

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 24

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

1. DATE OF ORDER 07/11/2016	2. CONTRACT NO. (If any) NRC-HQ-60-14-E-0002	6. SHIP TO: a. NAME OF CONSIGNEE US NUCLEAR REGULATORY COMMISSION-
3. ORDER NO. NRC-HQ-60-16-T-0001	4. REQUISITION/REFERENCE NO. RES-16-0268	

5. ISSUING OFFICE (Address correspondence to) US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-5E03 ATTN ROB ROBINSON 301-415-0728 WASHINGTON DC 20555-0001	b. STREET ADDRESS MAIL PROCESSING CENTER 4930 BOILING BROOK PARKWAY	c. CITY ROCKVILLE	d. STATE MD	e. ZIP CODE 20852
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7. TO: BILL ARCIERI a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES INC	f. SHIP VIA
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b. COMPANY NAME	<input type="checkbox"/> a. PURCHASE REFERENCE YOUR:	<input checked="" type="checkbox"/> b. DELIVERY
c. STREET ADDRESS 11140 ROCKVILLE PIKE	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. 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.	
d. CITY ROCKVILLE	e. STATE MD	f. ZIP CODE 20852-3106

9. ACCOUNTING AND APPROPRIATION DATA See Schedule	10. REQUISITIONING OFFICE OFF OF NUCLEAR REG RESEARCH
--	--

11. BUSINESS CLASSIFICATION (Check appropriate box(es)) <input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. SERVICE-DISABLED VETERAN-OWNED <input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM <input type="checkbox"/> h. EDWOSB	12. F.O.B. POINT
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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) 06/01/2017	16. DISCOUNT TERMS
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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)
	The U.S. Nuclear Regulatory Commission hereby issues Task Order 2 (NRC-HQ-60-16-T-0001) in support of the project entitled, "PARCS Manual Upgrades." This Task Order is issued against the Base IDIQ (NRC-HQ-60-14-E-0002), entitled Continued ...					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT	19. GROSS SHIPPING WEIGHT	20. INVOICE NO.	17(h) TOTAL (Cont. pages)
	21. MAIL INVOICE TO:			
	a. NAME US NUCLEAR REGULATORY COMMISSION			\$0.00
	b. STREET ADDRESS (or P.O. Box) ONE WHITE FLINT NORTH 11555 ROCKVILLE PIKE MAILSTOP 03-E17A			\$319,900.00
c. CITY ROCKVILLE	d. STATE MD	e. ZIP CODE 20852-2738		

22. UNITED STATES OF AMERICA BY (Signature) 	07/11/2016	23. NAME (Typed) MONIQUE B. WILLIAMS TITLE: CONTRACTING/ORDERING OFFICER
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TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

AUG 16 2016

ADM002

**ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION**

PAGE NO

2

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

DATE OF ORDER
07/11/2016

CONTRACT NO.
NRC-HQ-60-14-E-0002

ORDER NO.
NRC-HQ-60-16-T-0001

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	<p>"Maintenance of NRC Computer Codes II." Specific details regarding this Task Order, to include contract clauses and Statement of Work are included in the attached pages.</p> <p>Period of Performance: Date of Award - 12 Months from Date of Award Total Task Order Ceiling: \$319,900.00 Total Obligated Amount: \$319,900.00</p> <p>Contractor Acceptance of Task Order NRC-HQ-60-16-T-0001:</p> <hr/> <p>DESIGNATED AUTHORIZED SIGNATURE</p> <hr/> <p>DATE</p> <hr/> <p>TITLE</p>					
TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))					\$0.00	

[Faint, illegible text and stamps at the bottom of the page]

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1 24

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

1. DATE OF ORDER 07/08/2016	2. CONTRACT NO. (If any) NRC-HQ-60-14-E-0002	6. SHIP TO: a. NAME OF CONSIGNEE US NUCLEAR REGULATORY COMMISSION-	
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c. CITY ROCKVILLE		d. STATE MD	e. ZIP CODE 20852

7. TO: BILL ARCIERI	f. SHIP VIA	
a. NAME OF CONTRACTOR INFORMATION SYSTEMS LABORATORIES INC	8. TYPE OF ORDER	

b. COMPANY NAME	<input type="checkbox"/> a. PURCHASE	<input checked="" type="checkbox"/> b. DELIVERY
c. STREET ADDRESS 11140 ROCKVILLE PIKE	REFERENCE YOUR:	
d. CITY ROCKVILLE	e. STATE MD	
f. ZIP CODE 20852-3106	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.	

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 REG RESEARCH
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11. BUSINESS CLASSIFICATION (Check appropriate box(es))					12. F.O.B. POINT
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<input type="checkbox"/> f. SERVICE-DISABLED VETERAN-OWNED	<input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM	<input type="checkbox"/> h. EDWOSB			

13. PLACE OF		14. GOVERNMENT B/L NO.	15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date) 06/01/2017	16. DISCOUNT TERMS
a. INSPECTION Destination	b. ACCEPTANCE Destination			

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	21. MAIL INVOICE TO:			
	a. NAME US NUCLEAR REGULATORY COMMISSION			\$0.00
	b. STREET ADDRESS (or P.O. Box) ONE WHITE FLINT NORTH 11555 ROCKVILLE PIKE MAILSTOP O3-E17A			\$319,900.00
c. CITY ROCKVILLE	d. STATE MD	e. ZIP CODE 20852-2738	17(i) GRAND TOTAL	

22. UNITED STATES OF AMERICA BY (Signature)	23. NAME (Typed) MONIQUE B. WILLIAMS TITLE: CONTRACTING/ORDERING OFFICER
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**ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION**

PAGE NO

2

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

DATE OF ORDER 07/08/2016	CONTRACT NO. NRC-HQ-60-14-E-0002	ORDER NO. NRC-HQ-60-16-T-0001
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	<p>"Maintenance of NRC Computer Codes II." Specific details regarding this Task Order, to include contract clauses and Statement of Work are included in the attached pages.</p> <p>Period of Performance: Date of Award - 12 Months from Date of Award Total Task Order Ceiling: \$319,900.00 Total Obligated Amount: \$319,900.00</p> <p>Contractor Acceptance of Task Order NRC-HQ-60-16-T-0001:</p> <p align="right"> William Arcieri <i>William Arcieri</i> 2016.07.08 14:45:09 -04'00' </p> <p>DESIGNATED AUTHORIZED SIGNATURE</p> <p align="center">7/8/2016</p> <p>DATE</p> <p align="center">Division Mgr., Energy & Space Div</p> <p>TITLE</p>					

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$0.00

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SECTION B – SUPPLIES OR SERVICES/PRICES

B.1 NRCB010 BRIEF PROJECT TITLE AND WORK DESCRIPTION

(a) The title of this project is:

“PARCS Manual Upgrades”

(b) Summary work description:

The objective of this work scope is to provide a more detailed input description of all of the various components of the user manual. The contractor shall also review the consistency of the contents to source code, clearly identify coupled vs stand-alone input in the manual, and add calculation examples to highlight correct input structure for a variety of plant types.

B.2 NRCB040 CONSIDERATION AND OBLIGATION—COST-PLUS-FIXED-FEE

(a) The total estimated cost to the Government for full performance of this contract is **\$319,900.00**, of which the sum of **\$296,205.00** represents the estimated reimbursable costs, and of which **\$23,695.00** represents the fixed-fee.

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

(c) The amount obligated by the Government with respect to this contract is **\$319,900.00**.

(d) This is a fully-funded contract and FAR 52.232-20 – “Limitation of Cost” applies.

(e) In accordance with FAR 52.216-8 - Fixed Fee, it is the policy of the NRC to withhold payment of fee after payment of 85 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 15 percent of the total fee or \$100,000, whichever is less. Accordingly, the maximum amount of fixed-fee that may be held in reserve is **\$3,554.25**.

B.3 COST SCHEDULE (See Next Page)

Period of Performance: Date of Award – 12 Months from Date of Award

CLIN	Description	Est. Hrs.	6/1/16-3/31/17 rates	4/1/17 – 3/31/18 rates	Total
0001	Project Manager – (Barber)				
0002	SME (PARCS) – (Barber)				
0003	SME (LaTex) – (Larson)				
0004	Documentation Support <ul style="list-style-type: none"> • Glenn Roth • Diane Mlynarczyk • Scott Barnes • Qifan Huang 				
0005	Adm. Support (Amoruso)				
SUBTOTAL (LABOR)					
Fringe Rates					
<ul style="list-style-type: none"> • Category “a” Labor (All others) • Category “c” Labor (Huang) 					
0006	ODCs	1 LOT			
G&A Rates –					
SUBTOTAL (COST)					
0007	Fixed Fee				
GRAND TOTAL					\$319,900.00

SECTION C – DESCRIPTION/SPECIFICATIONS

C.1 STATEMENT OF WORK

C.1.1 Project Title

PARCS Manual Upgrades

C.1.2 Background

The Purdue Advanced Reactor Core Simulator (PARCS) is a 3-dimensional reactor core analysis code that has been coupled to TRACE and RELAP5. PARCS can also perform stand-alone reactor analyses. The need for coupled thermal hydraulics and multidimensional reactor kinetics has increased due to reduced margins and the discovery of safety significant events, i.e., Anticipated Occupational Occurrences (AOO’s) related to BWR instabilities. PARCS is also needed to calculate spatial distribution of the more severe transients that can occur during reactivity insertion events (e.g., rod bank withdrawal, rod drop, rod ejection) and the core power surges and oscillations associated with over-cooling events (e.g., turbine trip and transients without scram (ATWS)).

RES has been developing PARCS since the mid-1990 as a 3D spatial reactor kinetics

tool. PARCS was originally developed and maintained by Purdue University and Information Systems Laboratories Inc. (ISL) but the PARCS development team relocated to the University of Michigan in 2008. Over time, the 3D neutronic solution methods in PARCS have evolved from nodal diffusion theory to include added options for multi-group nodal, fine-mesh neutron diffusion theory, and SP3 transport theory. Several fuel geometries are also possible: Cartesian, cylindrical, and hexagonal.

PARCS is also capable of reading in nuclear data from the industry lattice physics codes HELIOS and CASMO or the DOE SCALE code system's POLARIS and TRITON. These lattice physics codes use transport theory and depletion calculations to produce the tables of energy-collapsed and spatially smeared nuclear data that are needed by the nodal solver PARCS. However, a PMAXS format converter code, GenPMAXS, is needed to format the nuclear data accordingly to be read by PARCS.

Over the many years of development, modernization, and improvement by a relatively small team of code developers, the code theory and user manuals have not kept pace with the development of the code. As such deficiencies between the PARCS documentation and the actual coding have compounded and has become a high priority due to problems identified by the NRC staff and the CAMP international cooperative research group. Additionally, the numbers of domestic and international users have increased significantly with a wide variation of user capability so it is more and more important that the NRC make these needed improvements to the code manuals.

C.1.3 Objective

The objective of this work scope is to provide a more detailed input description of all of the various components of the user manual. The contractor shall also review the consistency of the contents to source code, clearly identify coupled vs stand-alone input in the manual, and add calculation examples to highlight correct input structure for a variety of plant types.

C.1.4 Scope of Work

The Contractor shall provide the following scope of work:

C.1.4.1 Volume I: Input Manual Work

The PARCS input manual requires several improvements in order to make it more readable and understandable. These improvements include restructuring the document, adding more detailed input description, reviewing consistency with the source code, and isolating input related to thermal-hydraulics coupling from the stand-alone PARCS input. As part of the upgrade of the PARCS input manual, the documentation should be converted from FrameMaker to LaTeX. In addition, this manual should include the PATHS input description in addition to the PARCS input description. Details of these changes are described below.

C.1.4.1.1 Restructure Documentation

The PARCS input manual should be restructured in order to better organize and describe the various input cards. The goal of this restructuring should be to provide a clearer picture of how the PARCS input should be specified. It should also provide

improved navigation using heading tags and hyperlinks between related input cards. Restructuring of the PARCS input manual should be performed using LaTeX. This will require embedding LaTeX tags inside the PARCS source files related to input processing. These LaTeX tags will contain details of the input card description which will then be parsed using a Python script for inclusion in the base LaTeX document. The tags will include header information which will tell the parser where to place the card description in the manual.

The main advantage of this approach is that it provides a more reliable mechanism to keep the source code and documentation synchronized. When input changes are made to the code, developers can concurrently make input description changes since that information is already embedded in the source file. When the new code is compiled, scripts can also recompile the input manual, providing instant synchronization. Other advantages include providing self-documented source code and improving the configuration management of the manuals, i.e., changes in the manual from version to version are easily identified.

C.1.4.1.2 Improve Input Description

The description of the PARCS input cards should be improved to provide a clearer understanding of how the specified input is interpreted used by the code. This description should include a range of both valid and invalid input, and should identify what the code will use for default values. Required and optional input cards should be clearly identified as such. In addition, if a specific input card affects other input cards, this should be clearly described, including hyperlinks to the related sections in the input manual.

C.1.4.1.3 Isolate Coupled and Stand-Alone Input

Input cards that are only used for coupling to a thermal-hydraulic code should be isolated from the PARCS stand-alone input. Likewise, cards that are only used for stand-alone PARCS applications should be clearly identified. Any cards that are treated differently in coupled mode versus stand-alone mode should also be separately discussed.

C.1.4.1.4 Review for Consistency

The manual should be reviewed for consistency with the source code to ensure that each input card is adequately described. In addition, the range of valid and invalid input should also be compared against the error checking performed by the code to ensure consistency with the manual. Any discrepancies identified should be resolved with either corrections to the input manual or communication of recommended source changes to the code developers.

Deliverable for Task 1: PARCS/PATHS Input Manual, along with all source changes, LaTeX document source, and parsing scripts.

C.1.4.2. Volume II: User's Guide

Currently, a comprehensive PARCS User's Guide does not exist. This task will focus on preparing this documentation, which will draw from several sources of currently available information. To begin, the sample input and output discussion from the existing PARCS input manual will be extracted and re-worked for inclusion in the User's

Guide. In addition, the calculation notebooks prepared by the NRC for Hatch Unit 1 and TMI1, Cycles 1 and 2, will be examined. Any suitable information will be extracted and included in this User's Guide. A list of any additional content that needs to be developed will be prepared and sent to the NRC Project Manager.

Assuming that coupled transient examples (PBTT, MSLB, VVER) currently residing in the PARCS manual will be re-worked and placed, along with the depletion examples (Hatch and TMI) into this volume.

Deliverable for Task 2: PARCS/PATHS User's Guide, along with all LaTeX document source. In addition, a list of any additional user guide content that needs to be developed will be prepared for the NRC Project Manager.

C.1.5 Reporting Requirements

C.1.5.1 Monthly Letter Status Report (MLSR)

The contractor shall provide a Monthly Letter Status Report which consists of a technical progress report and financial status report. This report will be used by the Government to assess the adequacy of the resources proposed by the contractor to accomplish the work contained in this SOW and provide status of contractor progress in achieving activities and producing deliverables. The report shall include order summary information, work completed during the specified period, milestone schedule information, problem resolution, travel plans, and staff hour summary.

C.1.5.2 Final Report

The contractor shall provide a final report summarizing the work performed and the results and conclusions under this order. The reporting shall include the actual volumes 1 and 2 documentation. For volume 1, the report shall also include any major deficiencies or omissions in the existing PARCS manuals.

C.1.6 Deliverables and Delivery Schedule

Section #	Deliverable	Due Date	Format	Submit to
C.1.5.1 MLSR	1 [Monthly Report]	20 th calendar day of the following month	Word Document	CO/COR
C.1.5.2 Final Report	2 [Volume 1]	8 months after contract award	Word Document	COR
C.1.5.2 Final Report	3 [Volume 2]	12 months after contract award	Word Document	COR

C.1.7 Applicable Documents and Standards

N/A

C.1.8 Section 508 – Electronic and Information Technology Standards

N/A

C.1.9 Place of Performance

All performance is expected to be performed at the contractor's facilities.

C.1.10 Contractor Travel

No Travel is anticipated in association with this Task Order.

SECTION D – PACKAGING AND MARKING

D.1 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 Regulatory Research, under Contract/order number NRC-HQ-60-14-E-0002 – NRC-HQ-60-16-T-0001.

D.2 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: N/A.

SECTION F – DELIVERIES OR PERFORMANCE

F.1 NRCF032 TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (SEP 2013)

This order shall commence on the Date of Award and will expire on 12 Months from the Date of Award.

F.2 DELIVERABLES AND DELIVERABLE SCHEDULE

See Section C.1.6

F.3 NRCF010 PLACE OF DELIVERY-REPORTS

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

Carl Thurston (1 electronic copy)
Contracting Officer's Representative (COR)
U.S. Nuclear Regulatory Commission
Phone Number: 301-415-2448
Email Address: carl.thurston@nrc.gov

Rob Robinson
Contract Specialist (CS)
Phone Number: 301-415-0728
Email Address: Richard.robinsonii@nrc.gov

SECTION G – CONTRACT ADMINISTRATION DATA

G.1 2052.215-71 PROJECT OFFICER AUTHORITY. (OCT 1999)

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

Name: Carl Thurston
Email Address: carl.thurston@nrc.gov
Telephone Number: 301-415-2448

(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.

G.2 2052.215-70 KEY PERSONNEL. (JAN 1993)

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

Douglas Barber
Lance Larson

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.

SECTION I – CONTRACT CLAUSES

I.1 NRCG20 REGISTRATION IN FEDCONNECT® (JULY 2014)

The Nuclear Regulatory Commission (NRC) uses Compusearch Software Systems' secure and auditable two-way web portal, FedConnect®, to communicate with vendors and contractors. FedConnect® provides bi-directional communication between the vendor/contractor and the NRC throughout pre-award, award, and post-award acquisition phases. Therefore, in order to do business with the NRC, vendors and contractors must register to use FedConnect® at <https://www.fedconnect.net/FedConnect>. The individual registering in FedConnect® must have authority to bind the vendor/contractor. There is no charge for using FedConnect®. Assistance with FedConnect® is provided by Compusearch Software Systems, not the NRC. FedConnect® contact and assistance information is provided on the FedConnect® web site at <https://www.fedconnect.net/FedConnect>.

I.2 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-Central Contractor Registration".

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.

I.3 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.

I.4 NRCH470 GREEN PURCHASING (SEP 2015)

(a) In furtherance of the sustainable acquisition goals of Executive Order (EO) 13693, "Planning for Federal Sustainability in the Next Decade," products and services provided under this contract/order shall be energy efficient (EnergyStar® or Federal Energy Management Program - FEMP-designated products), water efficient, biobased, environmentally preferable (excluding EPEAT®-registered products), non-ozone depleting, contain recycled content, or are non- or low toxic alternatives or hazardous constituents (e.g., non-VOC paint), where such products and services meet agency performance requirements. See: Executive Order (EO) 13693, "Planning for Federal Sustainability in the Next Decade."

(b) The NRC and contractor may negotiate during the contract term to permit the substitution or addition of designated recycled content products (i.e., Comprehensive Procurement Guidelines - CPG), EPEAT®-registered products, EnergyStar®- and FEMP designated energy efficient products and appliances, USDA designated biobased products (Biopreferred® program), environmentally preferable products, WaterSense and other water efficient products, products containing non- or lower-ozone depleting substances (i.e., SNAP), and products containing non- or low-toxic or hazardous constituents (e.g., non-VOC paint), when such products and services are readily available at a competitive cost and satisfy the NRC's performance needs.

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

I.5 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.

J.1 SECTION J - List of Documents, Exhibits and Other Attachments

1. Billing Instructions for Cost Reimbursement Type Contracts



INVOICE FORMAT FOR COST-REIMBURSEMENT CONTRACTS

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ATTACHMENT 1

BILLING INSTRUCTIONS FOR COST-REIMBURSEMENT TYPE CONTRACTS (MAY 2013)

General: During performance and through final payment of this contract, the contractor is responsible for the accuracy and completeness of data within the System for Award Management (SAM) database and for any liability resulting from the Government's reliance on inaccurate or incomplete SAM data.

The contractor shall prepare invoices/vouchers for reimbursement of costs in the manner and format described herein. FAILURE TO SUBMIT INVOICES/VOUCHERS IN ACCORDANCE WITH THESE INSTRUCTIONS MAY RESULT IN REJECTION OF THE INVOICE/VOUCHER AS IMPROPER.

Standard Forms: Reimbursement requests shall be submitted on the payee's letterhead, invoice/voucher, 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."

Electronic Invoice/Voucher Submissions: The preferred method of submitting invoices/vouchers is electronically to the U.S. Nuclear Regulatory Commission, via email to: NRCPayments@nrc.gov.

Hard-Copy Invoice/Voucher Submissions: If you submit a hard-copy of the invoice/voucher, a signed original and supporting documentation shall be submitted to the following address:

NRC Payments
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mailstop O3-E17A
Rockville, MD 20852-2738

Purchase of Capital Property: (*\$50,000 or more with life of one year or longer*)

Contractors must report to the Contracting Officer, electronically, any capital property acquired with contract funds having an initial cost of \$50,000 or more, in accordance with procedures set forth in NRC Management Directive (MD) 13.1, IV, C – "Reporting Requirements" (revised 2/16/2011).

Agency Payment Office: Payment will continue to be made by the office designated in the contract in Block 12 of the Standard Form 26, or Block 25 of the Standard Form 33, whichever is applicable.

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**BILLING INSTRUCTIONS FOR
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Frequency: The contractor shall submit requests for reimbursement once each month, unless otherwise authorized by the Contracting Officer.

Format: Invoices/Vouchers shall be submitted in the format depicted on the attached sample form entitled "Invoice/Voucher for Purchases and Services Other Than Personal". Alternate formats are permissible only if they address all requirements of the Billing Instructions. The instructions for preparation and itemization of the invoice/voucher are included with the sample form.

Task Order Contracts: The contractor must submit a separate invoice/voucher for each individual task order with detailed cost information. This includes all applicable cost elements and other items discussed in paragraphs (a) through (s) of the attached instructions. In addition, the invoice/voucher must specify the contract number, and the NRC-assigned task/delivery order number.

Billing of Costs after Expiration of Contract: If costs are incurred during the contract period and invoiced after the contract has expired, you must cite the period during which these costs were incurred. To be considered a proper expiration invoice/voucher, the contractor shall clearly mark it "EXPIRATION INVOICE" or "EXPIRATION VOUCHER".

Final invoices/vouchers shall be marked "FINAL INVOICE" or "FINAL VOUCHER".

Currency: Invoices/Vouchers must be expressed in U.S. Dollars.

Supersession: These instructions supersede previous Billing Instructions for Cost-Reimbursement Type Contracts (July 2011).



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**BILLING INSTRUCTIONS FOR
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**INVOICE/VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL
(SAMPLE FORMAT - COVER SHEET)**

1. Official Agency Billing Office

NRC Payments
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mailstop O3-E17A
Rockville, MD 20852-2738

2. Invoice/Voucher Information

a. Payee's DUNS Number or DUNS+4. The Payee shall include the Payee's Data Universal Number (DUNS) or DUNS+4 number that identifies the Payee's name and address. The DUNS+4 number is the DUNS number plus a 4-character suffix that may be assigned at the discretion of the Payee to identify alternative Electronic Funds Transfer (EFT) accounts for the same parent concern.

b. Taxpayer Identification Number. The Payee shall include the Payee's taxpayer identification number (TIN) used by the Internal Revenue Service (IRS) in the administration of tax laws. (See IRS Web site: [http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Employer-ID-Numbers-\(EINs\)](http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Employer-ID-Numbers-(EINs))).

c. Payee's Name and Address. Show the name of the Payee as it appears in the contract and its correct address. If the Payee assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Payee shall require as a condition of any such assignment, that the assignee shall register separately in the System for Award Management (SAM) database at <http://sam.gov> and shall be paid by EFT in accordance with the terms of this contract. See Federal Acquisition Regulation (FAR) 52.232-33(g) Payment by Electronic Funds Transfer - Central Contractor Registration (October 2003).

d. Contract Number. Insert the NRC contract number (including Enterprise-wide Contract (EWC)), GSA Federal Supply Schedule (FSS), Governmentwide Agency Contract (GWAC) number, or Multiple Agency Contract (MAC) number, as applicable.

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- e. Task Order Number. Insert the task/delivery order number (If Applicable). **Do not include more than one task order per invoice or the invoice may be rejected as improper.**
- f. Invoice/Voucher. The appropriate sequential number of the invoice/voucher, beginning with 001 should be designated. Contractors may also include an individual internal accounting number, if desired, in addition to the 3-digit sequential number.
- g. Date of Invoice/Voucher. Insert the date the invoice/voucher is prepared.
- h. Billing Period. Insert the beginning and ending dates (day, month, year) of the period during which costs were incurred and for which reimbursement is requested.
- i. Description of Deliverables. Provide a brief description of supplies or services, quantity, unit cost, and total cost.
- j. Work Completed. Provide a general summary description of the services performed or products submitted for the invoice period and specify the section or Contract Line Item Number (CLIN) or SubCLIN in the contract pertaining to the required deliverable(s).
- k. Shipping. Insert weight and zone of shipment, if shipped by parcel post.
- l. Charges for freight or express shipments. Attach prepaid bill if shipped by freight or express.
- m. Instructions. Include instructions to consignee to notify the Contracting Officer of receipt of shipment.
- n. For Indefinite Delivery contracts, the final invoice/voucher shall be marked "FINAL INVOICE" or "FINAL VOUCHER".
- o. Direct Costs. Insert the amount billed for the following cost elements, adjustments, suspensions, and total amounts, for both the current billing period and for the cumulative period (from contract inception to end date of this billing period).

(1) Direct Labor. This consists of salaries and wages paid (or accrued) for direct performance of the contract itemized as follows:

<u>Labor Category</u>	<u>Hours Billed</u>	<u>Rate</u>	<u>Total</u>	<u>Cumulative Hours Billed</u>
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- (2) Fringe Benefits. This represents fringe benefits applicable to direct labor and billed as a direct cost. Where a rate is used indicate the rate. Fringe benefits included in direct labor or in other indirect cost pools should not be identified here.
- (3) Contractor-acquired property (\$50,000 or more). List each item costing \$50,000 or more and having a life expectancy of more than one year. List only those items of equipment for which reimbursement is requested. For each such item, list the following (as applicable): (a) an item description, (b) manufacturer, (c) model number, (d) serial number, (e) acquisition cost, (f) date of purchase, and (g) a copy of the purchasing document.
- (4) Contractor-acquired property (under \$50,000), Materials, and Supplies. These are equipment other than that described in (3) above, plus consumable materials and supplies. List by category. List items valued at \$1,000 or more separately. Provide the item number for each piece of equipment valued at \$1,000 or more.
- (5) Premium Pay. This enumeration in excess of the basic hourly rate. (Requires written approval of the Contracting Officer.)
- (6) Consultant Fee. The supporting information must include the name, hourly or daily rate of the consultant, and reference the NRC approval (if not specifically approved in the original contract).
- (7) Travel. Total costs associated with each trip must be shown in the following format:

<u>Start Date</u>		<u>Destination</u>		<u>Costs</u>
From	To	From	To	\$

(Must include separate detailed costs for airfare, per diem, and other transportation expenses. All costs must be adequately supported by copies of receipts or other documentation.)

- (8) Subcontracts. Include separate detailed breakdown of all costs paid to approved subcontractors during the billing period.
- (9) Other Costs. List all other direct costs by cost element and dollar amount separately.

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p. Indirect Costs (Overhead and General and Administrative Expense). Cite the formula (rate and base) in effect in accordance with the terms of the contract, during the time the costs were incurred and for which reimbursement is requested.

q. Fixed-Fee. If the contract provides for a fixed-fee, it must be reimbursed as indicated in the contract. Cite the formula or method of computation. Include this information as it applies to individual task orders as well.

- (1) The NRC will withhold payment of 15% of the negotiated contract fixed-fee amount, not to exceed \$100,000.
- (2) If the fee withholding amount has reached \$100,000, the contractor may resume billing the NRC for the balance of its fee under subsequent invoices for work completed.
- (3) Any fee amounts withheld by the NRC will be paid to the contractor during contract closeout in increments, following the submission/settlement of indirect rate proposals in accordance with FAR 52.216-8, "Fixed Fee" (JUN 2011).

r. Total Amount Billed. Insert columns for total amounts for the current and cumulative periods.

s. Adjustments. Insert columns for any adjustments, including outstanding suspensions for deficient or defective products or nonconforming services, for the current and cumulative periods.

t. Grand Totals.

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3. Sample Invoice/Voucher Information

Sample Invoice/Voucher Information (Supporting Documentation must be attached)

This invoice/voucher represents reimbursable costs for the billing period from ____ through ____.

		<u>Amount Billed</u>	
		<u>Current Period</u>	<u>Cumulative</u>
(a)	<u>Direct Costs</u>		
(1)	Direct labor	\$ _____	\$ _____
(2)	Fringe benefits (% of direct labor)	\$ _____	\$ _____
(3)	Government property (\$50,000 or more)	\$ _____	\$ _____
(4)	Government property, Materials, and Supplies (under \$50,000 per item)	\$ _____	\$ _____
(5)	Premium pay (NRC approved overtime)	\$ _____	\$ _____
(6)	Consultants Fee	\$ _____	\$ _____
(7)	Travel	\$ _____	\$ _____
(8)	Subcontracts	\$ _____	\$ _____
(9)	Other costs	\$ _____	\$ _____
Total Direct Costs:		\$ _____	\$ _____

(b) Indirect Costs (provide the rate information applicable to your firm)

(10)	Overhead ____ % of _____ (Indicate Base)	\$ _____	\$ _____
(11)	General and Administrative (G&A) ____ % of _____ (Indicate Base)	\$ _____	\$ _____
Total Indirect Costs:		\$ _____	\$ _____

(c) Fixed-Fee:

- (12) Fixed-Fee Calculations:
- i. Total negotiated contract fixed-fee percent ____ and amount \$ _____
 - ii. 85% allowable fee amount \$ _____
 - iii. Cumulative fee billed on prior invoices \$ _____

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- iv. Fee due this invoice (*not to exceed 85% of fee earned based upon negotiated contract fee percentage*) \$ _____

Note: The fee balance withheld by NRC may not exceed \$100,000.

	Total Fixed-Fee:	\$ _____	\$ _____
(d)	Total Amount Billed	\$ _____	\$ _____
(e)	Adjustments (+/-)	\$ _____	\$ _____
(f)	Grand Total	\$ _____	\$ _____

(The invoice/voucher format provided above must include information similar to that included below in the following to ensure accuracy and completeness.)

SAMPLE SUPPORTING INFORMATION

The budget information provided below is for format purposes only and is illustrative.

Cost Elements:

- 1) Direct Labor - \$2,400

<u>Labor Category</u>	<u>Hours Billed</u>	<u>Rate</u>	<u>Total</u>	<u>Cumulative Hours Billed</u>
Senior Engineer I	100	\$14.00	\$1,400	975
Engineer	50	\$10.00	\$ 500	465
Computer Analyst	100	\$ 5.00	<u>\$ 500</u>	<u>320</u>
			\$2,400	1,760 hrs.

- 2) Fringe Benefits - \$480

Fringe @ 20% of Direct Salaries

<u>Labor Category</u>	<u>Salaries</u>	<u>Fringe Amount</u>
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Senior Engineer I	\$1,400	\$280
Engineer	\$ 500	\$100
Computer Analyst	<u>\$ 500</u>	<u>\$100</u>
	\$2,400	\$480

- 3) Government-furnished and contractor-acquired property (\$50,000 or more) - \$60,000

Prototype Spectrometer - item number 1000-01 = \$60,000

- 4) Government-furnished and contractor-acquired property (under \$50,000), Materials, and Supplies - \$2,000

10 Radon tubes @ \$110.00	= \$1,100
6 Pairs Electrostatic gloves @ \$150.00	= <u>\$ 900</u>
	\$2,000

- 5) Premium Pay - \$150

Walter Murphy - 10 hours @ \$10.00 Per Hour (Reg. Pay) = \$100 x 1.5 OT rate = \$150
 (EX: Premium pay for this individual was approved and authorized under this contract by the NRC Contracting Officer by letter dated 6/1/2011.)

- 6) Consultants' Fee - \$100

Dr. Carney - 1 hour fully-burdened @ \$100 = \$100

- 7) Travel - \$2,640

- (i) Airfare: (2 Roundtrip trips for 1 person @ \$300 per r/t ticket)

<u>Start Date</u>	<u>End Date</u>	<u>Days</u>	<u>From</u>	<u>To</u>	<u>Cost</u>
4/1/2011	4/7/2011	7	Philadelphia, PA	Wash, D.C.	\$300
7/1/2011	7/8/2011	8	Philadelphia, PA	Wash, D.C.	\$300

- (ii) Per Diem: \$136/day x 15 days = \$2,040

- 8) Subcontracting - \$30,000

Company A	= \$10,000
Company B	= <u>\$20,000</u>

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\$30,000

(EX: Subcontracts for Companies A & B were consented to by the Contracting Officer by letter dated 6/15/2011.)

9) Other Costs - \$5,100

Honorarium for speaker at American Nuclear Society conference = \$5,000
Nuclear Planet Journal subscription fee = \$100

10) Overhead Expense - \$41,148

Overhead @ 40% of Total Direct Costs

11) General and Administrative (G&A) Expense - \$22,784

G&A @ 20% of Total Costs, excluding subcontracts and consultants

12) Fixed-Fee - \$8,218

Fixed-Fee applied to Total Costs @ 5%

Fixed-Fee Calculations:

- i. Total contract fixed-fee \$100,000
- ii. 85% allowable fee \$85,000
- iii. Cumulative fee billed on prior invoices \$85,000
- iv. Fee due this invoice (*not to exceed 85% of fee earned based upon negotiated contract fee percentage*) \$8,218

Total Amount Billed	\$175,020
Adjustments (+/-)	<u>- \$8,218</u>
Grand Total	\$166,802