

2. AMENDMENT/MODIFICATION NO. M0006	3. EFFECTIVE DATE See Block 16C	4. REQUISITION/PURCHASE REQ. NO. RES-18-0375	5. PROJECT NO. (If applicable)
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6. ISSUED BY US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-8E06M JEFFREY R MITCHELL 301-415-5074 WASHINGTON DC 20555-0001	CODE NRCHQ	7. ADMINISTERED BY (If other than Item 6) US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-8E06M WASHINGTON DC 20555-0001	CODE NRCHQ
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8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) NUMARK ASSOCIATES INC 1220 19TH ST NW STE 500 WASHINGTON DC 200362444	(x)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	x	10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-HQ-25-14-E-0004 NRC-HQ-20-16-T-0001
		10B. DATED (SEE ITEM 13) 09/22/2016
CODE 788247377	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) See Schedule	Net Increase:	\$233,211.00
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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).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER (Specify type of modification and authority) Bilateral; Mutual Agreement of the Parties

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 revise the scope of work for the Optional Task 3, as a result the changes are as follows:

- (1) revise the scope of work for optional task 3, as identified in the SOW entitled REV 1
- (2) authorize task 3
- (3) revise CLIN 10001 and 10002
- (4) add incremental funding in the amount of \$233,211.00
- (5) extend the period of performance till January 31, 2021
- (6) add [REDACTED] as the NRC COR for task 3

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) JEFFREY R. MITCHELL
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED
	16B. UNITED STATES OF AMERICA  (Signature of Contracting Officer)
	16C. DATE SIGNED 09/21/2018

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED
 NRC-HQ-25-14-E-0004/NRC-HQ-20-16-T-0001/M0006

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NAME OF OFFEROR OR CONTRACTOR
 NUMARK ASSOCIATES INC

ITEM NO. (A)	SUPPL ES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Other Requirements:</p> <p>Task 1 is paid under cost center 1061 and Task 3 is paid under cost center 1058, therefore the monthly letter status reports shall differentiate the reported costs.</p> <p>For subtask 3b, 3c, 3d, and 3e the test plan shall be prepared and obtain COR approval prior to fabricating the test specimens and/or beginning the testing.</p> <p>Refer to Section B, C, F, H and J on Task Order Award and delete them in their entirety and replace with Attachment No. 1 under Modification No. 6.</p> <p>All other terms and conditions remain unchanged. Delivery: 01/31/2021 Delivery Location Code: NRCHQ US NUCLEAR REGULATORY COMMISSION- MAIL PROCESSING CENTER 4930 BOILING BROOK PARKWAY ROCKVILLE MD 20852 USA</p> <p>Period of Performance: 09/30/2016 to 01/31/2021</p>				

SECTION B - SUPPLIES OR SERVICES AND PRICE/COSTS

B.1 PRICE/COST SCHEDULE

CLIN	Description	Est Cost	Fixed Fee	Total Cost Plus Fixed Fee
00001	Basic Award CLIN – Cost associated with performing Tasks 1 & 2.	██████████		Basic Award Cost & Fee: ██████████
00002	Basic Award CLIN – Fee associated with performing Tasks 1 & 2.		██████████	
10001	Cost associated with performing Task 3.	██████████		Task 3 Cost & Fee: ██████████
10002	Fee associated with performing Task 3.		██████████	
Estimated Total		\$600,797.97	\$20,398.90	\$621,196.87

B.2 NRCB044 CONSIDERATION AND OBLIGATION—INDEFINITE-QUANTITY CONTRACT

(a) The estimated total quantity of this contract for the products/services under this contract is **\$621,196.87** of which the sum of **\$600,797.97** represents the estimated reimbursable costs, and of which **\$20,398.90** represents fixed fee.

(b) The Contracting Officer will obligate funds on each task order issued.

(c) The amount currently obligated by the Government with respect to this contract is **\$524,967.00**, of which the sum of **\$504,568.10** represents the estimated reimbursable costs, and of which **\$20,398.90** represents the fixed-fee (fixed-fee CLIN 00002 is now fully-funded).

(d) This is an incrementally-funded contract and FAR 52.232-22 – “Limitation of Funds” applies.

(e) A total estimated cost and fee, if any, will be negotiated for each task order and will be incorporated as a ceiling in the resultant task order. The Contractor shall comply with the provisions of FAR 52.232-20 - Limitation of Cost for fully-funded task orders and FAR 52.232-22 - Limitation of Funds for incrementally-funded task orders, issued hereunder.

FEE HOLDBACK TABLE		85.00%	
CLIN	TOTAL FEE	85% LIMIT	15% (HOLD BACK)
00002	\$9,969.62	\$8,474.18	\$1,495.44
10002	\$10,429.28	\$8,864.88	\$1,564.40
TOTAL	\$20,398.90	\$17,339.06	\$3,059.84

(End of Clause)

SECTION C – DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK REVISION NO. 1

NRC Requisition Office: NRR/RES

Fee Recoverable: Partial:

- Work under Tasks 1 and Task 3 are not license fee recoverable.
- Work under Task 2 is licensee fee recoverable.

1. PROJECT TITLE

“Technical Assistance to Review American Society of Mechanical Engineer’s Boiler and Pressure Vessel Code Case and Licensee Relief Requests for Carbon Fiber Repairs”

2. BACKGROUND

The American Society of Mechanical Engineer’s Boiler and Pressure Vessel (ASME) Code is currently developing an ASME Code Case to use carbon fiber to repair ASME Code Class II and III piping at US Nuclear Power Plants. The ASME Code is developing requirements for the use of carbon fiber for the first time for use by the ASME Code for nuclear plant application. The current version of the draft code case is over 80 pages long, detailing in significant technical detail the requirements for material specification, qualification, design, fabrication, installation, evaluation and testing. The NRC expects relief requests to implement a carbon fiber repair within the next year. Additionally, the NRC will review the proposed ASME Code Case on carbon fiber repair for inclusion into the US Code of Federal Regulations.

3. PROJECT DESCRIPTION AND OBJECTIVE(S)

This task order is organized into two parts: the Basic task order is comprised of Tasks 1 and 2. The CLIN is comprised of Task 3.

Basic task order Objective - (Tasks 1 and 2): the Contractor shall provide expert analysis and review of the draft ASME Code Case on carbon fiber repair. The Contractor’s review will be used to support endorsement, rejection or any potential conditions for use of the draft code case and licensee specific relief requests.

CLIN Objective - (Task 3): This task identifies areas in which validation testing of repair mockups, test samples, and materials may be required by the COR. Specifically, Task 3 is designed to provide the following confirmatory information which has been identified as necessary to support the review of future related relief requests and/or ASME Code Case(s):

- a) Characteristic Values of Ultimate Strength and Stiffness of Single-Ply Lamina. There are three common characteristic values (A-Basis, B-Basis, and ASTM D7290) which may be applicable depending on the safety-significance of a proposed repair. An understanding of the differences between these values is needed to determine the relevant safety margin.
- b) Bond Strength at Terminal Ends at Operating Temperature. The bond strength at the terminal ends of the repair and the inter-laminar shear strength are essential for ensuring water tightness. However, limited relevant data exists to substantiate that the recommended values are obtained or to reflect any changes associated with the range of operating temperatures (minimum, nominal, and/or maximum).
- c) Ultimate Strength and Stiffness of Multi-Ply Laminate. Technical literature indicates that the strength is reduced as the number of layers increases. An understanding of the changes in strength and stiffness as a function of the number of layers is needed to evaluate potential future proposed repairs.
- d) Water Tightness at Operating Temperature and Pressure. Available data to confirm water tightness is limited to room temperature. Water tightness tests at operating temperatures (minimum, nominal, and/or maximum) are needed to understand the temperature effects.
- e) Hydrostatic Pressure Test. A room temperature hydrostatic pressure test is needed to validate available data and design information. No relevant hydrostatic pressure testing has been identified in currently available technical literature.

This Statement of Work for this Task Order falls within the Unrestricted part of NRC IDIQ Enterprise-Wide Contract (EWC) entitled Technical Assistance in Support of Agency Environmental and Reactor Programs, paragraph 3.2 entitled, "LICENSING SUPPORT."

4. STATEMENT OF WORK TASKS

Technical Directions

The COR may issue Technical Directions (TDs) from time to time throughout the duration of the task order. These TDs must be within scope of the task order SOW and shall not constitute new assignments of work or changes of such a nature as to constitute a change to the task order cost or period of performance. Any modifications to the scope of work, cost or period of performance of this task order must be issued by the task order Contracting Officer (CO) and will be coordinated with the task order Contracting Officer's Representative (COR). The COR may issue TDs for the purpose of making adjustments or clarifications to the timing and performance of the tasks and/or the delivery schedule of the documents within this task order.

In the event that the contractor believes that any of these TDs do have an impact in terms of changing the scope, cost or period of performance of the task order, the contractor shall immediately inform the task order CO and request appropriate guidance prior to taking action on the TD in question.

Task 1: Review of ASME Code Case on Carbon Fiber Repair

(All work under Task 1 is non-fee-billable)

Contractor shall review the ongoing development and final version of the ASME Code Case, which the NRC task order COR will provide as it is updated to the Contractor upon task order award, for the purpose of providing an overall assessment of the effectiveness of the described carbon fiber repair technique to repair components within the scope of the ASME Code Case. The acceptance standard for this task is to provide reasonable assurance of structural integrity and leak tightness, thereby ensuring adequate protection of public health and safety for the life of the repair. The contractor shall review the complete ASME Code Case, as well as provide specific focus in the following areas of the Case;

- 1) Section 2000 – Materials
 - i) Validate the scope of the Code Case to ensure that it contains all material component categories required to be addressed in the carbon fiber repair process.
 - ii) Ensure all definitions and referenced requirements in Appendices I-III are adequate
- 2) Subsection 2300 – Testing and Qualification
 - i) Verify that all testing and qualification are adequate and comparable to ASME Code Section II and Section III requirements for the use of metallic piping in regards to structural integrity and leak-tightness.
- 3) Section 3000 – Design
 - i) Review terms and requirements to ensure all aspects of carbon fiber repair are within design scope
 - ii) Validate that design equations, allowable variables, and safety factors are adequate.
- 4) Section 4000 – Fabrication and Installation
 - i) Review process to ensure that the requirements are adequate to ensure structural integrity and leak-tightness
 - ii) Verify references used to support fabrication and installation
 - iii) Ensure that the generic process rules are adequate to not limit technique to only one manufacture's process
 - iv) Evaluate processing issues, including potential defects, bonding and repair requirements
 - v) Evaluate the defect and patch repair processes in test specimen application
- 5) Section 5000 – Examination and Verification Testing
 - i) Review scope and capability of examination techniques
 - ii) Ensure that the examinations and testing is adequate to identify all potential degradation types for carbon fiber applications for this Code Case.
 - iii) Validate qualification and capabilities of NDE to identify degradation
 - iv) Ensure the testing is adequate to provide reasonable assurance of structural integrity and leak-tightness
- 6) Section 6000 – Testing
 - i) Evaluate requirements in relation to current 10 CFR 50.55a ISI requirements for repairs, to ensure structural integrity and leak-tightness
 - ii) Validate the testing requirements and in-service inspection appendix to ensure in-service inspection methods and frequencies are adequate to provide reasonable assurance of structural integrity and leak-tightness for all potential degradation mechanisms
- 7) Appendix Review

- i) Review each appendix as called out by the sections above for adequacy and completeness.

While in process of the review, the contractor shall inform the NRC COR, in the monthly reports, of any issues for resolution in the development of the ASME Code Case. Finally, the contractor shall provide a draft technical letter report (TLR) detailing the review above and recommendations for either acceptance or rejection of the final ASME Code Case in a timeframe to support NRC review prior to the required ASME Code voting process. The contractor shall review NRC comments on the draft TLR and submit a final TLR version prior to the final ASME Code voting process on the ASME Code Case.

Task 2 Review of plant specific relief requests to implement carbon fiber repair

(All work under Task 2 is fee-billable)

The contractor shall provide support for up to four (4) licensee relief requests to use carbon fiber as a repair or mitigation technique. The NRC COR will provide the contractor the specific licensee relief request for each review. If the COR provides the contractor a relief request to review as part of this task before Task 1 is complete, the contractor will review the relief request in each of the areas identified in Task 1, but on a plant specific basis rather than for a generic application. For example, a relief request may request to use just one type of carbon fiber repair technique. The contractor would review the particular application of that specific technique by assessing the materials, testing and qualification, design, fabrication and installation, examination and verification testing, and other testing requirements. . A plant specific relief request is considered to be more focused on a particular application method, and therefore limited in scope of the overall review in comparison to the generic relief request for all application types. If the relief request review occurs after Task 1 is complete, the contractor shall review the plant specific relief request in accordance with the implement the ASME Code Case for use of carbon fiber repairs. The contractor's review will be focused on ensuring that the relief request complies with the ASME Code Case, identifies any deviations, and provides an expert opinion and technical basis for the acceptance, modification or rejection of any deviations.

In both cases, the contractor shall perform an assessment of the relief request for completeness for review in accordance with NRC, Office of Nuclear Reactor Regulation, Office Instruction No.: LIC-109, Revision 1, "Acceptance Review Procedures." (ML091810088) The contractor shall then perform a technical review of the relief request in accordance with NRC, Office of Nuclear Reactor Regulation, Office Instruction No.: LIC-102, Revision 2, "Relief Request Reviews." (ML091380595) The contractor shall provide any requests for additional information (RAIs) in accordance with the above-referenced instructions on a timeline as defined in Task 2b of the Deliverables section of this statement of work (SOW). The contractor shall provide a technical letter report detailing the review above on a timeline provided by the NRC as defined in Task 2b of the Deliverables section of this SOW.

Task 3 Mockup testing and physical evaluation

(All work under Task 3 is non-fee-billable)

The contractor shall perform the required series of evaluation tests on a carbon fiber repaired mockup pipe and evaluate the effectiveness of the repair by loading the pipe to failure, both in internal pressure and external load. All test samples shall be fabricated in accordance with the

applicable materials and fabrication procedures which will be used to fabricate the repaired mockup pipe. All testing shall be performed in general accordance with draft ASME Code Case N-871, "Internal Repair of Buried Class 2 & 3 Piping Using Carbon Fiber Reinforced Polymer Composites."

Subtask 3a) Characteristic Values of Ultimate Strength and Stiffness of Single-Ply Lamina.

- i. Fabricate and test a minimum of 50 single-ply lamina samples at room temperature to obtain ultimate strength and stiffness values in accordance with ASTM D3039.
- ii. Analyze the resulting data to determine the A-Basis, B-Basis, and ASTM D7290 characteristic value of both ultimate strength and stiffness.
- iii. Provide a technical letter report which includes the material used, fabrication methods, test plan, raw data, methodologies used and analysis results.

Subtask 3b) Bond Strength at Terminal Ends at Operating Temperature.

- i. Develop a test plan which describes the fabrication and test methodology for evaluating the bond strength at the terminal ends at operating temperature. Obtain COR approval of the test plan prior to fabricating and testing samples.
- ii. Perform testing in accordance with ASTM D4541 and ASTM D5868 and the approved test plan.
- iii. Provide a technical letter report which includes the as-executed fabrication and test methods, raw data, and analyzed results.

Subtask 3c) Ultimate Strength and Stiffness of Multi-Ply Laminate.

- i. Develop a test plan which describes the fabrication and test methodology for evaluating the ultimate strength and stiffness of multi-ply laminate. Obtain COR approval of the test plan prior to fabricating and testing samples.
- ii. Perform testing in accordance with the approved test plan.
- iii. Provide a technical letter report which includes the as-executed fabrication and test methods, raw data, and analyzed results.

Subtask 3d) Water Tightness at Operating Temperature and Pressure.

- i. Develop a test plan which describes the fabrication and test methodology for evaluating the water tightness at operating temperature and pressure. The contractor shall obtain a test pipe piece not to exceed 40-inches in diameter and develop two test samples. The test plan should detail the fabrication process which will include removing a portion of the pipe of adequate size in a method to be consistent with general corrosion of carbon steel. The test plan should also detail the test methodology, including any non-destructive examination. Obtain COR approval of the test plan prior to fabricating and testing samples.
- ii. Notify the COR at least 3 days in advance of fabrication and testing so that NRC and other stakeholders can observe. Provide safe access for installation vendor and observers.
- iii. Perform fabrication and testing in accordance with the approved test plan. The contractor shall verify that all documentation is complete and in accordance with the draft ASME Code Case N-871 or that any deviations have been specifically approved by the COR.
- iv. Provide a technical letter report which includes the as-executed fabrication and test methods, raw data, and analyzed results.

Subtask 3e) Hydrostatic Pressure Test.

- i. Develop a test plan which describes the fabrication and test methodology for performing the hydrostatic pressure test. In the test plan, describe whether a pristine sample will be used, or if the sample that was used to complete Subtask 3d will be used. If additional material property samples are needed to support the associated calculations, include them in the test plan. Obtain COR approval of the test plan prior to fabricating (if needed) and testing samples.
- ii. Notify the COR at least 3 days in advance of fabrication and testing so that NRC and other stakeholders can observe. Provide safe access for installation vendor and observers.
- iii. Perform testing in accordance with the approved test plan.
- iv. Provide a technical letter report which includes the as-executed fabrication and test methods, raw data, and analyzed results.

Required equipment and/or analysis tools are listed under “Key Equipment” in Section 11, “Special Considerations”. NRC understands that base equipment, such as tensile testing machines or ovens, can be used synergistically for various test applications. However, capabilities to perform all required testing by the ASME Code Case is expected, unless directed otherwise by the NRC COR.

5. APPLICABLE DOCUMENTS AND STANDARDS

Licensee relief requests, as provided by the NRC COR for review.

NRC, Office of Nuclear Reactor Regulation, Office Instruction No.: LIC-109, Revision 1, “Acceptance Review Procedures.” (ML091810088)

NRC, Office of Nuclear Reactor Regulation, Office Instruction No.: LIC-102, Revision 2, “Relief Request Reviews.” (ML091380595)

6. DELIVERABLES AND DELIVERY SCHEDULE/REPORTING REQUIREMENTS

The contractor shall provide the deliverables stated in the table below, both in hard copy and electronic format, unless directed otherwise by the COR. The electronic format shall be provided using a Microsoft-based product, (e.g., Outlook, Word, Excel, PowerPoint) unless the COR and the contractor specifically agree on another format. All deliverables shall be in the format of draft version, revision version with redline/strikeout with a change-control appendix, and a revised version which can be the final version. The contractor shall maintain appropriate revision control in an electronic format.

For each “final” deliverable (e.g., preliminary, draft, or final) that accomplishes a specific portion of a subtask activity, the contractor shall provide an electronic copy to the COR. The contractor shall explicitly state in its submittal that the product provided is the deliverable for Task/Subtask XX, as further described below.

The schedule for deliverables shall be contained in the approved Project Plan for the task order effort, which is included as a deliverable in the table below.

The contractor shall develop (as necessary), maintain, and control data, files, information, and deliverables pursuant to this task order

Deliverable Schedule

Deliverable	Description	Quantity/ Media	Completion Date
Task 1a	Document providing expert perspective on and summary of ASME Code Case Meetings or Teleconferences	electronic	As scheduled by COR, but no earlier than 1 week after meeting
Task 1b	Draft TLR on Review of Final ASME Code Case on Carbon Fiber Repair	electronic	Submit three weeks prior to deadline for NRC vote on Final ASME Code Case on Carbon Fiber Repair at ASME Code Standards Committee Meeting*
	Final TLR addressing NRC comments (may include multiple iterations)	electronic	Submitted two weeks after NRC COR provides comments on Task 1b
Task 2a	Relief Request Acceptance Review	electronic	Submit within two weeks of COR providing relief request to contractor
Task 2b	Requests for Additional Information (RAIs)	electronic	Submit within three months of contractor notification of NRC COR completion of acceptance review licensee's relief request
Task 2c	Draft Review TLR	electronic	If no RAI's, use 2b completion date. If RAI's provided, submit within one month of NRC COR's provision to the contractor of licensee RAI responses
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments to contractor
Task 3a	Provide Draft Review TLR	electronic	Submit within one month after all testing completed
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments provided in electronic format to contractor
Task 3b	Provide Draft Review TLR	electronic	Submit within one month after all testing completed
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments provided in electronic format to contractor
Task 3c	Provide Draft Review TLR	electronic	Submit within one month after all testing completed

Deliverable	Description	Quantity/ Media	Completion Date
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments provided in electronic format to contractor
Task 3d	Provide Draft Review TLR	electronic	Submit within one month after all testing completed
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments provided in electronic format to contractor
Task 3e	Provide Draft Review TLR	electronic	Submit within one month after all testing completed
	Address NRC comments on TLR (may include multiple iterations)	electronic	Submit two weeks after NRC COR provides comments provided in electronic format to contractor
4	MLSR in accordance with Sections F.3 and J (Attachment 5) of the base IDIQ contract.	electronic	See delivery date established in base IDIQ contract.

* **Note:** The dates for the current review are provided below from the last ASME Code meeting on this code case. They are provided as a starting basis for effort for this deliverable. However, the NRC notes that these dates are subject to change through the development of the ASME Code Case.

Feb 2016 -- Design section revisions still in progress and to be completed by May 2016 meeting. Proposed revision to timing: complete design section by August 2016 meeting.

May 2016 -- Resolve Section III Design Comments, continue Code Case development

Aug 2016 -- Complete Code Case development and acceptance by TG-Repair by CFC

Aug 2016 -- After meeting, submit by letter ballot for review and comment to WG-NMRR and WG-Design & Programs

Nov 2016 -- Resolve comments and submit to WG-NMRR and WG-D&P for approval (at meeting).

Nov 2016 -- After meeting, submit by letter ballot to SG-RRA for review and comment.

Feb 2017 -- Resolve comments and submit to SG-RRA for approval (at meeting).

May 2017 -- Submit to Section XI Standards Committee for approval.

The above deliverables shall be submitted to the task order COR. Unless otherwise directed by the COR or the CO, the contractor must provide all deliverables except the Monthly Letter Status Reports (MLSR) as draft products. The COR will review all draft deliverables (and coordinate any internal NRC staff review, if needed) and provide comments back to the contractor. The contractor shall revise the draft deliverable based on the comments provided by the COR and then deliver a revised version of the deliverable, which will then be considered the Final Version. When mutually-agreed upon between the contractor and the COR, the contractor may submit preliminary or partial drafts to help gauge the contractor's understanding of the particular work requirement. More than one round of drafts may be needed if the contractor does not successfully incorporate the COR's comments on the previous draft.

7. GOVERNMENT-FURNISHED PROPERTY

None.

8. PERIOD OF PERFORMANCE

See **NRCF030A PERIOD OF PERFORMANCE ALTERNATE I**

9. PLACE OF PERFORMANCE

The work to be performed under this contract/order will be primarily performed at the location of the contractor facility.

10. SPECIAL CONSIDERATIONS

TRAVEL/MEETINGS

Travel to NRC Headquarters will be required for public meetings, as requested by NRC COR. Estimations are for one person taking one trip during FY17 and one trip during FY18. Trips are expected to be three days in length: travel day, work day, and return travel day.

Travel to ASME Code meetings will be required, as requested by NRC COR. Estimations are for one person taking one trip during FY18 and two trips during FY19. Trips are expected to be up to five days in length: one travel day, three work days, and one return travel day.

Under Task 3, the NRC COR may direct that two persons travel to a repair site for quality control evaluation and test monitoring. Estimations are for one trip during FY19. The trip would be expected to be up to four days in length: travel day, two work days, and return travel day.

Contractor will be authorized travel expenses consistent with the substantive provisions of the Federal Travel Regulation (FTR) and the limitation of funds specified in this contract/order. All travel requires written Government approval from the CO, unless otherwise delegated to the COR.

Travel will be reimbursed in accordance with FAR 31.205-46, "Travel costs" and the General Services Administration's Federal Travel Regulations at:
<http://www.gsa.gov/portal/content/104790>.

All travel requires prior written approval from the COR

SECURITY

Work on this task order may involve the handling of documents that contain proprietary information. The contractor shall safeguard documents containing proprietary information against unauthorized disclosure. After completion of work, the contractor must either destroy the documents or return them to the NRC. If they are destroyed, please confirm this

in an e mail to the COR with a copy to the CO and include the date and manner in which the documents were destroyed.

KEY PERSONNEL

See **2052.215-70 KEY PERSONNEL. (JAN 1993)**

KEY EQUIPMENT, CERTIFICATIONS, and ANALYSIS TOOLS

The contractor shall provide the following required equipment, certifications, in order to perform the research described in this SOW:

1. Testing apparatus to perform the following tests:
 - ASTM C581, Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Reinforced Structures Intended for Liquid Service
 - ASTM D570, Standard Test Method for Water Absorption of Plastics
 - ASTM D695, Standard Test Method for Compressive Properties of Rigid Plastics
 - ASTM D696, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With Vitreous Silica Dilatometer
 - ASTM D790, Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Insulating Materials
 - ASTM D1141, Standard Practice for the Preparation of Substitute Ocean Water
 - ASTM D1598, Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure
 - ASTM D2247, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
 - ASTM D2344, Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
 - ASTM D2369, Standard Test Method for Volatile Content of Coatings
 - ASTM D2583, Standard test method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
 - ASTM D2990, Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
 - ASTM D2992, Standard Practice for obtaining hydrostatic or pressure design basis for glass fiber reinforced thermosetting epoxy pipe and fittings
 - ASTM D3039, Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
 - ASTM D3045, Standard Practice for Heat Aging of Plastics Without Load
 - ASTM D3418, Standard Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry
 - ASTM D3479, Standard Test Method for Tension-Tension Fatigue of Polymer Matrix Composite Materials
 - ASTM D4065, Standard Practice for Plastics: Dynamic Mechanical Properties: Determination and Report of Procedures

- ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- ASTM D4571, Standard Test Methods for Rubber Compounding Materials – Determination of Volatile Material
- ASTM D5379, Standard Test Method for Shear Properties of Composite Materials by the V-notched Beam Method
- ASTM D6641, Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture
- ASTM D7290, Standard Practice for Evaluating Material Property Characteristic Values for Polymeric Composites for Civil Engineering Structural Applications
- ASTM D7522, Standard Test Method for Pull-Off Strength for FRP Bonded to Concrete Substrate
- ASTM D7616, Standard Test Method for Determining Apparent Overlap Splice Shear Strength Properties of Wet Lay-Up Fiber-Reinforced Polymer Matrix Composites Used for Strengthening Civil Structures
- ASTM D149, Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
- ASTM D543, Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- ASTM D638, Standard Test Method for Tensile Properties of Plastics
- ASTM D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
- ASTM D903, Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
- ASTM D1598, Standard Test method for the time to failure of plastic pipe under constant internal pressure
- ASTM D1599, Standard Test method for short time hydraulic failure pressure of plastic pipe, tubing and fittings
- ASTM D1763, Standard Specification for Epoxy Resins
- ASTM D2105, Standard Test Method for Longitudinal Tensile Properties of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Tube
- ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness
- ASTM D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
- ASTM D3165, Standard Test Method for Strength Properties of Adhesives in Shear by Tension Loading of Single-Lap-Joint Laminated Assemblies
- ASTM D3681, Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe in a Deflected Condition
- ASTM D3846, Standard Test Method for In-Plane Shear Strength of Reinforced Plastics
- ASTM D5868, Standard Test Method for Lap Shear Adhesion for Fiber Reinforced Plastic (FRP) Bonding
- ASTM D6604, Standard Practice for Glass Transition Temperatures of Hydrocarbon Resins by Differential Scanning Calorimetry
- ASTM G8, Standard Test Method for Cathodic Disbonding of Pipeline Coatings

- ASTM G42, Standard Test Method for Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperatures
 - ASTM G84, Standard Practice for Measurement of Time-of-Wetness on Surfaces Exposed to Wetting Conditions as in Atmospheric Corrosion Testing
 - ASTM G95, Standard Test Method for Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method)
2. Hydrostatic Test Equipment: pressurizers, pumps and servo control system to test pipe specimens up to 36" in diameter under internal hydrostatic pressures up to 2000 psi and at 95C until failure (>10,000 hours).
 3. Specimen Preparation Equipment: milling cutter to precisely machine specimens with notching techniques needed to prepare specimens. Polishing equipment and procedures to accurately locate the fusion line and melt zone area prior to accurately positioning the razor notch for SCG evaluation of specimens. Special fixtures, as necessary, for razor notching per ASTM standards and for recording the Load-displacement of specimens.
 4. Instrumented Impact Testing Equipment: Dynatup Charpy testing machine with purpose-built fixtures for Charpy specimens.

LICENSE FEE RECOVERY

Work under Tasks 1 and Task 3 are not license fee recoverable.

Work under Task 2 is licensee fee recoverable. The COR will provide a cost accounting code (CAC) number for each relief request under Task 2.

The COR will provide all needed TACS and/or CACs to the contractor after Task Order Award

In the MLSR, the contractor shall:

- Track non-fee billable costs in Tasks 1 and 3 separately from the fee-billable costs in Task 2.
- Include a cost and hourly breakdown of the work performed during that period across each CAC number.

DATA RIGHTS

The NRC shall have unlimited rights to and ownership of all deliverables provided under this contract/order, including reports, recommendations, briefings, work plans and all other deliverables. All documents and materials, to include the source codes of any software, produced under this contract/order are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. These documents and materials may not be used or sold by the contractor without written authorization from the CO. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. This right does not abrogate any other Government rights. The definition of "unlimited rights" is contained in Federal Acquisition Regulation (FAR) 27.401, "Definitions." FAR clause at FAR 52.227-14, "Rights in Data-General," is hereby incorporated by reference and made a part of this

contract/order.

SECTION F - Deliveries or Performance

NRCF030A PERIOD OF PERFORMANCE ALTERNATE I

The total period of performance for this project is September 30, 2016 through January 31, 2021.

(See FAR 52.216-18 - Ordering)
(End of Clause)

SECTION H - Special Contract Requirements

2052.215-70 KEY PERSONNEL. (JAN 1993)

(a) The following individuals are considered to be essential to the successful performance of the work hereunder:

NAME	LABOR CATEGORY/POSITION
[REDACTED]	Subject Matter Expert (SME)
[REDACTED]	Sr. Tech Reviewer (STR)

*The contractor agrees that personnel may not be removed from the contract work or replaced without compliance with paragraphs (b) and (c) of this section.

(b) If one or more of the key personnel, for whatever reason, becomes, or is expected to become, unavailable for work under this contract for a continuous period exceeding 30 work days, or is expected to devote substantially less effort to the work than indicated in the proposal or initially anticipated, the contractor shall immediately notify the contracting officer and shall, subject to the concurrence of the contracting officer, promptly replace the personnel with personnel of at least substantially equal ability and qualifications.

(c) Each request for approval of substitutions must be in writing and contain a detailed explanation of the circumstances necessitating the proposed substitutions. The request must also contain a complete resume for the proposed substitute and other information requested or needed by the contracting officer to evaluate the proposed substitution. The contracting officer and the project officer shall evaluate the contractor's request and the contracting officer shall promptly notify the contractor of his or her decision in writing.

(d) If the contracting officer determines that suitable and timely replacement of key personnel who have been reassigned, terminated, or have otherwise become unavailable for the contract work is not reasonably forthcoming, or that the resultant reduction of productive effort would be so substantial as to impair the successful completion of the contract or the service order, the contract may be terminated by the contracting officer for default or for the convenience of the Government, as appropriate. If the contracting officer finds the contractor at fault for the condition, the contract price or fixed fee may be equitably adjusted downward to compensate the Government for any resultant delay, loss, or damage.

(End of Clause)

2052.215-71 CONTRACTING OFFICER REPRESENTATIVE (COR) AUTHORITY. (OCT 1999)

(a) The contracting officer's authorized representative hereinafter referred to as the COR for this contract is:

Name:

[REDACTED]

[REDACTED]

Telephone Number:

Email:

The alternate contracting officer's representative is:

Name

[REDACTED]

Address

US NRC

[REDACTED]

Telephone Number

[REDACTED]

(b) Performance of the work under this contract is subject to the technical direction of the NRC COR. The term technical direction is defined to include the following:

(1) Technical direction to the contractor which shifts work emphasis between areas of work or tasks, authorizes travel which was unanticipated in the Schedule (i.e., travel not contemplated in the Statement of Work or changes to specific travel identified in the Statement of Work), fills in details, or otherwise serves to accomplish the contractual statement of work.

(2) Provide advice and guidance to the contractor in the preparation of drawings, specifications, or technical portions of the work description.

(3) Review and, where required by the contract, approve technical reports, drawings, specifications, and technical information to be delivered by the contractor to the Government under the contract.

(c) Technical direction must be within the general statement of work stated in the contract. The COR does not have the authority to and may not issue any technical direction which:

(1) Constitutes an assignment of work outside the general scope of the contract.

(2) Constitutes a change as defined in the "Changes" clause of this contract.

(3) In any way causes an increase or decrease in the total estimated contract cost, the fixed fee, if any, or the time required for contract performance.

(4) Changes any of the expressed terms, conditions, or specifications of the contract.

(5) Terminates the contract, settles any claim or dispute arising under the contract, or issues any unilateral directive whatever.

(d) All technical directions must be issued in writing by the COR or must be confirmed by the project officer in writing within ten (10) working days after verbal issuance. A copy of the written direction must be furnished to the contracting officer. A copy of NRC Form 445, Request for Approval of Official Foreign Travel, which has received final approval from the NRC must be furnished to the contracting officer.

(e) The contractor shall proceed promptly with the performance of technical directions duly issued by the COR in the manner prescribed by this clause and within the COR's authority under the provisions of this clause.

(f) If, in the opinion of the contractor, any instruction or direction issued by the project officer is within one of the categories defined in paragraph (c) of this section, the contractor may not proceed but shall notify the contracting officer in writing within five (5) working days after the receipt of any instruction or direction and shall request that contracting officer to modify the contract accordingly. Upon receiving the notification from the contractor, the contracting officer shall issue an appropriate contract modification or advise the contractor in writing that, in the contracting officer's opinion, the technical direction is within the scope of this article and does not constitute a change under the "Changes" clause.

(g) Any unauthorized commitment or direction issued by the COR may result in an unnecessary delay in the contractor's performance and may even result in the contractor expending funds for unallowable costs under the contract.

(h) A failure of the parties to agree upon the nature of the instruction or direction or upon the contract action to be taken with respect to the instruction or direction is subject to 52.233-1 - Disputes.

(i) In addition to providing technical direction as defined in paragraph (b) of the section, the COR shall:

(1) Monitor the contractor's technical progress, including surveillance and assessment of performance, and recommend to the contracting officer changes in requirements.

(2) Assist the contractor in the resolution of technical problems encountered during performance.

(3) Review all costs requested for reimbursement by the contractor and submit to the contracting officer recommendations for approval, disapproval, or suspension of payment for supplies and services required under this contract.

(End of Clause)

SECTION J - List of Documents, Exhibits and Other Attachments

Attachments:

1. Monthly Letter Status Report Template (MLSR)