

2. AMENDMENT/MODIFICATION NO. M002	3. EFFECTIVE DATE see block 16c below	4. REQUISITION/PURCHASE REQ. NO. RES-11-194 dtd: 5/10/11	5. PROJECT NO.(if applicable)
6. ISSUED BY U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Claudia Melgar 492-3487 Mail Stop: TWB-01-B10M Washington, DC 20555	CODE 3100	7. ADMINISTERED BY (If other than Item 6) U.S. Nuclear Regulatory Commission Div. of Contracts Mail Stop: TWB-01-B10M Washington, DC 20555	CODE 3100

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) THOMAS CLARK HALEY 4 LESLIE CIR EAST GREENBUSH NY 12061-9791	(X)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
		10A. MODIFICATION OF CONTRACT/ORDER NO. NRC-HQ-11-P-04-0058 Modification 002
		10B. DATED (SEE ITEM 13) 02-11-2011
CODE 967008124	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 ACKNOWLEDGMENT 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) B&R: 2011-60-11-6-154 JC: V6073 BOC 252A APN: 31X0200.160
 OBGLIATED FUNDS: \$2,280.00
 DUNS: 967008124 FAIMIS: 112598 NAICS: 54169

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: Bilateral Mutual Agreement of Parties
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
 The purpose of this modification to (1) extend the period of performance from May 10, 2011 to September 30, 2011; (2) increase total ceiling; (3) replace the Statement of Work, see attachment; and (4) revise pricing schedule.

Total contract ceiling is increased: From \$11,467.00 by \$2,280.00 To: \$13,747.00.
 Total ceiling amount: \$13,747.00 (changed)
 Total obligated amount: \$13,747.00 (changed)
 Period of performance: May 10, 2011 - September 30, 2011 (changed)

See continous page

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print) Thomas C. Haley Sole Proprietor	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Matthew J. Bucher Contracting Officer
15B. CONTRACTOR/OFFEROR <i>Thomas C. Haley</i> (Signature of person authorized to sign)	15C. DATE SIGNED 11 May 2011
	16B. UNITED STATES OF AMERICA BY <i>[Signature]</i> (Signature of Contracting Officer)
	16C. DATE SIGNED 5-12-2011

NSN 7540-01-152-8070
PREVIOUS EDITION NOT USABLE

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA - FAR (48 CFR) 53.243

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

MAY 13 2011

ADM002

The purpose of this modification is to (1) extend the period of performance from May 10, 2011 to September 30, 2011; (2) increase the total ceiling from \$11,467.00 by \$2,280.00 to \$13,747.00; (3) replace statement of work dated February 10, 2011 with Statement of Work dated May 10, 2011 (see attachment); and (4) revise pricing schedule.

Revised Price Schedule:

Table 1: Proposed Project Costs by Task

Task	Description	Fixed Price	Estimated travel expenses
1	Presentation on RACKLIFE program and BADGER methodology		
1A	Prepare information presentation material and present the material to staff in advance – 40 hours	[REDACTED]	
1B	Deliver oral presentation	[REDACTED]	[REDACTED]
2	Technical report – 40 hours	[REDACTED]	
2A	Written answers in the report responding to staff questions		
2B	Evaluate uncertainties associated with technical bases, assumptions, inputs, and methods used by the overall RACKLIFE methodology		
2C	Draft Report/Final Report	[REDACTED]	
	Totals	[REDACTED]	[REDACTED]

Travel will be reimbursed in accordance with federal travel regulations. This will be billed based on receipts, backup documentation, and/or tabulated costs (e.g., using standard road maps to compute mileage driven).

Accordingly the base contract is hereby revised as follows:

A summary of obligations for this contract, from award date through the date of this action, is given below:

Total Fiscal Year 11 Obligation Amount: \$11,476.00
 Total Fiscal Year 11 Obligation Amount: \$2,280.00
 Cumulative total of NRC Obligations: \$13,756.00

****ALL OTHER TERMS AND CONDITIONS OF THIS MODIFICATION REMAIN UNCHANGED****

May 2010

STATEMENT OF WORK FOR COMMERCIAL

TITLE: "Expert Consultation Pertaining to the RACKLIFE Methodology to Calculate BORAFLEX Degradation."

BACKGROUND

In spent fuel pools which use BORAFLEX™ as a neutron absorber, licensees use both the geometric configuration of spent fuel bundles in the pool and the amount of Boron-10 (B-10) in the BORAFLEX™ panels to demonstrate compliance with the subcriticality requirement of K_{eff} of 0.95 as specified in 10 CFR 50.68. Beginning in the late 1970s, BORAFLEX™ began to exhibit significant degradation, as documented in Information Notices (INs) 87-43, 93-70 and 95-38 and Generic Letter (GL) 96-04. As BORAFLEX™ panels degrade, the criticality calculations based on original B-10 areal density can become non-conservative.

To calculate the extent of degradation of BORAFLEX™, and therefore determine whether sufficient neutron absorbing material remains in the spent fuel pool to meet subcriticality requirements, licensees developed the RACKLIFE computer program. One of the inputs to the RACKLIFE program code is data collected by BADGER, a method which measures the change in neutron flux across a neutron absorber material and uses that data to estimate the B-10 areal density. This areal density is then integrated into the RACKLIFE program's calculations. The combination of RACKLIFE code and BADGER input data results in a surveillance methodology used to monitor the degradation of BORAFLEX™ in the spent fuel pool. Some licensees currently use the RACKLIFE methodology to demonstrate subcriticality compliance over a set period of time.

The staff is currently evaluating the use of the RACKLIFE methodology as a means to monitor the degradation of BORAFLEX™. This has recently become a more urgent issue because the degradation of BORAFLEX directly affects the compliance of the spent fuel pool. In order to thoroughly review the RACKLIFE methodology, the staff needs to obtain further details about the RACKLIFE methodology, including the integration of BADGER results into the RACKLIFE code, and the validation of the RACKLIFE code by means of silica concentration and BADGER data. Therefore, the staff seeks an expert consultant well-versed in development and application of the RACKLIFE methodology, including assumptions underlying the RACKLIFE code, familiarity with the integration of BADGER results into the RACKLIFE code, and knowledge about the BADGER measurements. The information obtained will be used to inform the staff and aid them in their evaluation.

The work is in support of NRR-UNR-0015 "User Need Request to Develop the Technical Bases for the Evaluation of Neutron Absorbing Materials in Spent Fuel Pools." The work is anticipated to be completed in a period of seven months.

OBJECTIVES

1. Inform the staff about the phenomena and processes simulated in the RACKLIFE methodology, including assumptions used in the development of the RACKLIFE methodology.
2. Answer staff's specific questions regarding aspects of the RACKLIFE computer program, operation of the BADGER test, the integration of BADGER results into the RACKLIFE code, and the application of the overall RACKLIFE methodology into calculating the degradation of BORAFLEX™.
3. Inform the staff regarding uncertainties associated with components of the RACKLIFE methodology, including uncertainties arising from assumptions and inputs used in the methodology.

SCOPE OF WORK

The scope of work is divided into 2 tasks, as shown in the following table:

Task/ Subtask	Task Description	Completion (months after award)
1	Presentation on RACKLIFE program and BADGER methodology.	1
1.1	Prepare information presentation material (PowerPoint slides) and present the material to staff in advance.	1
1.2	Deliver presentation orally in person, and respond to staff questions.	1
2	Draft Technical report	4
2.1	Include written answers to staff questions in the report addressing the overall RACKLIFE/BADGER methodology.	4
2.2	Evaluate and estimate uncertainties associated with technical bases, assumptions, inputs, and methods used by the overall RACKLIFE/BADGER methodology.	4
2.3	Final Technical Report	7

In Task 1, the consultant shall prepare a presentation describing the basis and function of the RACKLIFE code, and its integration with BADGER data. The presentation shall be comprehensive with regard to all the processes and phenomena simulated in RACKLIFE. The presentation shall also detail the assumptions made in programming the processes and phenomena into RACKLIFE, and the expected contribution to uncertainty of these assumptions. In addition, broad topics which are expected to be covered in Task 1 include, but not limited to:

1. General use of RACKLIFE/BADGER as a surveillance tool.
2. Details of technical bases, models, and equations used to develop the RACKLIFE algorithm, including seminal laboratory research.
3. Clarification of specific portions of the original EPRI reports pertaining to RACKLIFE and BADGER.
4. Confirmation and validation of the RACKLIFE code

- a. Comparison of calculated and measured concentrations of silica
- b. Fine-tuning of the RACKLIFE code using BADGER results
5. Uncertainties associated with the RACKLIFE methodology, including but not limited to
 - a. Uncertainties associated with calculations performed by RACKLIFE
 - b. Uncertainties associated with measurements performed by the BADGER technique
 - c. Related in-situ measurements of input variables, e.g., silica concentration as a function of filter performance
 - d. Overall uncertainty associated with a final result, e.g., percentage degradation.
6. Impact of recent developments in the RACKLIFE/BADGER procedure, e.g., temperature fluctuations and variability of escape coefficient.

A four-hour working meeting is anticipated for the delivery of the presentation and interaction with the staff on Task 1 issues. The consultant will travel to NRC Headquarters in Rockville, Maryland to meet with the staff.

In Task 2, the consultant shall supply a written technical report detailing uncertainties associated with components of the overall RACKLIFE methodology. The report will also contain detailed written answers to questions pertaining to the methodology which need further elaboration or clarification, or were not fully addressed in Task 1. Also included in the final report will be the following: 1. estimations of the uncertainties, for example, as a percentage, associated with components of the RACKLIFE calculational methodology based on professional expert opinion; and 2. statements of the uncertainties associated with components of the BADGER neutron absorption instrument. For uncertainties associated with BADGER, uncertainties may be based on sample calculations and reported quantitatively, if possible.

RESEARCH QUALITY

The quality of NRC research programs are assessed each year by the Advisory Committee on Reactor Safeguards. Within the context of their reviews of RES programs, the definition of quality research is based upon several major characteristics:

Results meet the objectives (75% of overall score)
 Justification of major assumptions (12%)
 Soundness of technical approach and results (52%)
 Uncertainties and sensitivities addressed (11%)

Documentation of research results and methods is adequate (25% of overall score)
 Clarity of presentation (16%)
 Identification of major assumptions (9%)

It is the responsibility of the contractor to ensure that these quality criteria are adequately addressed throughout the course of the research that is performed. The NRC project manager and technical monitor will review all research products with these criteria in mind.

TECHNICAL AND OTHER SPECIAL QUALIFICATIONS REQUIRED

The Contractor shall have unique experience and expertise necessary for supplying information to NRC staff as pertains to the RACKLIFE/BADGER surveillance program. This includes intimate knowledge of the RACKLIFE surveillance method in more detail than what is included in public reports. The staff requires that the consultant have expertise in RACKLIFE methodology, familiarity with the BADGER measurement, and expertise regarding the input of BADGER results into the RACKLIFE code. To prevent influence from Organizational Conflicts of Interest as specified in Section (iii) of 48 C.F.R. 2009.570-3 (b) (1), "Standards for Evaluation of Potential Organizational Conflicts of Interest," the contractor must also not have significant current support from the nuclear industry or nuclear industry groups.

LEVEL OF EFFORT

The estimated level of effort is 40 hours for one consultant for Task 1 and two days of travel for one consultant. The level of effort for Task 2 is to be determined.

PERIOD OF PERFORMANCE

The period of performance, will be 7 months from the date of the contract. The project is expected to start in late January 2011.

REPORTING REQUIREMENTS

Monthly letter status reports, written presentation material, and a technical report will be required.

Monthly Letter Status Report.

A Monthly Letter Status Report (MLSR) is to be submitted to the NRC Project Manager by the 20th of the month following the month to be reported with copies provided to the following:

Resource Name: RESDEMLSR.Resource@nrc.gov

The MLSR will identify the title of the project, the job code, the Principal Investigator, the period of performance, the reporting period, summarize each month's technical progress, list monthly spending, total spending to date, and the remaining funds and will contain information as directed in NRC Management Directive 11.1. Any administrative or technical difficulties which may affect the schedule or costs of the project shall be immediately brought to the attention of the NRC project manager.

PUBLICATIONS NOTE

RES encourages the publication of the scientific results from RES sponsored programs in refereed scientific and engineering journals as appropriate. If the laboratory proposes to publish in the open literature or present the information at meeting in addition to submitting the required technical reports, approval of the proposed article or presentation should be obtained from the NRC Project Manager. The RES Project Manager shall either approve the material as

submitted, approve it subject to NRC suggested revisions, or disapprove it. In any event, the RES Project Manager may disapprove or delay presentation or publication of papers on information that is subject to Commission approval that has not been ruled upon or which has been disapproved. Additional information regarding the publication of NRC sponsored research is contained in NRC Management Directives 3.7, "NUREG Series Publications," and 3.9, "NRC Staff and Contractor Speeches, Papers, and Journal Articles on Regulatory and Technical Subjects."

If the presentation or paper is in addition to the required technical reports and the RES Project Manager determines that it will benefit the RES project, the Project Manager may authorize payment of travel and publishing costs, if any, from the project funds. If the Project Manager determines that the article or presentation would not benefit the RES project, the costs associated with the preparation, presentation, or publication will be borne by the contractor. For any publication or presentations falling into this category, the NRC reserves the right to require that such presentation or publication will not identify the NRC's sponsorship of the work.

NEW STANDARDS FOR CONTRACTORS WHO PREPARE NUREG-SERIES MANUSCRIPTS

The U.S. Nuclear Regulatory Commission (NRC) began to capture most of its official records electronically on January 1, 2000. The NRC will capture each final NUREG-series publication in its native application. Therefore, please submit your final manuscript that has been approved by your NRC Project Manager in both electronic and camera-ready copy.

All format guidance, as specified in NUREG-0650, Revision 2, will remain the same with one exception. You will no longer be required to include the NUREG-series designator on the bottom of each page of the manuscript. The NRC will assign this designator when we send the camera-ready copy to the printer and will place the designator on the cover, title page, and spine. The designator for each report will no longer be assigned when the decision to prepare a publication is made. The NRC's Publishing Services Branch will inform the NRC Project Manager for the publication of the assigned designator when the final manuscript is sent to the printer.

For the electronic manuscript, the Contractor shall prepare the text in Microsoft Word, and use any of the following file types for charts, spreadsheets, and the like.

File Types to be Used for NUREG-Series Publications	
File Type	File Extension
Microsoft®Word®	.doc
Microsoft® PowerPoint®	.ppt
Microsoft®Excel	.xls
Microsoft®Access	.mdb
Portable Document Format	.pdf

This list is subject to change if new software packages come into common use at NRC or by our licensees or other stakeholders that participate in the electronic submission process. If a portion of your manuscript is from another source and you cannot obtain an acceptable electronic file type for this portion (e.g., an appendix from an old publication), the NRC can, if necessary, create a tagged image file format (file extension.tif) for that portion of your report. Note that you should continue to submit original photographs, which will be scanned, since digitized photographs do not print well.

If you choose to publish a compact disk (CD) of your publication, place on the CD copies of the manuscript in both (1) a portable document format (PDF); (2) a Microsoft Word file format; and (3) an Adobe Acrobat Reader, or, alternatively, print instructions for obtaining a free copy of Adobe Acrobat Reader on the back cover insert of the jewel box.

DELIVERABLES/SCHEDULES AND/OR MILESTONES

The contractor shall provide an oral presentation and written deliverables as specified in the tasks listed in the Scope of Work and Table 1.

ORGANIZATIONAL CONFLICT OF INTEREST DISCLOSURE (to be inserted by Division of Contracts)

MEETINGS AND TRAVEL

Two days of travel to NRC Headquarters in Rockville, MD.

NRC-FURNISHED MATERIAL

None

APPROPRIATE USE OF GOVERNMENT FURNISHED INFORMATION TECHNOLOGY

(IT) EQUIPMENT AND/ OR IT SERVICES/ ACCESS (APRIL 2003)

As part of contract performance the NRC may provide the contractor with information technology (IT) equipment and IT services or IT access as identified in the statement of work or subsequently as identified in the project. Government furnished IT equipment, or IT services, or IT access may include but is not limited to computers, copiers, facsimile machines, printers, pagers, software, phones, Internet access and use, and email access and use. The contractor (including the contractor's employees, consultants and subcontractors) shall use the NRC furnished IT equipment, and/or IT provided services, and/or IT access solely to perform the necessary efforts required under the contract. The contractor (including the contractor's employees, consultants and subcontractors) are prohibited from engaging or using the NRC IT equipment and government provided IT services or IT access for any personal use, misuse, abuses or any other unauthorized usage.

The contractor is responsible for monitoring its employees, consultants and subcontractors to ensure that NRC furnished IT equipment and/or IT services, and/or IT access are not being used for personal use, misused or abused. The NRC reserves the right to withdraw or suspend the use of its government furnished IT equipment, IT services and/ or IT access arising from contractor personal usage, or misuse or abuse; and/or to disallow any payments associated with contractor (including the contractor's employees, consultants and subcontractors) personal usage, misuses or abuses of IT equipment, IT services and/or IT access; and/or to terminate the project arising from violation of this provision.

TECHNICAL DIRECTION

Technical direction will be provided by the Project Manager, Dr. April Pulvirenti, who can be reached at:

U. S. Nuclear Regulatory Commission
Mail Stop: CSB-05C24M
Washington, D. C. 20555-0001

Phone: (301) 251-7976
Fax: (301) 251-7420
Email: (April.Pulvirenti@nrc.gov)

Express mail should be sent to:
U. S. Nuclear Regulatory Commission
Mail Stop: CSB-05C24M
11545 Rockville Pike
Rockville, MD 20852-2738