

2. AMENDMENT/MODIFICATION NO. 3. EFFECTIVE DATE 4. REQUISITION/PURCHASE REQ. NO. 5. PROJECT NO. (If applicable)  
 M0003 04/24/2015 RES-15-0198

6. ISSUED BY CODE NRC HQ  
 ACQUISITION MANAGEMENT DIVISION  
 MAIL STOP 3WFN-05-C64MP  
 WASHINGTON DC 20555-0001

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

8. NAME AND ADDRESS OF CONTRACTOR (No. street, county, State and ZIP Code)  
 UNIVERSITY OF WISCONSIN SYSTEM  
 ATTN MARK SWEET  
 21 N PARK ST STE 6401  
 MADISON WI 537151218

9A. AMENDMENT OF SOLICITATION NO (x)  
 9B. DATED (SEE ITEM 11)  
 10A. MODIFICATION OF CONTRACT/ORDER NO. X  
 NRC-HQ-60-14-C-0002  
 10B. DATED (SEE ITEM 13)  
 03/24/2014

CODE 161202122 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: \$150,000.00  
 2015-X0200-FEEBASED-60-60D003-11-6-213-1045-252A

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 Changes -- Cost Reimbursement Alternate I (APR 1984)  
 D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor  is not,  is required to sign this document and return 1 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 (1) incorporate the revised statement of work; (2) increase the contract level of effort by an additional 2005 hours, thereby increasing the contract ceiling from \$153,727 to \$309,100; (3) extend the period of performance, thereby changing the contract end date from April 23, 2015 to March 31, 2016; (4) and provide \$150,000 of incremental funding, thereby increasing the total obligation amount from \$153,727 to \$303,727. A detailed description is provided on pages 2-4.

Total Obligation Amount: \$303,727 (Changed)  
 Total Ceiling Amount: \$309,100 (Changed)  
 Period of Performance: 6/01/2014 to 3/31/2016 (Changed)

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) Kurt McMillen  
 Managing Officer, Research & Sponsored Programs  
 15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign) Kurt McMillen  
 15C. DATE SIGNED 4/23/2015  
 16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) DOMINIQUE MALONE  
 16B. UNITED STATES OF AMERICA (Signature of Contracting Officer) Dominique Malone  
 16C. DATE SIGNED 4/27/2015

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TEMPLATE - ADMIN

MAY 12 2015

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The purpose of this modification is to (1) incorporate the revised statement of work; (2) increase the contract level of effort by an additional 2005 hours, thereby increasing the contract ceiling from \$153,727 to \$309,100; (3) extend the period of performance, thereby changing the contract end date from April 23, 2015 to March 31, 2016; (4) provide \$150,000 of incremental funding, thereby increasing the total obligation amount from \$153,727 to \$303,727; (5) and incorporate FAR clauses FAR 52.232-20 "Limitation of Cost and FAR 52.232-22 "Limitation of Funds" into the contract. As a result of this modification:

**Section B.2**, entitled "**CONSIDERATION AND OBLIGATION—COST REIMBURSEMENT (JUN 1988) ALTERNATE I (JUN 1988)**" is revised as follows:

- (a) The total estimated cost (ceiling) to the Government for full performance under this contract is \$309,100.
- (b) The amount presently obligated by the Government with respect to this contract is \$303,727.

**Section C**, entitled "**STATEMENT OF WORK**" is revised as follows:

#### **4.0 SPECIFIC TASKS**

**4.1 - Task 1: Analytical Support for CCI Experiments-** The contractor shall provide analytical support for pre- and post-test analysis of experiments.

##### **4.1.2 Requirements:**

The contractor shall run the CORQUENCH code and compare MELCOR/CORCON results with CORQUENCH results, for pre-test calculations and for the benchmark exercise, and document the results in a letter report. The immediate focus of the contract support shall be to assist the NRC in the benchmark exercise of CCI-7.

The contractor shall run a base case benchmark calculation of CCI-7 and supplement the NRC staff's effort in running a number of sensitivity cases. For the purpose of estimating the effort, six sensitivity cases may be considered.

The contractor shall also run pre-test calculations of CCI-8, using both MELCOR/CORCON and CORQUENCH.

Finally, the contractor shall perform post-test benchmark analysis of CCI-8 using the CCI-7 template mentioned above.

Additionally, the contractor shall analyze the preliminary specifications of two future CCI tests (CCI-9 and CCI-10) to determine if the current test designs are feasible.

**4.1.3 Standard:** The contractor shall submit a letter report on CORCON improvement highlighting the insights obtained for improving the CORCON module of the MELCOR code. The contractor shall also submit the analysis report on CCI-9 and CCI-10 design feasibility.

**4.1.4 Deliverable:** The contractor shall submit a letter report on code improvements pertaining to CCI by September 2015. The contractor shall also submit a second letter report on CCI-9 and CCI-10 design feasibility by September 2015.

Estimated Completion Date: Please see Task 4.2

Estimated level of Effort: Please see Task 4.2

#### **4.2 Task 2: Model Improvement in TEXAS-V Code**

##### **4.2.1 Requirement:**

The contractor shall work on improving the TEXAS-V fuel-coolant interaction code to include an updated melt solidification model based on recently completed KROTOS and TROI experiments. The TEXAS-V code was developed by the University of Wisconsin and various improvements have been made to the code. The NRC routinely uses the TEXAS-V code for confirmatory safety analysis.

The contractor shall also analyze thoroughly the PuLIMS test results and advise NRC on whether stratified steam explosion is an issue.

**4.2.2 Standard:** The contractor shall document the results of the code improvement effort in a letter report highlighting the updated modeling features and any experimental assessment performed for the validation and verification purpose.

**4.2.3 Deliverable:** The contractor shall submit Letter reports.

Estimated Completion Date: 12/31/2015

Estimated level of Effort: 3,180 hours (additional 1,580 hours combined Task 4.1 and Task 4.2)

#### **4.3 Task 3: Expert Technical Assistance on Emerging Severe Accident Issues**

##### **4.3.1 Requirements:**

The contractor shall provide expert technical support in specific severe accident topics (e.g., debris coolability, CCI, fuel-coolant interaction, steam explosion, hydrogen combustion, etc.) as requested by the NRC Contracting Officer Representative (COR). This task will also contribute to the NRC's ongoing effort in knowledge transfer and management related to relevant severe accident phenomenological topics.

##### **4.3.2 Standard:**

**4.3.3 Deliverable:** The contractor shall submit Letter reports

Estimated Completion Date: 03/31/2016

Estimated level of Effort: 1,025 hours (additional 425 hours)

#### **Meetings and Travel**

1-2 staff from University of Wisconsin shall travel to attend project meetings.

**Subcontracts and Consultants**

Mr. Joseph Shepard will continue to provide consultant services

**Section F.5**, entitled "**PERIOD OF PERFORMANCE**" is revised as follows:

This contract shall commence on 3/24/2014 and will expire on March 31, 2016.

**Section I**, entitled "**CONTRACT CLAUSES**" is revised to include the following FAR clauses:

FAR 52.232-20 LIMITATION OF FUNDS

(a) The parties estimate that performance of this contract, exclusive of any fee, will not cost the Government more than

(1) the estimated cost specified in the Schedule or,

(2) if this is a cost-sharing contract, the Government's share of the estimated cost specified in the Schedule. The Contractor agrees to use its best efforts to perform the work specified in the Schedule and all obligations under this contract within the estimated cost, which, if this is a cost-sharing contract, includes both the Government's and the Contractor's share of the cost.

(b) The Contractor shall notify the Contracting Officer in writing whenever it has reason to believe that --

(1) The costs the Contractor expects to incur under this contract in the next 60 days, when added to all costs previously incurred, will exceed 75 percent of the estimated cost specified in the Schedule; or

(2) The total cost for the performance of this contract, exclusive of any fee, will be either greater or substantially less than had been previously estimated.

(c) As part of the notification, the Contractor shall provide the Contracting Officer a revised estimate of the total cost of performing this contract.

(d) Except as required by other provisions of this contract, specifically citing and stated to be an exception to this clause --

(1) The Government is not obligated to reimburse the Contractor for costs incurred in excess of

(i) the estimated cost specified in the Schedule or,

(ii) if this is a cost-sharing contract, the estimated cost to the Government specified in the Schedule; and

(2) The Contractor is not obligated to continue performance under this contract (including actions under the Termination clause of this contract) or otherwise incur costs in excess of the estimated cost specified in the Schedule, until the Contracting Officer

(i) notifies the Contractor in writing that the estimated cost has been increased and

(ii) provides a revised estimated total cost of performing this contract. If this is a cost-sharing contract, the increase shall be allocated in accordance with the formula specified in the Schedule.

(e) No notice, communication, or representation in any form other than that specified in subparagraph (d)(2) above, or from any person other than the Contracting Officer, shall affect this contract's estimated cost to the Government. In the absence of the specified notice, the Government is not obligated to reimburse the Contractor for any costs in excess of the estimated cost or, if this is a cost-sharing contract, for any costs in excess of the estimated cost to the Government specified in the Schedule, whether those excess costs were incurred during the course of the contract or as a result of termination.

(f) If the estimated cost specified in the Schedule is increased, any costs the Contractor incurs before the increase that are in excess of the previously estimated cost shall be allowable to the same extent as if incurred afterward, unless the Contracting Officer issues a termination or other notice directing that the increase is solely to cover termination or other specified expenses.

(g) Change orders shall not be considered an authorization to exceed the estimated cost to the Government specified in the Schedule, unless they contain a statement increasing the estimated cost.

(h) If this contract is terminated or the estimated cost is not increased, the Government and the Contractor shall negotiate an equitable distribution of all property produced or purchased under the contract, based upon the share of costs incurred by each.

(End of Clause)

#### FAR 52.232-22 LIMITATION OF FUNDS

(a) The parties estimate that performance of this contract will not cost the Government more than

(1) the estimated cost specified in the Schedule or,

(2) if this is a cost-sharing contract, the Government's share of the estimated cost specified in the Schedule.

The Contractor agrees to use its best efforts to perform the work specified in the Schedule and all obligations under this contract within the estimated cost, which, if this is a cost-sharing contract, includes both the Government's and the Contractor's share of the cost.

(b) The Schedule specifies the amount presently available for payment by the Government and allotted to this contract, the items covered, the Government's share of the cost if this is a cost-sharing contract, and the period of performance it is estimated the allotted amount will cover. The parties contemplate that the Government will allot additional funds incrementally to the contract up to the full estimated cost to the Government specified in the Schedule, exclusive of any fee. The Contractor agrees to perform, or have performed, work on the contract up to the point at which the total amount paid and payable by the Government under the contract approximates but does not exceed the total amount actually allotted by the Government to the contract.

(c) The Contractor shall notify the Contracting Officer in writing whenever it has reason to believe that the costs it expects to incur under this contract in the next 60 days, when added to all costs previously incurred, will exceed 75 percent of

(1) the total amount so far allotted to the contract by the Government or,

(2) if this is a cost-sharing contract, the amount then allotted to the contract by the Government plus the Contractor's corresponding share.

The notice shall state the estimated amount of additional funds required to continue performance for the period specified in the Schedule.

(d) Sixty days before the end of the period specified in the Schedule, the Contractor shall notify the Contracting Officer in writing of the estimated amount of additional funds, if any, required to continue timely performance under the contract or for any further period specified in the Schedule or otherwise agreed upon, and when the funds will be required.

(e) If, after notification, additional funds are not allotted by the end of the period specified in the Schedule or another agreed-upon date, upon the Contractor's written request the Contracting Officer will terminate this contract on that date in accordance with the provisions of the Termination clause of this contract. If the Contractor estimates that the funds available will allow it to continue to discharge its obligations beyond that date, it may specify a later date in its request, and the Contracting Officer may terminate this contract on that later date.

(f) Except as required by other provisions of this contract, specifically citing and stated to be an exception to this clause --

(1) The Government is not obligated to reimburse the Contractor for costs incurred in excess of the total amount allotted by the Government to this contract; and

(2) The Contractor is not obligated to continue performance under this contract (including actions under the Termination clause of this contract) or otherwise incur costs in excess of --

(i) The amount then allotted to the contract by the Government or;

(ii) If this is a cost-sharing contract, the amount then allotted by the Government to the contract plus the Contractor's corresponding share, until the Contracting Officer notifies the Contractor in writing that the amount allotted by the Government has been increased and specifies an increased amount, which shall then constitute the total amount allotted by the Government to this contract.

(g) The estimated cost shall be increased to the extent that

(1) the amount allotted by the Government or,

(2) if this is a cost-sharing contract, the amount then allotted by the Government to the contract plus the Contractor's corresponding share, exceeds the estimated cost specified in the Schedule.

If this is a cost-sharing contract, the increase shall be allocated in accordance with the formula specified in the Schedule.

(h) No notice, communication, or representation in any form other than that specified in subparagraph (f)(2) above, or from any person other than the Contracting Officer, shall affect the amount allotted by the Government to this contract. In the absence of the specified notice, the Government is not obligated to reimburse the Contractor for any costs in excess of the total amount allotted by the Government to this contract, whether incurred during the course of the contract or as a result of termination.

(i) When and to the extent that the amount allotted by the Government to the contract is increased, any costs the Contractor incurs before the increase that are in excess of --

(1) The amount previously allotted by the Government or;

(2) If this is a cost-sharing contract, the amount previously allotted by the Government to the contract plus the Contractor's corresponding share, shall be allowable to the same extent as if incurred afterward, unless the Contracting Officer issues a termination or other notice and directs that the increase is solely to cover termination or other specified expenses.

(j) Change orders shall not be considered an authorization to exceed the amount allotted by the Government specified in the Schedule, unless they contain a statement increasing the amount allotted.

(k) Nothing in this clause shall affect the right of the Government to terminate this contract. If this contract is terminated, the Government and the Contractor shall negotiate an equitable distribution of all property produced or purchased under the contract, based upon the share of costs incurred by each.

(l) If the Government does not allot sufficient funds to allow completion of the work, the Contractor is entitled to a percentage of the fee specified in the Schedule equaling the percentage of completion of the work contemplated by this contract.

(End of Clause)