ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES 1 21

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

1. DATE OF ORDER: 08/18/2015

2. CONTRACT NO. (If any): NRC-HQ-25-14-E-0001

3. ORDER NO.: NRC-HQ-20-15-T-0002

4. REQUISITION/REFERENCE NO.: NRR-15-0163

5. ISSUING OFFICE (Address correspondence to):
US NRC - HQ
ACQUISITION MANAGEMENT DIVISION
MAIL STOP TWFN-5E03
WASHINGTON DC 20555-0001

6. SHIP TO:
a. NAME OF CONSIGNEE: US NUCLEAR REGULATORY COMMISSION-
b. STREET ADDRESS: MAIL PROCESSING CENTER, 4930 BOILING BROOK PARKWAY
c. CITY: ROCKVILLE
d. STATE: MD
e. ZIP CODE: 20852

7. TO:
a. NAME OF CONTRACTOR: NUMARK ASSOCIATES INC
b. COMPANY NAME:
c. STREET ADDRESS: 1220 19TH ST NW STE 500
d. CITY: WASHINGTON
e. STATE: DC
f. ZIP CODE: 200362444

f. SHIP VIA:

8. TYPE OF ORDER
[ ] a. PURCHASE
REFERENCE YOUR:
Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.
[X] b. DELIVERY
Except for billing instructions on the reverse, this delivery order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.

9. ACCOUNTING AND APPROPRIATION DATA: See Schedule

10. REQUISITIONING OFFICE: OFF OF NUCLEAR REACTOR REGULATION

11. BUSINESS CLASSIFICATION (Check appropriate box(es))
[X] a. SMALL [ ] b. OTHER THAN SMALL [ ] c. DISADVANTAGED [ ] d. WOMEN-OWNED [ ] e. HUBZone
[ ] f. SERVICE-DISABLED VETERAN-OWNED [ ] g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM [ ] h. EDWOSB

12. F.O.B. POINT:

13. PLACE OF
a. INSPECTION: Destination
b. ACCEPTANCE: Destination

14. GOVERNMENT B/L NO.:

15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date):

16. DISCOUNT TERMS: 30

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	NRC-HQ-25-14-E-0001/NRC-HQ-20-15-T-0002 NUMARK EWC SB TO 05 "Review of Topical Report (TR) NEDE-33005" Continued ...					

18. SHIPPING POINT:
19. GROSS SHIPPING WEIGHT:
20. INVOICE NO.:

17(h) TOTAL (Cont. pages): $383,313.43

21. MAIL INVOICE TO:
a. NAME: US NUCLEAR REGULATORY COMMISSION
b. STREET ADDRESS (or P.O. Box): ONE WHITE FLINT NORTH, 11555 ROCKVILLE PIKE, MAILSTOP O3-E17A
c. CITY: ROCKVILLE
d. STATE: MD
e. ZIP CODE: 20852-2738

SEE BILLING INSTRUCTIONS ON REVERSE

17(i) GRAND TOTAL: $560,918.28

22. UNITED STATES OF AMERICA BY (Signature): Sharlene McCubbin

23. NAME (Typed): SHARLENE M. MCCUBBIN
TITLE: CONTRACTING/ORDERING OFFICER

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITION NOT USABLE

OPTIONAL FORM 347 (Rev. 2/2012)
Prescribed by GSA/FAR 48 CFR 53.213(f)

SUNSI REVIEW COMPLETE SEP 10 2015

TEMPLATE - ADM001

ADM002

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER	CONTRACT NO.	ORDER NO.
08/18/2015	NRC-HQ-25-14-E-0001	NRC-HQ-20-15-T-0002

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Contractor POCs: Business: Paul Edelstein, Vice President Contracts and Administrative Services E-mail: pedelstein@numarkassoc.com Phone: 202-466-2700 Technical: Martin Bowling, Project Manager E-mail: mbowling@numarkassoc.com Phone: 202-466-2700 NUMARK Authorized Official 8/21/15 Date Accounting Info: 2015-X0200-FEEBASED-20-20D008-11-4-151-1065-251A					
00001	Review of Topical Report NEDE-33005 TRACG LOCA CPFF Estimated Cost:$383,313.43 Incrementally Funded Amount: $250,000.00				383,313.43	
10001	Option Period 1 - Review of Topical Report NEDE-33005 TRACG LOCA CPFF Amount: $177,604.85(Option Line Item) Anticipated Exercise Date07/31/2016 The obligated amount of award: $250,000.00. The total for this award is shown in box 17(i).				0.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H)) $383,313.43

SECTION B - Supplies or Services/Prices

NRCB010 BRIEF PROJECT TITLE AND WORK DESCRIPTION (AUG 2011)

(a) The title of this project is: "Review of Topical Report (TR) NEDE-33005, "TRACG Application for Emergency Core Cooling Systems/Loss-of-Coolant-Accident Analyses for Boiling Water Reactors 2-6"

(b) Summary work description: The objective of this task order is to provide the NRC staff in completing its review of the TRACG-LOCA methodology used to perform realistic ECCS evaluation for BWR LOCA analysis. The project will include review of relevant TRs, review of responses to staff requests for additional information (RAIs), evaluation of the acceptability of TRACG-LOCA as a realistic ECCS EM, and defense of the review to the NRC Advisory Committee on Reactor Safeguards (ACRS).

PRICE/COST SCHEDULE

ITEM NO.	DESCRIPTION OF SUPPLIES/SERVICES	ESTIMATED COST	FIXED FEE	TOTAL ESTIMATED CPFF
00001	"Review of Topical Report (TR) NEDE-33005"	[redacted]	[redacted]	[redacted]
10001	Option Period 1 - "Review of Topical Report (TR) NEDE-33005"	[redacted]	[redacted]	[redacted]
Total				**$560,918.28**

NRCB040A CONSIDERATION AND OBLIGATION—COST-PLUS-FIXED-FEE ALTERNATE I (AUG 2011)

(a) The total estimated cost to the Government for full performance of this contract is **$560,918.28** of which the sum of [redacted] represents the estimated reimbursable costs, and of which [redacted] represents the fixed-fee.

(b) The amount currently obligated by the Government with respect to this contract is [redacted], of which the sum of [redacted] represents the estimated reimbursable costs, and of which [redacted] represents the fixed-fee.

(c) This is an incrementally-funded contract and FAR 52.232-22 - "Limitation of Funds" applies.

(d) In accordance with FAR 52.216-8 - Fixed Fee, it is the policy of the NRC to withhold payment of fee after payment of [redacted] percent of the fee has been paid in order to protect the Government's interest. The amount of fixed-fee withheld from the contractor will not exceed [redacted] percent of the total fee or [redacted], whichever is less. Accordingly, the maximum amount of fixed-fee that may be held in reserve is [redacted]

SECTION C - Description/Specifications

Statement of Work

1. PROJECT TITLE

"REVIEW OF TOPICAL REPORT (TR) NEDE-33005, "TRACG APPLICATION FOR EMERGENCY CORE COOLING SYSTEMS / LOSS-OF-COOLANT-ACCIDENT ANALYSES FOR BWR/2-6."

This task order effort falls under paragraph 3.6 "Topical Reports", within the scope of the Small Business ECW SOW.

2. BACKGROUND

Under the NRC Topical Report Program, GE Hitachi Nuclear Energy (GEH) has submitted NEDE-33005P, which describes a realistic evaluation model (EM) for emergency core cooling system (ECCS). The EM is intended for analysis of small-, intermediate-, and large-break loss of coolant accidents (LOCAs) in boiling water reactors (BWRs). Topical Report NEDE-33005P represents an extension of TRACG-04, the GEH-proprietary version of the Transient Reactor Analysis Code (TRAC). TRACG-04 has previously been approved for, among other things, analysis of anticipated operational occurrences (AOOs) in the currently operating fleet of domestic BWRs.

The main components of the TRACG-LOCA methodology are described in NEDE-33005P. However, this report provides only the basis and methodology for application of TRACG to BWR ECCS evaluation. The report heavily references NEDE-32176P, Revision 4, "TRACG Model Description," and NEDE-32177P, Revision 3, "TRACG Qualification." While it is common for vendors to document realistic LOCA analysis methods using the format set forth in NUREG/CR-5249, "Quantifying Reactor Safety Margins: Application of Code Scaling, Applicability and Uncertainty Evaluation Methodology to a Large-Break, Loss-of-Coolant Accident," GEH has instead structured NEDE-33005P to take advantage of the TRACG-04 status as a computer code that has been NRC-reviewed and approved for application to other types of BWR safety analyses.

3. PROJECT DESCRIPTION AND OBJECTIVE(S)

The contractor shall provide support to the NRC staff in completing its review of the TRACG-LOCA methodology used to perform realistic ECCS evaluation for BWR LOCA analysis. The project will include review of relevant TRs, review of responses to staff requests for additional information (RAIs), evaluation of the acceptability of TRACG-LOCA as a realistic ECCS EM, and defense of the review to the NRC Advisory Committee on Reactor Safeguards (ACRS). Specific review objectives will include:

- Assist the NRC staff in determining whether the GEH's Phenomena Identification and Ranking Table (PIRT) contained in Chapter 3 of NEDE-33005P reflects the general state of knowledge regarding BWR LOCA simulation, and identify and resolve major discrepancies.
- Assist the NRC staff in determining whether the correlations, models, constitutive relationships, etc., contained in the TRACG04 computer code provide for accurate BWR ECCS evaluation as set forth in 10 CFR 50.46(a)(1)(i).

- Assist the NRC staff in determining whether, in plant-specific applications, the TRACG-LOCA analytic methods predict ECCS performance for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated LOCAs are calculated, consistent with 10 CFR 50.46(a)(1)(i).
- Assist the NRC staff in determining whether GEH's statistical methods provide an acceptable means to predict acceptable upper tolerance limits for ECCS performance with respect to the acceptance criteria contained in 10 CFR 50.46(b)(1) – (b)(3).
- As needed, participate in on-site regulatory audits with GEH in support of the above objectives.
- As needed, perform audit calculations using a reactor analysis computer code in support of the above objectives.
- Support defense of the NRC safety evaluation of NEDE-33005P to the ACRS.

4. TASKS

This Statement of Work (SOW) is organized into distinct tasks; however, many of these tasks can be performed in parallel. For example, a review and evaluation of the Phenomena Identification and Ranking Table contained in Chapter 3 of NEDE-33006P would be well-informed by a concurrent review of Chapters 6 – 8 of NEDE-33006P, since the latter chapters demonstrate the statistical methods for addressing model and plant uncertainty, and provide further information concerning the relative importance of various phenomena. A number of RAI responses have provided proposed TR revision text. As such, it is important that the RAI responses be reviewed together with the TR itself.

4.1 Review and evaluate GEH's Phenomena Identification and Ranking Table (PIRT) in the context of the vendor's assignment of specific importance values to specific phenomena and processes associated with BWR LOCA. This PIRT is contained in Chapter 3 of NEDE-33005P, as supplemented by RAI responses. The relevant RAI responses will include 22, 36, 37, 38, and 58. As advised by the COR, compare the TRACG-LOCA PIRT to other BWR LOCA PIRTs, review the PIRT against the results provided in Chapters 6 – 8 of NEDE-33005P, participate in regulatory audits with the vendor and perform supporting calculations. Determine whether the PIRT is consistent with the regulatory guidance documents listed in Section 5 of this SOW. Address issues by developing supplemental RAIs for transmittal to GEH, review RAI responses, and prepare a report summarizing the review and evaluation. Include, in the report, an evaluation of each RAI response relevant to this task.

4.2 Review and evaluate the individual models, correlations, closure relations, etc., within TRACG04 that are important in BWR LOCA simulation, with particular emphasis on those models that have not been used, or have not been important, in prior, NRC-approved, applications of TRACG04. TRACG04 model capabilities, uncertainties, and biases are described in Chapters 4 and 5 of NEDE-33005P, as supplemented by RAI responses, and as supported by NEDE-32176P, Revision 4, "TRACG Model Description," and NEDE-32177P, Revision 3, "TRACG Qualification." The relevant RAI responses for this task include 21, 33, 39, 47, 50, 51, 52, 54, and 63. As advised by the COR, evaluate the TRACG04 modeling capabilities against relevant separate effects tests and integral system tests, participate in regulatory audits with the vendor and perform supporting calculations. Determine whether TRACG model development and qualification is consistent with the regulatory guidance documents listed in Section 5 of this SOW. Address issues by

developing supplemental RAIs for transmittal to GEH, review RAI responses, and prepare a report summarizing the review and evaluation. Include, in the report, an evaluation of each RAI response relevant to this task.

4.3 Review and evaluate the system nodalization established for analysis in accordance with NEDE-33005P, as supplemented by RAI responses. The nodalization is discussed in Sections 5.2 and 6.4 of NEDE-33005P, as supplemented by RAI responses 3, 5, 6, 7, 9, 20, 34, 41. Note that the information in Section 6.4 does not pertain to the TRACG nodalization, but is significantly affected by the nodalization RAI responses. As advised by the COR, evaluate the TRACG-LOCA system nodalization to ensure that it does not unnecessarily bias predicted results or introduce unevaluated error or uncertainty, participate in regulatory audits with the vendor and perform supporting calculations. Determine whether TRACG-LOCA nodalization is consistent with the regulatory guidance documents listed in Section 5 of this SOW. Address issues by developing supplemental RAIs for transmittal to GEH, review RAI responses, and prepare a report summarizing the review and evaluation. Include, in the report, an evaluation of each RAI response relevant to this task.

4.4 Review and evaluate the system analysis methods employed in TRACG-LOCA to determine the limiting LOCA scenarios. Demonstration analyses are provided in Chapter 8 of NEDE-33005P; the analytic treatment of plant parameters is discussed in Chapter 6 of NEDE-33005P. Both chapters have been supplemented as discussed in RAI responses 4, 6, 7, 9, 10, 11, 12, 13, 20, 25, 26, 27, 28, 29, 30, 31, 32, 35.[1] As advised by the COR, evaluate the TRACG-LOCA system analysis capabilities against other NRC-approved BWR ECCS evaluation models, participate in regulatory audits with the vendor, and perform supporting calculations. Determine whether the TRACG-LOCA system analysis methodology is consistent with the regulatory guidance documents listed in Section 5 of this SOW. Address issues by developing supplemental RAIs for transmittal to GEH, review RAI responses, and prepare a report summarizing the review and evaluation. Include, in the report, an evaluation of each RAI response relevant to this task.

4.5 Review and evaluate the statistical methods used in TRACG-LOCA to develop a singular statement of uncertainty with regard to ECCS performance, including both GEH's assessment of model and plant uncertainties, and the process used to determine the total uncertainty associated with the predicted results. Consider information provided in response to RAIs 65 and 66. As advised by the COR, evaluate the TRACG-LOCA system analysis capabilities against other NRC-approved BWR ECCS evaluation models, participate in regulatory audits with the vendor, and perform supporting calculations. Determine whether the TRACG-LOCA uncertainty analysis methods provide reasonable upper tolerance limits for the 10 CFR 50.46(b)(1) through (b)(3) acceptance criteria. Determine whether the TRACG-LOCA upper tolerance limits conform to their specified statistical pedigree. Address issues by developing supplemental RAIs for transmittal to GEH, review RAI responses, and prepare a report summarizing the review and evaluation. Include, in the report, an evaluation of each RAI response relevant to this task.

4.6 Assist in the development of the NRC staff safety evaluation presenting the detailed technical basis for the final conclusion regarding the acceptability of NEDE-33005P for referencing in plant-specific licensing actions, and within the General Electric Standard

[1] The NRC staff is presently developing a significant number of RAIs related to this task. The Technical Monitor will provide additional direction concerning specific RAIs as the information becomes available.

Application for Reactor Fuel (GESTAR-II) licensing framework. As advised by the COR, support: (1) ACRS briefings on TRACG-LOCA; and (2) resolution of comments from NRC staff and GEH on the draft SE. Submit a Technical Evaluation Report that documents the safety evaluation input and includes, as an appendix, the written evaluation of each supplemental RAI response received from GEH in the performance of Tasks 4.1- 4.5.

5. APPLICABLE DOCUMENTS AND STANDARDS

- 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Reactor Nuclear Power Reactors"
- NUREG 0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, Light Water Edition"
    - Section 15.0.2, "Review of Transient and Accident Analysis Method"
    - Section 15.6.5, "Loss-of-Coolant Accidents Resulting From Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary"
- NRC Regulatory Guide 1.157, "Best-Estimate Calculations of Emergency Core Cooling System Performance"
- NRC Regulatory Guide 1.203, "Transient and Accident Analysis Methods"
- NUREG/CR-5249, "Quantifying Reactor Safety Margins: Application of Code Scaling, Applicability, and Uncertainty Evaluation Methodology to a Large-Break, Loss-of-Coolant Accident"

6. LABOR CATEGORIES

Personnel Qualifications: The contractor shall provide qualified personnel according to the categories listed in the following table, to perform the specific tasks delineated in the SOW. These labor categories represent the Government's currently known labor categories and experience/education requirements.

Labor Category	Skillsets	Minimum Qualification Requirement
Project Manager (PM)		
Subject Matter Expert (SME)	See Note 1	See Note 1
Sr. Tech Reviewer (STR)	See Note 1	See Note 1
Technical Reviewer (TR)	See Note 1	See Note 1
Administrative Support (ADMIN)		

Note 1: Expert-level nuclear, mechanical, or reactor engineer/scientist on a part-time, intermittent basis with 10 years' experience and PhD in related discipline or with 15 years' experience and MS in related discipline. The team must demonstrate capabilities in the following skillsets:

- Experience within the past 5 years performing regulatory review of best-estimate loss of coolant accident analysis methods
- Use of transient thermal hydraulic analysis and core thermal analysis heat-up codes

- Nuclear engineering advanced reactor design combined with the ability to perform calculations, analyses, and studies of thermal-hydraulics using state-of-the art thermal-hydraulic codes that include RELAP5 and TRACE computer codes
- LOCA analysis including all phases of the accident for both large and small breaks, key modeling techniques and modeling codes
- Knowledge of and simulation experience with the experimental results for separate effects tests and integral systems experiments pertaining to small and large break LOCA key phenomenological behavior
- Knowledge of experimental facilities and results such as PKL, UPTF, Semiscale, LOFT, ROSA, THTF, and FLECHT
- Knowledge of small break LOCA key phenomenological behavior and techniques to model such events with current state-of-the-art computer codes.

7. GOVERNMENT-FURNISHED PROPERTY

The NRC will furnish the following electronically:

- NEDE-33005P, "TRACG Application for Emergency Core Cooling Systems / Loss-of-Coolant-Accident Analyses for BWR/2-6,"
- Supplements to NEDE-33005P submitted by GEH,
- Related letter reports submitted by previous consultants,
- Referenced and supporting GEH topical reports, such as NEDE-32176P, Revision 4, "TRACG Model Description,"
- Additional documentation provided by the COR.

8. PLACE OF PERFORMANCE

Work performed under this contract will be performed at the contractor's facility.

9. SPECIAL CONSIDERATIONS

9.1 Travel/Meetings At the direction of the COR, prepare for and travel to Wilmington, NC, to support audits in support of completion of Tasks 1 – 5. It is assumed that one five day audit will be required to complete the review.

Travel requires prior written approval from the COR.

Contractor will be authorized travel expenses consistent with the provisions of the Federal Travel Regulation (FTR) and the limitation of funds specified in this contract/order.

9.2 Security Work performed under this contract will require access to Sensitive Unclassified Non-Safeguards Information (SUNSI). Specifically, the contract requires access to proprietary information.

9.3 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 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. Materials supplied to the Government shall be the sole property of the Government and may not be used for other purpose. This right does not abrogate 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.

9.4 License Fee Recovery Work performed under this task order is license fee recoverable.

SECTION D - Packaging and Marking

NRCD010 PACKAGING AND MARKING

(a) The Contractor shall package material for shipment to the NRC in such a manner that will ensure acceptance by common carrier and safe delivery at destination. Containers and closures shall comply with the Surface Transportation Board, Uniform Freight Classification Rules, or regulations of other carriers as applicable to the mode of transportation.

(b) On the front of the package, the Contractor shall clearly identify the contract number under which the product is being provided.

(c) Additional packaging and/or marking requirements are as follows: None.

NRCD020 BRANDING

The Contractor is required to use the statement below in any publications, presentations, articles, products, or materials funded under this contract/order, to the extent practical, in order to provide NRC with recognition for its involvement in and contribution to the project. If the work performed is funded entirely with NRC funds, then the contractor must acknowledge that information in its documentation/presentation.

Work Supported by the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Reactor Regulation, under Contract/order number NRC-HQ-25-14-E-0001/ NRC-HQ-25-15-T-0002.

SECTION E - Inspection and Acceptance

CONTRACTING OFFICER'S REPRESENTATIVE

(a) The Contracting Officer's authorized representative hereinafter referred to as the Contracting Officer's Representative (COR) for this Task Order is:

Name: Evan Davidson
Address: Mail Stop: OWFN 10 F4
Washington, DC 20555

Telephone Number: 301-415-1342

(b) Performance of the work under this contract is subject to the technical direction of the NRC project officer. 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 project officer 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 project officer 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 project officer in the manner prescribed by this clause and within the project

officer'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 project officer 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 project officer 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.

SECTION F - Deliveries or Performance

NRCF010 PLACE OF DELIVERY-REPORTS

The items to be furnished hereunder shall be delivered, with all charges paid by the Contractor, to:

a. Name: Evan Davidson (1 Electronic Copy)
b. Contracting Officer's Representative (COR)
c. Address: Evan.Davidson@nrc.gov (1 Electronic Copy)

d. Name: Domonique Malone (1 Electronic Copy)
e. Contract Specialist (CS)
f. Address: Dominique Malone@nrc.gov (1 Electronic Copy)

NRCF032 TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (SEP 2013)

This order shall commence on August 18, 2015 and will expire on February 17, 2017.

Option Period 1 – 02/18/2017 – 02/17/2018

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 advised 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. 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 Deliverable Number XX, as further described below.

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

Deliverable	Description	Completion Date
1	PIRT Review and Evaluation RAIs	One month after task order award
	Resubmit with NRC comments addressed	Two weeks after receipt of NRC comments
2	PIRT Review and Evaluation Report	Two months after task order award
	Resubmit with NRC comments addressed	Two weeks after receipt of NRC comments
3	TRACG-LOCA Modeling Review and Evaluation RAIs	Nine months after Task Order award
	Resubmit with Government comments addressed	Two weeks after receipt of

		NRC comments
4	TRACG-LOCA Modeling Review and Evaluation Report	Five months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
5	TRACG-LOCA Nodalization RAIs	Nine months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
6	TRACG-LOCA Nodalization Report	11 months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
7	TRACG-LOCA Systems Analysis Review and Evaluation RAIs	Six months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
8	TRACG-LOCA Systems Analysis Review and Evaluation Report	Nine months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
9	TRACG-LOCA Uncertainty Analysis Review and Evaluation RAIs	Seven months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
10	TRACG-LOCA Modeling Review and Evaluation Report	11 months after task order award
	Resubmit with Government comments	Two weeks after receipt of NRC comments
11	Draft Technical Evaluation Report	13 months after task order award
	Resubmit with Government comments addressed	Two weeks after receipt of NRC comments
12	Safety Evaluation Comment Disposition	16 months after task order award
	Resubmit with Government comments	Two weeks after receipt of NRC comments
13	Monthly Letter Status Reports in the format provided in Attachment 1.	20th of each month

The above deliverables shall be submitted to the task order CO and task order COR, unless otherwise advised by the COR or the CO, the contractor must provide deliverables except the Monthly Letter Status Reports (MLSR) as draft products. The COR will review draft deliverables (and coordinate 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.

SECTION G - Contract Administration Data

NRCG030 ELECTRONIC PAYMENT (SEP 2014)

The Debt Collection Improvement Act of 1996 requires that all payments except IRS tax refunds be made by Electronic Funds Transfer. Payment shall be made in accordance with FAR 52.232-33, entitled "Payment by Electronic Funds Transfer-System for Award Management".

To receive payment, the contractor shall prepare invoices in accordance with NRC's Billing Instructions. Claims shall be submitted on the payee's letterhead, invoice, or on the Government's Standard Form 1034, "Public Voucher for Purchases and Services Other than Personal," and Standard Form 1035, "Public Voucher for Purchases Other than Personal – Continuation Sheet." The preferred method of submitting invoices is electronically to: NRCPayments@nrc.gov.

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	Title
Dr. Vesselin V. Palazov	Principal Investigator
Don Fletcher	Support Reviewer
Jay Spore	Support Reviewer

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.

2052.215-78 TRAVEL APPROVALS AND REIMBURSEMENT (OCT 1999) - ALTERNATE I (OCT 1999)

(a) Total expenditure for travel may not exceed **$2,000.00** without the prior approval of the contracting officer.

(b) All foreign travel must be approved in advance by the NRC on NRC Form 445, Request for Approval of Official Foreign Travel, and must be in compliance with FAR 52.247-63 Preference for U.S. Flag Air Carriers. The contractor shall submit NRC Form 445 to the NRC no later than 30 days prior to the commencement of travel.

(c) The contractor will be reimbursed only for travel costs incurred that are directly related to this

contract and are allowable subject to the limitations prescribed in FAR 31.205-46.
(d) It is the responsibility of the contractor to notify the contracting officer in accordance with the FAR Limitations of Cost clause of this contract when, at any time, the contractor learns that travel expenses will cause the contractor to exceed the travel ceiling amount identified in paragraph (a) of this clause.

(e) Reasonable travel costs for research and related activities performed at State and nonprofit institutions, in accordance with Section 12 of Pub. L. 100-679, must be charged in accordance with the contractor's institutional policy to the degree that the limitations of Office of Management and Budget (OMB) guidance are not exceeded. Applicable guidance documents include OMB Circular A-87, Cost Principles for State and Local Governments; OMB Circular A-122, Cost Principles for Nonprofit Organizations; and OMB Circular A-21, Cost Principles for Educational Institutions.

NRCH400 SECURITY REQUIREMENTS RELATING TO THE PRODUCTION OF REPORT(S) OR THE PUBLICATION OF RESULTS UNDER CONTRACTS, AGREEMENTS, AND GRANTS

Review and Approval of Reports

(a) Reporting Requirements. The contractor/grantee shall comply with the terms and conditions of the contract/grant regarding the contents of the draft and final report, summaries, data, and related documents, to include correcting, deleting, editing, revising, modifying, formatting, and supplementing any of the information contained therein, at no additional cost to the NRC. Performance under the contract/grant will not be deemed accepted or completed until it complies with the NRC's directions. The reports, summaries, data, and related documents will be considered draft until approved by the NRC. The contractor/grantee agrees that the direction, determinations, and decisions on approval or disapproval of reports, summaries, data, and related documents created under this contract/grant remain solely within the discretion of the NRC.

(b) Publication of Results. Prior to any dissemination, display, publication, or release of articles, reports, summaries, data, or related documents developed under the contract/grant, the contractor/grantee shall submit them to the NRC for review and approval. The contractor/grantee shall not release, disseminate, display or publish articles, reports, summaries, data, and related documents, or the contents therein, that have not been reviewed and approved by the NRC for release, display, dissemination or publication. The contractor/grantee agrees to conspicuously place any disclaimers, markings or notices, directed by the NRC, on any articles, reports, summaries, data, and related documents that the contractor/grantee intends to release, display, disseminate or publish to other persons, the public, or any other entities. The contractor/grantee agrees, and grants, a royalty-free, nonexclusive, irrevocable worldwide license to the government, to use, reproduce, modify, distribute, prepare derivative works, release, display or disclose the articles, reports, summaries, data, and related documents developed under the contract/grant, for any governmental purpose and to have or authorize others to do so.

(c) Identification/Marking of Sensitive Unclassified Non-Safeguards Information (SUNSI) and Safeguards Information (SGI). The decision, determination, or direction by the NRC that information possessed, formulated or produced by the contractor/grantee constitutes SUNSI or SGI is solely within the authority and discretion of the NRC. In performing the contract/grant, the contractor/grantee shall clearly mark SUNSI and SGI, to include for example, OUO-Allegation

Information or OUO-Security Related Information on any reports, documents, designs, data, materials, and written information, as directed by the NRC. In addition to marking the information as directed by the NRC, the contractor shall use the applicable NRC cover sheet (e.g., NRC Form 461 Safeguards Information) in maintaining these records and documents. The contractor/grantee shall ensure that SUNSI and SGI is handled, maintained and protected from unauthorized disclosure, consistent with NRC policies and directions. The contractor/grantee shall comply with the requirements to mark, maintain, and protect all information, including documents, summaries, reports, data, designs, and materials in accordance with the provisions of Section 147 of the Atomic Energy Act of 1954 as amended, its implementing regulations (10 CFR 73.21), Sensitive Unclassified Non-Safeguards and Safeguards Information policies, and NRC Management Directives and Handbooks 12.5, 12.6 and 12.7.

(d) Remedies. In addition to any civil, criminal, and contractual remedies available under the applicable laws and regulations, failure to comply with the above provisions, and/or NRC directions, may result in suspension, withholding, or offsetting of any payments invoiced or claimed by the contractor/grantee.

(e) Flowdown. If the contractor/grantee intends to enter into any subcontracts or other agreements to perform this contract/grant, the contractor/grantee shall include all of the above provisions in any subcontracts or agreements.

NRCH410 WHISTLEBLOWER PROTECTION FOR NRC CONTRACTOR AND SUBCONTRACTOR EMPLOYEES

(a) The U.S. Nuclear Regulatory Commission (NRC) contractor and its subcontractor are subject to the Whistleblower Employee Protection public law provisions as codified at 42 U.S.C. 5851. NRC contractor(s) and subcontractor(s) shall comply with the requirements of this Whistleblower Employee Protection law, and the implementing regulations of the NRC and the Department of Labor (DOL). See, for example, DOL Procedures on Handling Complaints at 29 C.F.R. Part 24 concerning the employer obligations, prohibited acts, DOL procedures and the requirement for prominent posting of notice of Employee Rights at Appendix A to Part 24 entitled: "Your Rights Under the Energy Reorganization Act".

(b) Under this Whistleblower Employee Protection law, as implemented by regulations, NRC contractor and subcontractor employees are protected from discharge, reprisal, threats, intimidation, coercion, blacklisting or other employment discrimination practices with respect to compensation, terms, conditions or privileges of their employment because the contractor or subcontractor employee(s) has provided notice to the employer, refused to engage in unlawful practices, assisted in proceedings or testified on activities concerning alleged violations of the Atomic Energy Act of 1954 (as amended) and the Energy Reorganization Act of 1974 (as amended).

(c) The contractor shall insert this or the substance of this clause in any subcontracts involving work performed under this contract.

NRCH470 GREEN PURCHASING (SEP 2013)

(a) In furtherance of the sustainable acquisition goals included in Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," products and services acquired under this contract/order shall be energy-efficient (Energy Star or Federal Energy Management Program (FEMP) designated), water-efficient, biobased, environmentally

preferable (e.g., Electronic Product Environmental Assessment Tool (EPEAT) certified), non-ozone depleting, recycled content, and non-toxic or less toxic alternatives, to the maximum extent practicable in meeting NRC contractual requirements.

(b) See NRC's Green Purchasing Plan (GPP) at:
http://pbadupws.nrc.gov/docs/ML1219//ML12191A130.pdf and the General Service

Administration's (GSA) Green Procurement Compilation at:
http://www.gsa.gov/portal/content/198257.

(c) The contractor shall flow down this clause into all subcontracts and other agreements that relate to performance of this contract/order.

NRCH480 USE OF AUTOMATED CLEARING HOUSE (ACH) ELECTRONIC PAYMENT/REMITTANCE ADDRESS

The Debt Collection Improvement Act of 1996 requires that all Federal payments except IRS tax refunds be made by Electronic Funds Transfer. It is the policy of the Nuclear Regulatory Commission to pay government vendors by the Automated Clearing House (ACH) electronic funds transfer payment system. Item 15C of the Standard Form 33 may be disregarded.

SECTION I - Contract Clauses

52.217-8 OPTION TO EXTEND SERVICES (NOV 1999)

The Government may require continued performance of any services within the limits and at the rates specified in the contract. These rates may be adjusted only as a result of revisions to prevailing labor rates provided by the Secretary of Labor. The option provision may be exercised more than once, but the total extension of performance hereunder shall not exceed 6 months. The Contracting Officer may exercise the option by written notice to the Contractor within 15 days.

(End of clause)

SECTION J - List of Documents, Exhibits and Other Attachments

Attachment No.	Description
1.	Billing Instructions for Cost-Reimbursement Type Contracts