

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>			1. CONTRACT ID CODE		PAGE OF PAGES 1 4		
2. AMENDMENT/MODIFICATION NO. M0003		3. EFFECTIVE DATE 06/26/2014		4. REQUISITION/PURCHASE REQ. NO. RES-14-0443		5. PROJECT NO. (If applicable)	
6. ISSUED BY US NRC - HQ DIVISION OF CONTRACTS		CODE NRCHQ		7. ADMINISTERED BY (If other than Item 6)		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)  See Schedule				(x) 9A. AMENDMENT OF SOLICITATION NO.			
				9B. DATED (SEE ITEM 11)			
				X 10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-HQ-13-C-04-0026/NRC-HQ-13-C-04-0026			
				10B. DATED (SEE ITEM 13) 03/26/2013			
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 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)

Net Increase:

\$75,577.00

See Schedule

**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: Mutual Agreement and Optional CLIN exercise
	D. OTHER (Specify type of modification and authority)

**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.)

ALDEN RESEARCH LABORATORY INC

175795392

ALDEN RESEARCH LABORATORY INC

30 SHREWSBURY ST

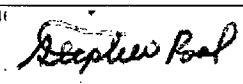
HOLDEN MA 015201843

NRC-HQ-13-C-04-0026

LIST OF CHANGES:

Reason for Modification : Exercise optional modified task 3B at \$75,577. See end of SOW for 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)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		STEPHEN M. POOL	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	15D. SIGNATURE	16C. DATE SIGNED
(Signature of person authorized to sign)			06/30/2014

NSN 7540-01-152-8070  
Previous edition unusable

**SUNSI REVIEW COMPLETE**

STANDARD FORM 30 (REV. 10-83)  
Prescribed by GSA  
FAR (48 CFR) 53.243  
AUG 19 2014

TEMPLATE - ADM001

ADM002

<b>CONTINUATION SHEET</b>	REFERENCE NO. OF DOCUMENT BEING CONTINUED NRC-HQ-13-C-04-0026/NRC-HQ-13-C-04-0026/M0003	PAGE	OF
		2	4

NAME OF OFFEROR OR CONTRACTOR  
See Schedule

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>payment schedule.</p> <p>Total Amount for this Modification: \$17,677.00  New Total Amount for this Version: \$277,723.00  New Total Amount for this Award: \$426,569.00  Obligated Amount for this Modification: \$75,577.00  New Total Obligated Amount for this Award:  \$224,423.00  Incremental Funded Amount changed: from  \$0.00 to \$75,577.00  Alternate COR (Last, First) changed to : N/A  CHANGES FOR LINE ITEM NUMBER: 9500  Total Amount changed  from \$260,046.00 to \$202,146.00</p> <p>CHANGES FOR DELIVERY LOCATION: NRCHQ  Amount changed from \$260,046.00 to \$202,146.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 9500  Total Amount changed  from \$260,046.00 to \$202,146.00</p> <p>CHANGES FOR DELIVERY LOCATION: NRCHQ  Amount changed from \$260,046.00 to \$202,146.00</p> <p>Delivery Location Code: NRCHQ  US NRC - HQ  DIVISION OF CONTRACTS</p> <p>Period of Performance: 03/26/2013 to 03/25/2016</p> <p>Change Item 09500 to read as follows(amount shown  is the total amount):</p>				
09500	<p>Commercial Unexercised Ceiling as of 10/1/2013  Amount: \$202,146.00 (Option Line Item)  Anticipated Exercise Date 03/24/2016  Line Item Ceiling \$202,146.00  Incrementally Funded Amount: \$0.00</p> <p>Accounting Info:  0000-00000-RECON-00-000000-00-0-000-00000-0000  Funded: \$0.00</p> <p>Add Item 09502 as follows:</p>				0.00
09502	<p>exercise optional task 3B  Line Item Ceiling \$75,577.00  Incrementally Funded Amount: \$75,577.00  Continued ...</p>				75,577.00

NAME OF OFFEROR OR CONTRACTOR  
See Schedule

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Accounting Info: 0000-00000-RECON-00-000000-00-0-000-00000-0000 Funded: \$0.00 Accounting Info: 2014-X0200-FEEBASED-60-60D003-17-6-161-1061-251A Funded: \$75,577.00				

Purpose to exercise modified CLIN 6 (optional task 3B).

3B: Development, Application, and Demonstration of CFD Best Practice Guidelines and Uncertainty Estimation

In coordination with the NRC COR, the contractor shall develop (where needed), and demonstrate CFD best practice guidelines utilizing the FLUENT CFD models of the condensation test facility followed by a similar demonstration utilizing the larger 3D mixing and condensation facility from task 2. This analysis should focus on the utilization of the updated UDF for condensation predictions along with existing fluent capabilities that play a significant role in the estimation of turbulence and mixing. Error estimation should include the estimation of the grid convergence index as well as other sources of error where feasible. Existing guidelines that cannot be addressed due to limited resources should be summarized along with an estimate of the effort required to address these issues.

The UDF for condensation that has been refined in Task 3A along with appropriate turbulence and meshing options should be utilized for these analyses. Sensitivity studies should focus on the demonstration of best practice guidance and/or the verification and validation (V&V) of the approach. Specifically, Task 3B will be made up of the following activities:

- Demonstration and documentation of the application of best practice guidance and V&V techniques for a small condensation test facility.
- Demonstration and documentation of the application of best practice guidance and V&V techniques for a large 3D condensation and mixing test facility.
- Documentation of activities in Task 3A and 3B

The goal of the work will be to demonstrate CFD best practice application and development as well as V&V techniques while highlighting modeling improvements or modifications that improve the accuracy of the simulations relative to test data. All sensitivity study options will be pre-approved by NRC technical staff.

**Deliverables:**

- 1) All final FLUENT CFD models (case and data files) used in the above studies (in electronic format, suitable for reading on NRC computer systems)
- 2) Final UDF models , for both wall condensation and bulk condensation (in electronic format, suitable for reading on NRC computer systems )
- 3) A formal and comprehensive draft report for all simulations and validations in Tasks 3A and 3B that includes:
  - a. Documentation of settings and boundary conditions for FLUENT CFD models and the condensation UDF for all validations and sensitivity studies
  - b. Documentation of the methodology for the wall and bulk condensation UDF
  - c. Results of predictions, compared with benchmark and/or test data
  - d. A summary of the application of best practice guidelines and the V&V procedures (including those that were neglected due to limited resources).
  - e. Lessons learned, modeling deficiencies, and areas for future modeling
- 4) A final report including comments from NRC by 1 September 2015