

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE	PAGE OF PAGES
2. AMENDMENT/MODIFICATION NO. M0005		3. EFFECTIVE DATE See Block 16C	1 6
4. REQUISITION/PURCHASE REQ. NO. RES-15-0141		5. PROJECT NO. (if applicable)	
6. ISSUED BY US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP 3WFN-05-C64MP ATTN ROB ROBINSON 301-207-0905 WASHINGTON DC 20555-0001	CODE NRCHQ	7. ADMINISTERED BY (if other than Item 6) US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP 3WFN-05-C64MP WASHINGTON DC 20555-0001	CODE NRCHQ
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) PURDUE UNIVERSITY ATTN DANIELLE C EVANS NA WEST LAFAYETTE IN 479072024		(x) 9A. AMENDMENT OF SOLICITATION NO.	
CODE 072051394 FACILITY CODE		9B. DATED (SEE ITEM 11)	
		x 10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-HQ-13-C-04-0022 NRC-HQ-13-T-04-0001	
		10B. DATED (SEE ITEM 13) 08/30/2013	

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 6 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 ACKNOWLEDGEMENT 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)
See Schedule Net Increase: \$40,419.00

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

CHECK ONE	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
X	D. OTHER (Specify type of modification and authority) FAR 52-232-22 "Limitation of Funds"

E. IMPORTANT: Contractor is not. is required to sign this document and return 0 copies to the issuing office.

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

The purpose of this modification is to A) modify the statement of work to include Sub-Task 5; B) increase the task order ceiling in the amount of \$43,078.00 (from \$221,756.00 to \$264,834.00; C) provide funding in the amount of \$40,419.00, thus increasing the total obligated amount from \$221,756.00 to \$262,175.00; and D) extend the period of performance end date from 1/31/15 to 11/30/15. These changes are made in accordance with Purdue's revised proposal, submitted on 1/27/2015.

Accordingly, paragraphs (a) (b) and (c) of Section A.1 "Consideration and Obligation - Cost Reimbursement - No Fee (Aug 2011) are replaced with the following:

"(a) The total estimated cost to the Government for full performance under this task order Continued ...

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

15A. NAME AND TITLE OF SIGNER (Type or print) Kenneth W. Suter	15C. DATE SIGNED JAN 30 2015	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) RICHARD W. ROBINSON	16C. DATE SIGNED 1/30/2015
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)		16B. UNITED STATES OF AMERICA (Signature of Contracting Officer)	

NSN 7540-01-152-8070
Previous edition unusable

Kenneth W. Suter
Contract Analyst

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

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

FEB 13 2015

ADM002

NAME OF OFFEROR OR CONTRACTOR
PURDUE UNIVERSITY

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>is \$264,834.00.</p> <p>(b) The amount presently obligated by the Government with respect to this task order is \$262,175.00.</p> <p>(c) It is estimated that the amount currently obligated will cover performance through the task order end date."</p> <p>Period of Performance: 8/30/2013 - 11/30/2015 (changed) Total Task Order Ceiling: \$264,834.00 (changed) Total Amount Obligated: \$262,175.00 (changed)</p> <p>See attached pages for specific details regarding this modification.</p> <p>LIST OF CHANGES: Reason for Modification : Supplemental Agreement for work within scope Period Of Performance End Date changed from 2015-01-31 00:00:00 to 2015-11-30 00:00:00 Total Amount for this Modification: \$43,078.00 New Total Amount for this Version: \$264,834.00 New Total Amount for this Award: \$264,834.00 Obligated Amount for this Modification: \$40,419.00 New Total Obligated Amount for this Award: \$262,175.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 9400 Total Amount changed from \$94,756.00 to \$137,834.00 Obligated Amount for this modification: \$40,419.00 Incremental Funded Amount changed from \$94,756.00 to \$135,175.00 End Date changed from 2015-01-31 00:00:00 to 2015-11-30 00:00:00</p> <p>CHANGES FOR DELIVERY LOCATION: NRCHQ Amount changed from \$94,756.00 to \$137,834.00</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 2015-X0200-FEEBASED-60-60D003-11-6-213-1045-252A BBFY 2015 EBFY Fund X0200 Funds Source FEEBASED YBA Office 60 Continued ...</p>				

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED
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NAME OF OFFEROR OR CONTRACTOR
 PURDUE UNIVERSITY

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Division 60D003 Branch 60B301 Cost Ctr (Job Code) 1045 Major prog/business 11 Product Line 6 Product 213 BOC 252A REIM Agreement Num REIM Agmt Line Num FAIMIS Template Name 11-6-213-1045 Quantity: 0 Amount: \$40,419.00 Percent: 29.3244 Subject To Funding: N Payment Address: U.S. Nuclear Regulatory Commission One White Flint North 11555 Rockville Pike Mailstop O3-E17A Rockville MD 20852-2738 CHANGES FOR LINE ITEM NUMBER: 9301 End Date changed from 2015-01-31 00:00:00 to 2015-11-30 00:00:00 Delivery Location Code: NRCHQ US NRC - HQ DIVISION OF CONTRACTS				

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Specific Changes are as Follows:

1. Section A.1 "Consideration and Obligation – Cost Reimbursement – No Fee (AUG 2011) is revised as follows:

"A.1 CONSIDERATION AND OBLIGATION – COST REIMBURSEMENT – NO FEE (AUG 2011)

- (a) The total estimated cost to the Government for full performance under this task order is \$264,834.00.
- (b) The amount presently obligated by the Government with respect to this task order is \$262,175.00.
- (c) It is estimated that the amount currently obligated will cover performance through November 30, 2015.
- (d) This is an incrementally-funded task order and FAR 52.232-22 "Limitation of Funds" applies."

2. Section A.4 "Task/Delivery Order Period of Performance (AUG 2011)" is revised as follows:

"A.4 TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (AUG 2011)

This order shall commence on 8/30/2013 and will expire on 11/30/2015.

3. Add Task 5 to "Specific Tasks"

"Task 5. Characterization of Impedance Probe Performance and Range

From the results of previous experiments it is evident that impedance probes of the type used in the current test facility can have unexpected responses to flow conditions and void distribution. In this task, the contractor shall devise and carry out experiments to re-characterize the impedance probes in the test facility and to quantify the uncertainty of the data collected with the impedance probes.

The contractor shall first devise a strategy for re-characterizing the impedance probes over a wide range of test conditions. The strategy must be approved by the NRC before additional experiments are performed. The strategy must also:

- consider a wide range of flow conditions, characterized by a matrix of superficial liquid and gas velocities producing a large range of void fractions
- produce an updated calibration curve for at least one impedance probe location over the range of test conditions
- determine if the impedance probes have repeatable and realistic calibration curves
- determine the uncertainty of the impedance probe measurements for at least one

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- impedance probe location, over the range of test conditions
- make use of instrumentation with well-established uncertainties (single-sensor conductivity probes or gamma densitometer, for example)
- determine the realistic range of applicability of impedance probe measurements for this test facility

Once the strategy has been approved by the NRC, the contractor shall perform the re-characterization experiments, as proposed, and provide the following in a letter report.

- The contractor shall provide an updated calibration curve for at least one impedance probe location in the test facility, as well as a discussion of the repeatability and practicality of the impedance probe measurements.
- The contractor shall provide an assessment of the impedance probe sensor uncertainties over the entire range of flow conditions explored.
- The contractor shall provide an assessment of the range of conditions over which the impedance probes can be considered accurate and reliable.
- The contractor shall provide an updated assessment of void fraction results from Task 2, in light of the data obtained in this task.
- The contractor shall provide a discussion of the implications of the current results on the previous experiments that also utilized impedance probes. For example, the discussion shall include an extrapolation of the current results to different elevations in the same test facility and to impedance probe measurement in pipes of different diameters.
- The contractor shall provide the raw sensor data obtained by the confirmatory technique that was proposed and approved, as well as the void fraction data from the impedance probes.

Deliverables	Level of Effort	Completion Date	Standard
Letter report detailing the strategy for re-calibration and characterization of the impedance probes	40 staff-hours	January 30, 2015	The letter report shall include the strategy for re-characterizing and quantifying the range and uncertainty for the impedance over a wide range of test conditions.
Letter report on the re-calibration and characterization of the impedance probes	320 staff-hours	April 15, 2015	The letter report shall include the results of the re-characterization effort, including an updated calibration curve and an assessment of uncertainty and range of applicability. The letter report must also discuss the implications of the current analysis on the data obtained in Task 2 of this contract and on data obtained at other elevations and with different facility geometries.

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Raw sensor data from the confirmatory technique.	20 staff-hours	April 15, 2015	The raw sensor data shall be delivered in electronic format and include the data from all three axial locations over the range of test conditions describe in Task 2.
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The Government will provide feedback on the letter report on the strategy for re-calibration and characterization of the impedance probes within 2 weeks and on the other letter report within 30 days. The provided feedback shall be incorporated by the contractor into the final reports within 30 days after the end of the contract/order period of performance."

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED

[END of M0005]