AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

2 AMENDMENT/MODIFICATION NO	3 EFFECTIVE DATE	4 REQUISITION/PURCHASE REQ NO	5 PROJECT NO (If applicable)
7	8-29-2002	RES-C02-471	

CONTRACT ID CODE: NRC-04 98-045 | PAGE 1 OF PAGES

6 ISSUED BY CODE

U.S. Nuclear Regulatory Commission
Div of Contracts
Two White Flint North - MS T-7-I-2

Washington, DC 20555

7 ADMINISTERED BY (If other than Item 6) CODE

U.S. Nuclear Regulatory Commission
Div of Contracts
Two White Flint North - MS T-7-I-2

Washington, DC 20555

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

Purdue Research Foundation
Attn Mr Thomas B Wright
Sponsored Program Administration
1063 Hovde Hall
West Lafayette IN 47907-1063

(X)	9A AMENDMENT OF SOLICITATION NO
	9B DATED (SEE ITEM 11)
	10A MODIFICATION OF CONTRACT/ORDER NO NRC-04-98-045-
X	10B DATED (SEE ITEM 13) 07-28-1998

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

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 of 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.: 26015110205; Job Code W6698, BOC 252A,
Appropriation No.: 31X0200 260; Amount Obligated $60,000

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)
X	C THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF FAR 52 243-2 Changes
	D OTHER (Specify type of modification and authority)

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)

Please see the attached pages.

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)
Michael R. Ludwig Associate Director Sponsored Program Administration	Stephen M. Pool Contracting Officer
15B CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C DATE SIGNED 9/4/02
16B UNITED ~~STATES~~ OF AMERICA BY (Signature of Contracting Officer)	16C DATE SIGNED 9-3-02 ~~08-29-2002~~

STANDARD FORM 30 (REV 10-83)

TEMPLATE ADM 001

ADM02

CONTINUATION PAGE

The purpose of this contract modification is to incorporate a within scope change to the contract SOW and to adjust the contract estimated cost accordingly. Hence the contract is modified as follows:

1. Scetion C of the contract is modified to add the following tasks·

Section C PERFORM AND ANALYZE SEPARATE-EFFECTS TESTS

The contractor will perform a series of BWR flow instability tests. The objectives of these tests are to:

1. Obtain experimental data on BWR RPV flow instability with power feedback. 2. Develop TRAC-M input models for advanced reactor research, assess TRAC-M code using the obtained data, and identify TRAC-M model deficiencies.

WORK REQUIREMENTS:

The contract shall perform and analyze separate-effects tests to provide BWR flow instability data with power feedback inside the reactor pressure vessel (RPV). These data will be used to assess the ability of the TRAC-M code to simulate two phase hydraulic flow instability, which involves preparation input models in TRAC-M format, running the code, and assessing the code performance. The input models also should be applicable for the advanced reactor research. The contractor shall perform experiments for typical BWRs at full power, start-up, shut down, and other situations where instabilities are likely to occur. To accomplish the objectives, six separate subtasks must be performed.

Subtask 1. Scaling

Since the PUMA facility was originally scaled from the SBWR design, the contractor shall perform a scaling study to ensure the data obtained from experiments are prototypic of a typical BWR plant. If the analysis proves that scaling distortions exist with respect to a typical BWR, then these distortions shall be explained and the test conditions set to minimize them. In particular, since PUMA is designed for low pressure condition, the scaling analysis must address pressure scaling.

Subtask 2. Analytical Modeling of the BWR RPV Instability

A two-phase flow analytical model shall be developed to predict the RPV instability before the experiments start. The stability boundary shall be studied parametrically for a range of core inlet loss coefficients, reactor powers, and reactor pressures.

Subtask 3. PUMA Core Modifications

PUMA core inlet shall be modified to allow measurable and adjustable loss coefficients. The adjustable inlet allows parametric studies with a range of inlet losses. Proper instrument modifications shall be made to ensure the best void-fraction feedback measurement for the void-power feedback instability experiment.

Subtask 4. Parametric Flow Instability Experiment

A test matrix shall be developed for experimental study of flow instability with a range of inlet loss coefficients, the system inventories, reactor powers, and reactor pressures. The test matrix shall clearly state the operational conditions which instabilities will occur and identify the data that must be measured to characterize the instability type. The text matrix proposed by the contractor shall be approved by NRC before the experiments are initiated. In each parametric study, the instability type should be identified (Ledinegg, flow pattern transition, pressure drop, multiple hannel, density wave, etc . . .). The contractor shall ensure reasonable void measurements in the core region are taken. The