


INTERAGENCY AGREEMENT		1. IAA NO. NRC-HQ-20-16-T-0011/M0004		PAGE 1 OF 2	
2. ORDER NO.		3. REQUISITION NO. NRR-17-0148		4. SOLICITATION NO.	
5. EFFECTIVE DATE 08/30/2017		6. AWARD DATE 09/26/2017		7. PERIOD OF PERFORMANCE 08/01/2016 TO 09/30/2018	
8. SERVICING AGENCY BROOKHAVEN NATIONAL LABORATORY ALC: DUNS: 027579460 +4: BROOKHAVEN SITE OFFICE PO BOX 5000 BLDG 464 UPTON NY 11973-5000 POC Kim Nekulak TELEPHONE NO. 631-344-7439		9. DELIVER TO DAN HOANG US NUCLEAR REGULATORY COMMISSION 11155 ROCKVILLE PIKE ROCKVILLE MD 20852-2783			
10. REQUESTING AGENCY ACQUISITION MANAGEMENT DIVISION ALC: 31000001 DUNS: +4: US NUCLEAR REGULATORY COMMISSION TWO WHITE FLINT NORTH 11545 ROCKVILLE PIKE ROCKVILLE MD 20852-2738 POC Rachel Glaros TELEPHONE NO. (301) 415-0063		11. INVOICE OFFICE US NUCLEAR REGULATORY COMMISSION TWO WHITE FLINT NORTH 11545 ROCKVILLE PIKE MAILSTOP T9-B07 ROCKVILLE MD 20852-2738			
12. ISSUING OFFICE US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-8E06M WASHINGTON DC 20555-0001		13. LEGISLATIVE AUTHORITY Energy Reorganization Act of 1974			
		14. PROJECT ID			
		15. PROJECT TITLE SEE BLOCK 18.			
16. ACCOUNTING DATA 2017-X0200-FEEBASED-20-20D002-20B205-1061-11-4-149-251D-11-4-149-1061					
17. ITEM NO.	18. SUPPLIES/SERVICES	19. QUANTITY	20. UNIT	21. UNIT PRICE	22. AMOUNT
	Project Title: Evaluation of the Seabrook Nuclear Power Plant ASR License Amendment Request Master IAA: NRCHQ2514D0002 The purpose of this modification is to (1) make within scope changes to the statement of work and increase the level of effort; (2) increase the authorized cost ceiling [REDACTED] to \$317,621.00; (3) provide incremental funding in the amount of \$70,000.00, thereby increasing the total obligations for this task order from \$194,116.00 to \$264,116.00; and Continued ...				
23. PAYMENT PROVISIONS		24. TOTAL AMOUNT \$70,000.00			
25a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (SERVICING)		26a. SIGNATURE OF GOVERNMENT REPRESENTATIVE (REQUESTING) 			
25b. NAME AND TITLE	25c. DATE	26b. CONTRACTING OFFICER MORIE E. GUNTER-HENDERSON		26c. DATE 09/26/2017	

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<p>(4) extend the period of performance end date by one (1) year, from September 30, 2017 to September 30, 2018.</p> <p>Accordingly the task order is modified as follows:</p> <p>Attachment No. 1 entitled, "Statement of Work," is hereby deleted in its entirety and replaced with the Statement of Work attached to this Modification No. 4 entitled, "Statement of Work, Revision 1."</p> <p>Amount Obligated This Action: \$70,000.00 Total Obligated Amount to Date: \$264,116.00 (Changed) Total Authorized Ceiling Amount: \$317,621.00 (Changed) Period of Performance: 08/01/2016 to 09/30/2018 (Changed)</p> <p>All other terms and conditions of the task order remain unchanged.</p> <p>DUNS: 040535809 TAS: 31X0200.320 ALC: 31000001</p>			

STATEMENT OF WORK (SOW) REVISION 1

NRC Agreement Number NRC-HQ-25-14-D-0002	NRC Agreement Modification Number 	NRC Task Order Number (If Applicable) NRC-HQ-20-16-T-0011	NRC Task Order Modification Number (If Applicable) M0004
Project Title Evaluation of the Seabrook Nuclear Power Plant ASR License Amendment Request			
Job Code Number 	B&R Number 		Servicing Agency Brookhaven National Laboratory
NRC Requisitioning Office Office of Nuclear Reactor Regulation (NRR)		Period of Performance See Block 7 on the IAA Form	
NRC Form 187, Contract Security and Classification Requirements <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable		<input checked="" type="checkbox"/> Involves Proprietary Information <input type="checkbox"/> Involves Sensitive Unclassified	
<input type="checkbox"/> Non Fee-Recoverable		<input checked="" type="checkbox"/> Fee-Recoverable (If checked, complete all applicable sections below)	
Docket Number (If Fee-Recoverable/Applicable) 50-443		Inspection Report Number (If Fee Recoverable/Applicable) 	
Technical Assignment Control Number (If Fee-Recoverable/Applicable) To be provided to BNL by the COR after NRC receives the LAR		Technical Assignment Control Number Description (If Fee-Recoverable/Applicable) 	

CONTRACTING OFFICER'S REPRESENTATIVE

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Technical Reviewer

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NRC-FURNISHED PROPERTY/MATERIALS

The following NRC-furnished materials will be provided to BNL by the COR:

Electronic copy of Seabrook's license amendment request and associated support documents (to be provided as soon as the documents are available)

--- End of Executive Summary ---

STATEMENT OF WORK (SOW)

(Interagency Agreements)

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- 7.0 Meetings and Travel
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DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

(Interagency Agreements)

1.0 BACKGROUND

Alkali-Silica Reaction (ASR) concrete degradation is affecting safety-related structures at Seabrook Nuclear Power Plant. ASR is a unique, first-of-a-kind, degradation mechanism in the nuclear industry with no consensus approach to resolution. The licensee is currently operating under an operability determination that identifies the structures as operable, but degraded. Based on discussions with the licensee, it is expected that the licensee will submit a license amendment request (LAR) in accordance with 10 CFR 50.90 in July 2016 to resolve this operability issue. The resolution will rely on research results and extensive structural analysis. To determine the safety adequacy of the LAR, the U.S. Nuclear Regulatory Commission (NRC) Staff intends to perform an in-depth review of the adequacy of the licensee's proposed resolution. Due to the complexity and magnitude of the LAR and associated review, the review is taking longer than expected. When the task order was originally placed, it was not anticipated that a site audit would be necessary. Because of the complexity, NRC has been determined that a site audit is required, and possibly a follow-up site audit. Additionally, the original submittal was found unacceptable and the licensee was required to supplement the application. This led to additional review time.

2.0 OBJECTIVE

The objective of this task order is to obtain technical expertise from Brookhaven National Laboratory (BNL) to assist the NRC staff in the review of (1) the applicability of the licensee's research to the structures at Seabrook, (2) the methodology used by the licensee to evaluate the effects of ASR on the safety-related structures, and (3) the ongoing monitoring of the degradation.

3.0 SCOPE OF WORK/TASKS

BNL shall provide all resources necessary to accomplish the tasks and deliverables described in this Statement of Work (SOW). BNL shall provide technical support on the review of the licensee's proposed resolution of the effects of ASR on the design basis of safety related structures at Seabrook.

BNL shall perform a detailed technical review of the LAR. Services include review of the LAR submittal, preparation of input for requests for additional information (RAIs), review of the RAI

responses, participation in site audit(s), and preparation of safety evaluation input. BNL shall perform the following tasks:

Task 1: Conduct Acceptance Review

Conduct an acceptance review of the LAR based on guidance in NRR Office Instruction LIC-109, Revision 1. Prepare a draft technical letter report outlining the issues on the acceptability of the LAR. The COR will provide BNL comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

Task 2: Prepare RAI Input

Conduct an in-depth review and evaluation of the LAR, including an assessment of the following:

- a. justifying the adequacy of Seabrook structures based on the licensee's University of Texas research data
- b. the methodology for estimating the current progression of ASR degradation at Seabrook
- c. the methodology used by the licensee to evaluate the structural impact of ASR on the safety-related structures, specifically:
 - i. implementation of the 100-40-40 methodology
 - ii. use of moment redistribution
 - iii. use of "cracked section" properties
 - iv. development of the ASR load and associated load factors along with the application of the load to the structural models
 - v. repeatability of the ASR analysis methodology
- d. the adequacy of the ASR analysis methodology as applied to several structures identified as "Stage 3" structures in the analysis process (This step is necessary to demonstrate the licensee's ability to apply their proposed methodology. This verification step will likely occur during a second audit after the RAI responses are reviewed).
- e. the overall adequacy of the ASR-affected structures at Seabrook

Identify issues that are flawed in the licensee's approach, along with a technical basis, and prepare a draft technical letter report containing input for RAIs in accordance with the guidance in Section 4.3 of NRR Office Instruction LIC-101, Revision 4. The COR will provide BNL

comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

As directed by the COR, participate in telephone conference calls with the NRC and licensee to assist in clarifying RAIs.

Task 3: Review RAI responses

Review the licensee's responses to RAIs and determine if the information provided satisfactorily addresses the concern and would address the "hole" in safety evaluation (SE) input as discussed in NRR Office Instruction LIC-101, Revision 4. If necessary, identify issues with the responses, along with a technical basis, and prepare a draft technical letter report containing a summary of the resolution of the RAIs and input for any follow-up RAIs in accordance with the guidance in Section 4.3 of NRR Office Instruction LIC-101, Revision 4. The COR will provide BNL comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

As directed by the COR, participate in telephone conference calls with the NRC and licensee to assist in clarifying any follow-up RAIs.

Task 4: Review Follow-up RAI responses

If Necessary. Review the licensee's responses to follow-up RAIs and determine if the information provided satisfactorily addresses the concern as discussed in NRR Office Instruction LIC-101, Revision 4, and determine any outstanding issues or open items. As directed by the COR, participate in telephone conference calls with NRC and the licensee to further discuss the issue(s). Prepare a draft technical letter report containing a summary of resolution of follow-up RAIs and a discussion of any remaining open items, including a discussion of the information necessary to close the open items. The COR will provide comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

Task 5: Meeting Support

If Necessary. Prepare for and travel to NRC Headquarters to participate in a one-day meeting with the NRC staff and the licensee to discuss the results of NRC's evaluation to date and to assist in resolving remaining open items.

Task 6: Prepare Safety Evaluation Input

Prepare a draft technical letter report with input for the LAR safety evaluation in accordance with the guidance in NRR Office Instruction LIC-101, Revision 4. The report shall explain why the licensee's proposed approach is acceptable and shall include a resolution for all RAIs and a discussion of any remaining open items, including a discussion of the information necessary to close the open items. The COR will provide comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

Task 7: Audit Support

Prepare for and travel to Seabrook Station (and/or where the licensee designates) to participate in up to two (2) audits with the NRC staff to review analyses and supporting documents and to discuss issues directly with the licensee. This first audit is expected to focus on the adequacy of the ASR structural analysis methodology by conducting a detailed review of one "Stage Three" analysis. The second audit is expected to focus on the licensee's ability to properly apply the methodology to additional structures by conducting a high-level review of several "Stage Three" analyses. At the completion of each audit, prepare draft technical letter report that documents discussions held during the audit and the remaining open items. The COR will provide comments on the draft report. Prepare a final technical letter report that incorporates COR comments.

4.0 LIST OF DELIVERABLES

Task Number	Deliverables	Due Date
1	Draft technical letter report on the acceptability of the LAR	NLT than 10 calendar days after receipt of the LAR from the NRC
	Acceptance Criteria: Report includes decision on acceptability of LAR based on required guidance. Final technical letter report on the acceptability of the LAR	NLT than 7calendar days after receipt of COR comments

Task Number	Deliverables	Due Date
	Acceptance Criteria: All COR comments are addressed in the report.	
2	<p>Draft technical letter report containing input for RAIs</p> <p>Acceptance Criteria: RAI input is technically sound and adequately address identified issues. Report includes RAIs which follow required guidance.</p> <p>Final technical letter report containing input for RAIs</p> <p>Acceptance Criteria: All COR comments are addressed in the report.</p>	<p>NLT than 75 calendar days after NRC officially accepts the LAR</p> <p>NLT than 7 calendar days after receipt of COR comments</p>
3	<p>Draft technical Letter Report containing summary of resolution of RAIs and, if necessary, follow-up RAIs</p> <p>Acceptance Criteria: Report includes RAI resolutions and possible follow-up RAIs which are technically sound and follow required guidance.</p> <p>Final technical letter report containing summary of resolution of RAIs and, if necessary, follow-up RAIs</p> <p>Acceptance Criteria: All COR comments are addressed in the report.</p>	<p>NLT than 21 calendar days after receipt of the licensee's RAI responses.</p> <p>NLT than 7 calendar days after receipt of NRC comments</p>

Task Number	Deliverables	Due Date
4	<p><i>If Necessary.</i> Draft technical letter report containing summary of resolution of follow-up RAIs and any remaining open items.</p> <p>Acceptance Criteria: Report includes follow-up RAI resolutions and remaining open items which are technically sound and follow required guidance.</p> <p><i>If Necessary.</i> Final technical letter report containing summary of resolution of follow-up RAIs and any remaining open items.</p> <p>Acceptance Criteria: All COR comments are addressed in the report.</p>	<p>NLT than 21 calendar days after receipt of the licensee's RAI responses.</p> <p>NLT than 7 calendar days after receipt of COR comments</p>
6	<p>Draft technical letter report with input for the LAR safety evaluation.</p> <p>Acceptance Criteria: LAR input follows required guidance.</p> <p>Final technical letter report with input for the LAR safety evaluation.</p> <p>Acceptance Criteria: All COR comments are addressed in the report.</p>	<p>NLT than 45 calendar days after receipt of COR comments on the technical letter report summarizing the open items.</p> <p>NLT than 7 calendar days after receipt of COR comments</p>

Task Number	Deliverables	Due Date
7	<p>Draft technical letter report containing summary audit discussions and remaining open items.</p> <p>Acceptance Criteria: Report documents all discussions from audit and remaining open items which are technically sound and follow required guidance.</p> <p>Final technical letter report containing summary audit discussions and remaining open items.</p> <p>Acceptance Criteria: All COR comments are addressed in the report.</p>	<p>NLT 30 calendar days following the completion of the audit</p> <p>NLT than 7 calendar days after receipt of COR comments</p>
All	<p>Per SOW Section 8.1, Monthly Letter Status Reports (MLSRs)</p> <p>Acceptance Criteria: MLSR contains all required information.</p>	NLT than 20th of the following month

The above deliverables shall be provided electronically, in Microsoft Word format, and in hard copy (upon request) to the COR. The MLSR shall also be submitted to other NRC personnel as listed in Section 7.1 of the Enterprise-Wide Agreement (EWA) SOW.

5.0 ESTIMATED LABOR CATEGORIES, KEY PERSONNEL AND LEVELS OF EFFORT

BNL shall propose the appropriate labor categories necessary to meet the requirements of the task order modification.

Key personnel need experience and expertise in structural analysis, structural dynamics, and concrete codes and standards and their application to nuclear safety-related structures. Expertise is also required in finite element analysis and computer modeling techniques for nuclear structures.

6.0 CERTIFICATION AND LICENSE REQUIREMENTS

Not Applicable

7.0 MEETINGS AND TRAVEL

The following travel may be required under this task order:

- One trip, consisting of three technical reviewers, for a one-day meeting, at NRC Headquarters in Rockville, Maryland.
- Up to two, one-week audits, consisting of one technical reviewer for the first audit and two technical reviewers for the second audit, at Seabrook Station (or where the licensee designates).

BNL will be authorized travel expenses consistent with the Federal Travel Regulation (FTR) and the limitation of funds specified for this task order. All travel requires prior written approval from the COR. At the discretion of the COR, meetings may be conducted via telephone or video conference.

8.0 REPORTING REQUIREMENTS

BNL is responsible for structuring the deliverables to current agency standards. Deliverables shall be submitted free of spelling and grammatical errors and shall conform to requirements stated in this section.

8.1 Monthly Letter Status Report (MLSR)

BNL shall provide a Monthly Letter Status Report (MLSR) which consists of a technical progress report and financial status report. This report will be used by the NRC to assess the adequacy of the resources utilized by BNL to accomplish the work contained in this SOW and to provide status of BNL progress in achieving tasks and producing deliverables. The report shall include agreement/order summary information, work completed during the specified period, milestone schedule information, problem identification and resolution, travel plans, and staff hour summary. The MLSR shall be submitted in accordance with Section 7.1 of the EWA SOW.

The content and format of the MLSR shall be consistent with Attachment 5 (Monthly Letter Report Instructions) to the EWA SOW.

9.0 REQUIRED MATERIALS, FACILITIES, HARDWARE/SOFTWARE

Not applicable

10.0 APPLICABLE PUBLICATIONS (CURRENT EDITIONS)

The following regulations and guidance are applicable to this task order and can be found via the NRC Agencywide Documents Access and Management System (ADAMS) at

<http://adams.nrc.gov/wba/> or at <http://www.nrc.gov/reading-rm/doc-collections/>. If necessary, any references that are not available at these websites will be provided to BNL by the COR.

- 10 CFR Part 50, "DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES
- NRR Office Instruction LIC-101, Revision 4, "LICENSE AMENDMENT REVIEW PROCEDURES" ML113200053
- NRR Office Instruction LIC-109, Revision 1, "ACCEPTANCE REVIEW PROCEDURES" ML091810088

11.0 DATA RIGHTS

The NRC shall have unlimited rights to and ownership of all deliverables provided under this agreement/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 agreement/order are the property of the NRC with all rights and privileges of ownership/copyright belonging exclusively to the NRC. These documents and materials may not be used or sold by BNL without prior written authorization from the Contracting Officer. All materials supplied to the NRC shall be the sole property of the NRC and may not be used for any other purpose. This right does not abrogate any other Government rights.