


<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT D CODE		PAGE OF PAGES	
						1      10	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
M0005		See Block 16C		NRR-18-0168			
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
US NRC - HQ		NRCHQ					
ACQUISITION MANAGEMENT DIVISION							
MAIL STOP TWFN-07B20M							
WASHINGTON DC 20555-0001							
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x) 9A. AMENDMENT OF SOLICITATION NO.			
S W R I							
6220 CULEBRA RD				9B. DATED (SEE ITEM 11)			
SAN ANTONIO TX 782385166							
				X 10A. MODIFICATION OF CONTRACT/ORDER NO.			
				NRC-HQ-50-14-E-0001			
				NRC-HQ-20-16-T-0007			
				10B. DATED (SEE ITEM 13)			
CODE 007936842		FACILITY CODE		09/06/2016			
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended <input type="checkbox"/> 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 electronic communication 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 letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNT NG AND APPROPRIATION DATA (If required)				Net Increase:		\$30,000.00	
See Schedule							
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>							
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 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:						
	D. OTHER (Specify type of modification and authority)						
X	FAR 52,243-2 Changes-Cost Reimbursement (AUG 1987) Alternate I (APR 1984)						
<b>E. IMPORTANT</b> Contractor <input type="checkbox"/> is not <input checked="" type="checkbox"/> is required to sign this document and return _____ 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) increase the task order ceiling by \$47,248 to accommodate additional contractor support (2) provide funding in the amount of \$30,000.00. As a result, the task order ceiling is increased by \$47,248.00 from \$100,970.00 to \$148,218.00. The total obligated amount is increased by \$30,000.00, from \$100,970.00 to \$130,970.00. The period of performance remains the same.							
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)			
				SHARLENE M. MCCUBBIN			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
(Signature of person authorized to sign)						09/12/2018	

NAME OF OFFEROR OR CONTRACTOR

S W R I

ITEM NO. (A)	SUPPL ES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>2018-X0200-FEEBASED-20-20D008-20B801-1061-11-4-149-251A-11-4-149-1061</p> <p>Continuation Page attached.</p> <p>Period of Performance: 09/06/2016 to 12/31/2018</p>				

Accordingly, the following change is hereby made:

1. The increase in ceiling is a result of additional effort to cover Task 2, the 50.46c portion of the database and for Task 3. The work required for Task 3 was underestimated. The identification of the 50.46 reports was more complex than originally anticipated due to inconsistencies in the way the reports were submitted (e.g., different titles, packages, categorization, etc.). Additionally, determining what information to include in the database from the reports required more effort as a result of how each licensee documented the information. Therefore, the attached Statement of Work (SOW) titled "NRC-HQ-20-16-T-0007 MOD 5 SOW" hereby replaces Section C, Descriptions/Specifications/Statement of Work under this task order.

2. Section NRCB040A CONSIDERATION AND OBLIGATION—COST-PLUS-FIXED-FEE ALTERNATE I is replaced in its entirety.

NRCB040A CONSIDERATION AND OBLIGATION—COST-PLUS-FIXED-FEE ALTERNATE I

(a) The total estimated cost to the Government for full performance of this contract is \$148,218.00 of which the sum of [REDACTED] represents the estimated reimbursable costs, and of which [REDACTED] represents the fixed-fee.

(b) There shall be no adjustment in the amount of the Contractor's fixed fee.

(c) The amount currently obligated by the Government with respect to this contract is \$130,970.00, of which the sum of [REDACTED] represents the estimated reimbursable costs, and of which [REDACTED] represents the fixed-fee.

4. The period of performance remains the same 9/6/2016-12/31/2018  
All other terms and conditions remain the same.

Obligated Amount for this Modification: \$30,000.00  
Task Order Obligations: \$130,970.00 (changed)  
Task Order Ceiling: \$147,218.00 (changed)  
Period of Performance 9/6/2016-12/31/2018 (no changed)

## Statement of Work

### 1. PROJECT TITLE

10 CFR 50.46 Reporting Database Development

### 2. BACKGROUND

#### Current 10 CFR 50.46 Rule

10 CFR 50.46, “Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors,” requires that each boiling or pressurized light-water nuclear power reactor fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO™ cladding must be provided with an ECCS that must be designed so that its calculated cooling performance following a postulated loss-of-coolant accident conforms to the criteria set forth in 10 CFR 50.46(b) and ECCS cooling performance must be calculated in accordance with an acceptable evaluation model and must be calculated for postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated.

10 CFR 50.46(a)(3)(ii) governs the reporting requirements. It requires that for each change to or error in an acceptable evaluation model or in the application of such a model that affects the temperature calculation, the applicant or holder of a construction permit, operating license, combined license, or manufacturing license shall report the nature of the change or error and its estimated effect on the limiting ECCS analysis to the Commission at least annually and if the change or error is significant, the applicant or licensee shall provide a report within 30 days.

For significant errors and/or changes, 10 CFR 50.46 reports are required to be submitted to the NRC in 30 days. Each year, annual reports are submitted to the NRC that summarize all the errors and/or changes (significant and non-significant) accrued in the previous calendar. Some years there are no errors and/or changes identified for an evaluation model or in the application thereof, while other years there can be many errors and/or changes applied to an evaluation model or in the application thereof. These errors and/or changes can result in penalties or benefits to a licensee’s analysis of record. The number of errors and/or changes applied to the accepted evaluation models or in the application thereof has become quite large which makes it challenging to ensure that each licensee is applying the applicable errors and model changes to their analyses of record (AOR).

Additionally, many licensees have committed to reanalyze their design basis LOCAs with approved ECCS evaluation models that have implemented model changes to account for fuel pellet thermal conductivity degradation. Thus, the staff expects that many new LOCA analyses will be submitted and it will be necessary to track the analysis results and any model assessments.

Lastly, if the proposed 10 CFR 50.46c Rule gets final approval, the staff expects several additional new LOCA analyses to be submitted and many LOCA analyses to be updated to demonstrate compliance with the new rule.

#### Proposed 10 CFR 50.46c Rule

The proposed 10 CFR 50.46c rule establishes a general, performance-based rule governing ECCS performance for light-water regardless of fuel design or cladding material. This represents a

significant change from the existing ECCS regulations which apply to “uranium oxide pellets within cylindrical zircaloy or ZIRLO™ cladding.” Because ECCS requirements must be expressed independent of fuel type, and because ECCS performance ultimately must be based upon maintaining the fuel in the reactor in a safe (analyzed) condition, the proposed 10 CFR 50.46c rule separates the ECCS system performance requirements from the fuel system design.

In the proposed 10 CFR 50.46c rule, the specified performance objectives of the systems, structures, and components of the ECCS are to provide residual heat removal during and following a postulated LOCA. As with the existing regulation, the ECCS performance is demonstrated by acceptable ECCS evaluation models in the proposed rule. Specific performance requirements and analytical limits have been established for fuel designs consisting of uranium oxide or mixed uranium-plutonium oxide pellet with zirconium cladding alloys that account for relatively recent research findings. For other fuel designs, new performance objectives and analytical limits may be necessary. Such objectives and limits would need to take into consideration all the degradation mechanisms and any unique performance features of the particular fuel system.

The proposed rule follows the general regulatory approach of the existing regulation, yet it establishes non-prescriptive, performance-based regulatory language for demonstrating acceptable ECCS performance and determining fuel performance characteristics.

The 10 CFR 50.46c rule requires the similar reporting requirements as the current 10 CFR 50.46 rule, but clarifies the reporting and corrective action requirements in order to resolve recurring issues involving the interpretation of the current regulations’ requirements. The 10 CFR 50.46c rule distinguishes three possible combinations of reporting criteria based on the following: (1) predicted response, (2) level of significance, and (3) whether the error, change or operation would results in any exceeded acceptance criteria. For each scenario, the proposed rule provides the required actions, reports, and time frame for providing the necessary reports. The new rule maintains the same requirement for annual reporting and requires reporting significant errors in a similar manner.

At a high level the 10 CFR 50.46c reporting rule differs from the existing rule in the following ways. Since the rule allows for specific performance requirements and analytical limits for specific fuel designs, the performance criteria may be different for different fuel types. Thus, it is necessary for the licensee to submit their fuel specific analytical limits, and in particular, analytical limits to preserve cladding post-quench ductility. Additionally, the new reporting rule requires that in the ECCS model error and/or change assessments for equivalent clad reacted (ECR) impacts must be reported in addition to PCT impacts.

This new 10 CFR 50.46c rule has been submitted to the Commission for voting and final approval. If it gets approved, the licensees will be required to submit new LOCA analyses demonstrating that the analyses meet the new requirements. Thus, it will be necessary to track the licensee provided analytical limits, new analysis results, and any model assessments.

### 3. OBJECTIVE

The objective of this project is to modify the existing Core Operating Limits Report (COLR) database to incorporate the current 10 CFR 50.46 Reports and future 10 CFR 50.46c Reports. The database should have the capability for 10 CFR 50.46 reports to be uploaded for each plant, it should be searchable, and it should be able to generate various reports.

### 4. SCOPE OF WORK

The Contractor will collect 10 CFR 50.46 reports submitted by all licensees from all of calendar year 2015 and through June 1, 2016. The 10 CFR 50.46 reports are accessible via the NRC Agency Access and Management System (ADAMS). The Contractor will extract data from the 10 CFR 50.46 reports and applicable licensing basis documentation in order to modify the existing COLR database to incorporate the current 10 CFR 50.46 Reports. Note that no Contractor review is necessary for the 10 CFR 50.46 reports.

The Contractor will modify the existing COLR database to incorporate the current 10 CFR 50.46 Reports (and future 10 CFR 50.46 reporting). The database must meet the following requirements:

#### Database Contents

The database should contain the following, at a minimum, for the current 10 CFR 50.46 Rule:

- Plant Name
- Date of AOR
- ECCS Evaluation Model
- Analysis of Record (AOR) results for peak cladding temperature (PCT), equivalent clad reacted (ECR) / Maximum Local Oxidation (MLO), and core wide oxidation (CWO)
- List of model changes and errors and their associated PCT impact (with associated ML Number)
- Sum of the PCT impacts for the model changes and errors
- Sum of the PCT impacts and AOR PCT
- Sum of the absolute value of each PCT model change and error
- An indication if the fuel rod burst for the AOR PCT Case

The database should contain all of the above for the future 10 CFR 50.46c Rule and additionally:

- Date of Rebaseline AOR (if applicable)
- Fuel Type(s)
- Fuel Performance Analytical Limit for post-quench ductility (ECR) and, if applicable, PCT
- List of model changes and errors and their associated ECR impact (with associated ML Number)
- Sum of the ECR impacts for the model changes and errors
- Sum of the ECR impacts and AOR ECR
- Sum of the absolute value of each ECR model change and error
- The burnup associated with the limiting case
- An indication if the fuel rod burst for the AOR ECR Case

For both the current and future reports, the sum of the AOR and PCT/ECR impacts should be reported as both their resulting values and as margin to the limit (i.e. for the

current rule, if the value of the AOR + PCT impacts was 2100°F, the margin would be 100°F).

#### Database Capabilities

The database should be searchable using the various parameters in the database. The database should be able to generate individual plant reports and reports based on the searched parameters. The generated reports should be in PDF and Microsoft Excel file types. The data produced in Microsoft Excel report(s) should require minimal NRC staff manipulations in order for the staff to easily filter and sort the data. The database should have the capability to be easily updated and changed with new 10 CFR 50.46 reports in order to incorporate the new reports.

### **5. SPECIFIC TASKS**

**Task 1** – Attend a kickoff meeting. Prior to attending the meeting, become familiar with the regulatory framework, the references provided, and the typical format and content of the 10 CFR 50.46 reports. Participate in the meeting to further understand the staff goals for this contract. Following the kickoff meeting submit a trip report via email that summarizes any decisions reached and any understandings of technical direction given by the NRC staff.

**Task 2** – Suggest a format for the database. The database must meet the requirements described in Section 4 and must be able to be integrated into the database the NRC staff currently uses for COLRs (COLR Databased was developed using Microsoft Access). Using sample data, demonstrate the use and performance of the database to the technical point of contact. Coordinate with the technical point of contact to establish an acceptable design for the database.

**Task 3** – Identify and upload the 10 CFR 50.46 reports required in Section 4 to the database and harvest the necessary data from the reports and applicable licensing basis documentation. Coordinate with the technical point of contact to ensure that all the 10 CFR 50.46 reports were identified and that the correct data is being incorporated into the database.

**Task 4** – Develop guidance outlining the use of the database.

### **6. APPLICABLE DOCUMENTS AND STANDARDS**

- 1) 10 CFR 50.46, “Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors”
- 2) NRC Regulatory Information Summary 2016-04, “Clarification of 10 CFR 50.46 Reporting Requirements and Recent Issues Identified with Guidance Not Approved for Use”
- 3) SECY-16-0033, “Performance-Based Emergency Core Cooling System Requirements and Related Fuel Cladding Acceptance Criteria”

## 7. DELIVERABLES AND DELIVERY SCHEDULE

<b>Deliverable Number</b>	<b>Deliverable Acceptance Criteria</b>	<b>Deliverable Due Date</b>
1	Kick-off Meeting Report. This report summarizes any decisions reached and any understandings or technical direction given by the NRC staff.	One week after the kick-off meeting
2	A copy of the initial database and a summary report detailing the chosen design and key capabilities. The design of the database must meet the criteria described in Section 4 of the SOW and must address any NRC comments.	One month after submitting Deliverable 1
3	A copy of the final database addressing the NRC comments from Deliverable 2.	Three months after receiving NRC comments on Deliverable 2
4	A report identifying the number of 10 CFR 50.46 reports uploaded to the database, which 10 CFR 50.46 reports were uploaded to the database, any issues, and any missing documentation and a report once the database is fully populated.	Every 2 months after submitting Deliverable 2 until the database is fully populated
5	A Draft Guidance Document outlining the use of the database.	Six months after submitting Deliverable 1
6	A Final Guidance Document outlining the use of the database.	One month after receiving NRC comments on Deliverable 5

## 8. REQUIRED LABOR CATEGORIES/ESTIMATED LEVEL OF EFFORT

The contractor's team should include expertise in the following areas:

- 10 CFR 50.46 Requirements
- 10 CFR 50.46c Requirements (Future Rule)
- Microsoft Access Database Development

The estimated level of effort in professional staff hours apportioned among the tasks by labor category is shown in the table below. The estimated is advisory only and not to be considered as the sole basis for the development of the staffing plan.

Additional hours have been added to FY18. The hours are to cover Task 2, the 50.46c portion of the database. This was put on hold until new Commissioners were appointed which occurred at the end of May 2018. Thus, the work on the 50.46c portion of the database has not yet started.



Additional funding is needed because the work required for Task 3 was underestimated. The identification of the 50.46 reports was more complex than originally anticipated due to inconsistencies in the way the reports were submitted (e.g., different titles, packages, categorization, etc.). Additionally, determining what information to include in the database from the reports required more effort as a result of how each licensee documented the information. Therefore, Task 3 was underestimated and additional resources are needed to complete the remaining tasks.

<b>Task Number</b>	<b>Labor Category</b>	<b>Estimated Labor Hours: FY2016</b>	<b>Estimated Labor Hours: FY2017</b>	<b>Estimated Labor Hours: FY2018</b>
1	Professional Level 2	40		
1	Professional Level 1	40		
2	Professional Level 2	60		70
2	Professional Level 1	20		30
2	Professional Level 2	20		30
2	Professional Level 1	60		70
3	Professional Level 2		40	
3	Professional Level 1		80	
4	Professional Level 2		40	
4	Professional Level 1		40	
4	Professional Level 2		20	
4	Professional Level 1		20	
Project Management	Professional Level 2	20	20	
<b>Total</b>		260	260	200

## 9. GOVERNMENT-FURNISHED PROPERTY

N/A

## 10. PERIOD OF PERFORMANCE

The period of performance for this task order is 7 19 months after date of award. The increase in the period of performance is related to the Commission's vote on the 10 CFR 50.46c Rule which is anticipated to take place after new Commissions are appointed.

## **11. PLACE OF PERFORMANCE**

Work will be performed at the contractor's site.

## **12. TRAVEL/MEETINGS**

The following travel maybe required under this task order:

One 1 day trip to NRC Headquarters in Rockville, MD, for two people.  
All travel requires prior written approval from the COR.

## **13. SECURITY**

Information required for performance of this work is anticipated to be UNCLASSIFIED. Proprietary Information or other Sensitive Unclassified Non-Safeguards Information (SUNSI) may be required to complete the work. Access to non-public information in ADAMS is required.

## **14. LICENSE FEE RECOVERY**

The work performed under this task order is not license fee recoverable.