015115005 JCN: L1971 APPN: 31X0200.660
BOC: 252A OBLIGATE \$12,000.00

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

	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.
X	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, 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: Mutual consent of the parties.
X	D. OTHER (Specify type of modification and authority) Mutual agreement of both parties.

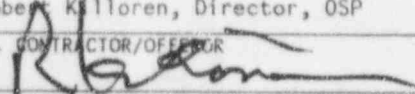
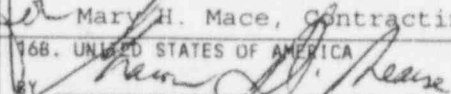
E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 2 copies to the issuing office.

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

See pages 2-3 for description of modification.

DF02
9/1

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) Robert Killoren, Director, OSP	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Mary H. Mace, Contracting Officer
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	16B. UNITED STATES OF AMERICA  (Signature of Contracting Officer)
15C. DATE SIGNED 9/20/96	16C. DATE SIGNED 9/11/96

NSN 7540-01-152-8070
PREVIOUS EDITION UNUSABLE

30-105

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

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PDR CONTR
NRC-04-92-040 PDR

The purpose of this modification is to (1) incorporate a within-scope change in accordance with the attached statement of work and PSU's technical proposal dated August 22, 1996, (2) increase the contract ceiling by \$12,124 from \$774,783 to \$786,907, (3) provide funding in the amount of \$12,000, and (4) change the Project Officer designated for this contract. Accordingly, the contract is modified as follows:

1. Under Section B.3, "Consideration and Obligation -- Cost Reimbursement (JUN 1988) Alternate I (JUN 1988)," paragraphs a. and b. are deleted in their entirety and the following is substituted in lieu thereof:

"a. The total estimated cost to the Government for full performance of this contract is \$786,907.

b. The amount presently obligated by the Government with respect to this contract is \$786,783."

2. Section C, "Statement of Work" is revised to add the effort as set forth in the attachment to this modification.
3. Section F.5, "Place of Delivery -- Reports" paragraph (a) is revised to read as follows:

"(a) Project Officer (1 copy)

Dave Ebert
US Nuclear Regulatory Commission
Division of Systems Technology, T10-G6
Office of Nuclear Regulatory Research
Washington, DC 20555"

4. Section G.2, "PROJECT OFFICER AUTHORITY (JUN 1988)," paragraph (a) is deleted in its entirety and the following is substituted in lieu thereof:

"(a) The Contracting Officer's authorized representative hereinafter referred to as the Project Officer for this contract is:

Name: Dave Ebert

Address: US Nuclear Regulatory Commission
Division of Systems Technology, T10-G6
Office of Nuclear Regulatory Research
Washington, DC 20555

Telephone: (301) 415-6501"

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

Total FY92 obligation:	\$100,000.00
Total FY93 obligation:	\$130,000.00
Total FY94 obligation:	\$225,000.00
Total FY95 obligation:	\$ 92,143.00
Total FY96 obligation:	\$239,640.00

Cumulative Total of NRC Obligations: \$ 786,783.00

This modification obligates FY96 funds in the amount of \$12,000.

All other terms and conditions of this contract remain unchanged.

Attachment: (1)

Statement of Work - Modification 12
"Separator/Dryer Model Corrections," Under Section C.1.3.2.A.1
of Contract No. NRC-04-93-040

Background

The separator/dryer component in TRAC-BF1 consists of three different models - an ideal separator, a simple separator, and a mechanistic separator. These model the steam separation process in increasing levels of complexity. Throughout the development of these models, numerous problems with execution were reported. These include failure to converge and very small time step requirements. The accuracy of the models is based on a comparison with steam separator performance data obtained by GE and reported in references 1 through 4. References 1 and 2 include detailed comparisons of model performance with GE separator data.

The models in the current version of TRAC-BF1 were reviewed and recent changes made to the code discussed with the code developers (reference 5). These reviews and discussions identified a number of problems. These problems are consistent with those reported on numerous occasions by ICAP members during their assessments of the TRAC-BF1 code. Based on this review of the GE developed models and the numerical scheme used to solve the equations a number of deficiencies were identified. These include inappropriate numerics that are incompatible with the numerics in the main code, inability to simulate certain abnormal conditions such as separator flooding, and errors in implementation of the GE models.

Scope of Work

The contractor shall:

Perform a complete rewrite of the separator model numerics and coding.

- Investigate alternative solution schemes and correct the separator/dryer errors noted.
- Assess the updated models against the test data in references 1 and 2, and the ICAP reports which identified the problems. (The ICAP reports include comparison of the TRAC calculations with actual plant data during transients in which the separator plays a critical role.) Assessment of the models against data from EPRI (references 6 and 7) may be necessary.

References:

1. Cheung, Y.K., J. Paraweswaran, and J.C. Shaug, "BWR Refill-Reflood Program Task 4.7 - Model Development TRAC-BWR Component Models," GE Report, NUREG/CR-2574, April 1983.
2. Giles, M. M., "Trac-BWR Completion Report: Generalized Leak Path and Separator Component Models," INEL Report, IS-NSMD-83-012, April 1983.

3. Giles, M. M., Updated TRAC-BWR Completion Report Generalized Leak Path and Separator Component Models," INEL Report, SAAMD-83-029, November 1983.
4. Giles, M. M., "Implicit SEPD," INEL Report, SE-RST-85-0007, 1985.
5. Weaver, W., Private Communication, 1994.
6. Waldman, J. P., "An evaluation of the RETRAN-02 Steam Separator Model," MS Thesis, The Pennsylvania State University, 1985.
7. Waldman, J. P., G. E. Robinson, and A. J. Baratta. "An evaluation of the RETRAN-02 Steam Separator Model," Proceedings of the Fourth International RETRAN Conference (1986).

Estimated Completion Date

10/30/96

Reporting Requirements and Deliverables

A letter report outlining the results of the work performed on the separator/dryer models is due upon completion of work, but no later than 10/30/96.