

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

1

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

BPA NO.

1. DATE OF ORDER 9/30/2008		2. CONTRACT NO. (if any)		6. SHIP TO:	
3. ORDER NO. NRC-DR-03-08-081		MODIFICATION NO.		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission	
4. REQUISITION/REFERENCE NO. 03-08-081		5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Jeffrey R. Mitchell, 301-492-3639 Mail Stop: TWB-01-B10M Washington, DC 20555		b. STREET ADDRESS Attn: Rachel Glaros Mail Stop: 013-E19	
7. TO:		c. CITY Washington		d. STATE DC	e. ZIP CODE 20555
a. NAME OF CONTRACTOR UNIVERSITY OF MARYLAND OFFICE OF RESEARCH ADMINISTRATION & ADVANCEMENT		f. SHIP VIA		8. TYPE OF ORDER	
b. COMPANY NAME		<input checked="" type="checkbox"/> a. PURCHASE		<input type="checkbox"/> b. DELIVERY	
c. STREET ADDRESS 3112 LEE BUILDING		e. STATE MD		f. ZIP CODE 207425100	
d. CITY COLLEGE PARK		9. ACCOUNTING AND APPROPRIATION DATA 820-15-111-126 J-4148 252A 31x0200.820 Obligate \$22,500.00		10. REQUISITIONING OFFICE NRR	

11. BUSINESS CLASSIFICATION (Check appropriate box(es))				12. F.O.B. POINT	
<input type="checkbox"/> a. SMALL	<input checked="" type="checkbox"/> b. OTHER THAN SMALL	<input type="checkbox"/> c. DISADVANTAGED	<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED	N/A	
<input type="checkbox"/> d. WOMEN-OWNED	<input type="checkbox"/> e. HUBZone	<input type="checkbox"/> f. EMERGING SMALL BUSINESS			

13. PLACE OF		14. GOVERNMENT B/L NO.		15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)		16. DISCOUNT TERMS	
a. INSPECTION	b. ACCEPTANCE			As Stated		Net 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)
	<p>The U.S. Nuclear Regulatory Commission (NRC) enters into a purchase order with the University of Maryland (UMD) for expenses of the material and supplies, test fixtures including oven and controller, and facility and equipment charges (e.g. scanning electron microscope, transmission electron microscopy, the Nuclear Reactor and Gamma Facility) These expenses are related to support NRC personnel being temporary assigned under the Intergovernmental Personnel Act</p> <p>The project involves understanding the properties of graphite under high temperature, high irradiation conditions and developing the fundamental knowledge of graphite.</p> <p>Reference, Attachment No. 1: Letter dated Feb 5, 2008 from UMD, Mohamad Al-Sheikhly</p>					

18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
21. MAIL INVOICE TO:						
a. NAME Department of Interior / NBC NRCPayments@nbc.gov						
b. STREET ADDRESS (or P.O. Box) Attn: Fiscal Services Branch - D2770 7301 W. Mansfield Avenue						17(i) GRAND TOTAL
c. CITY Denver		d. STATE CO	e. ZIP CODE 80235-2230			

22. UNITED STATES OF AMERICA BY (Signature) 		23. NAME (Typed) Jeffrey R. Mitchell Contracting Officer TITLE: CONTRACTING/ORDERING OFFICER	
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AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITIONS ARE OBSOLETE
FORM 347-100-01

SUNSI REVIEW COMPLETE

OPTIONAL FORM 347 (REV. 4/2006)
PRESCRIBED BY GSA FPMR 48 CFR 53.213(f)
ADMOO2

ADDITIONAL SIMPLIFIED ACQUISITION TERMS AND CONDITIONS

A.1 PRICE/COST SCHEDULE & PERIOD OF PERFORMANCE

BASE YEAR (MAY 25, 2008 – MAY 24, 2009)		
CLIN	DESCRIPTION	ESTIMATED COST (NOT TO EXCEED)
001	Materials & Supplies	\$3,000.00
002	Test Fixture including Oven and Controller	\$4,000.00
003	Facility and Equipment charges (Includes SEM, TEM, Reactor, Gamma and other testing facilities)	\$8,500.00
004	Facility & Administration (Less Tuition & Equipment) F&A Rate 50%	\$7,750.00
	ESTIMATED TOTAL	\$23,250.00

OPTION PERIOD 1 (MAY 25, 2009 – MAY 31, 2010)		
CLIN	DESCRIPTION	ESTIMATED COST (NOT TO EXCEED)
005	Materials & Supplies	\$3,000.00
006	Test Fixture including Oven and Controller	\$2,000.00
007	Facility and Equipment charges (Includes SEM, TEM, Reactor, Gamma and other testing facilities)	\$11,000.00
008	Facility & Administration (Less Tuition & Equipment) F&A Rate 50%	\$8,000.00
	ESTIMATED TOTAL	\$24,000.00

	ESTIMATED TOTAL (BASE PLUS OPTION YEAR 1)	\$47,250.00
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PERIOD OF PERFORMANCE:

This contract shall commence on May 25, 2008 and will expire on May 24, 2009. The term of this contract may be extended at the option of the Government for an additional one (1) year.

A.2 CONSIDERATION AND OBLIGATION--COST REIMBURSEMENT (JUN 1988) ALTERNATE I (JUN 1988)

- (a) The total estimated cost to the Government for full performance under this contract is \$23,250.00.
- (b) The amount presently obligated by the Government with respect to this contract is \$22,500.00.
- (c) It is estimated that the amount currently allotted will cover performance through May 24, 2009.

A.3 NOTICE LISTING CLAUSES INCORPORATED BY REFERENCE

The following clauses are hereby incorporated by reference (by Citation Number, Title, and Date) in accordance with the clause at FAR "52.252-2 CLAUSES INCORPORATED BY REFERENCE" contained in this document. FAR 52.252-2 contains the internet address for electronic access to the full text of a clause.

NUMBER	TITLE	DATE
	FEDERAL ACQUISITION REGULATION (48 CFR Chapter 1)	

A.4 52.213-4 TERMS AND CONDITIONS - SIMPLIFIED ACQUISITIONS (OTHER THAN COMMERCIAL ITEMS) (FEB 2008)

(a) The Contractor shall comply with the following Federal Acquisition Regulation (FAR) clauses that are incorporated by reference:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-3, Convict Labor (June 2003) (E.O. 11755).

(ii) 52.222-21, Prohibition of Segregated Facilities (Feb 1999) (E.O. 11246).

(iii) 52.222-26, Equal Opportunity (Mar 2007) (E.O. 11246).

(iv) 52.222-50, Combating Trafficking in Persons (Aug 2007) (22 U.S.C. 7104(g)).

(v) 52.225-13, Restrictions on Certain Foreign Purchases (Feb 2006) (E.o.s, proclamations, and statutes administered by the Office of Foreign Assets Control of the Department of the Treasury).

(vi) 52.233-3, Protest After Award (Aug 1996) (31 U.S.C. 3553). ALT I

(vii) 52.233-4, Applicable Law for Breach of Contract Claim (Oct 2004) (Pub. L. 108-77, 108-78).

(2) Listed below are additional clauses that apply:

(iv) 52.232-25, Prompt Payment (Oct 2003).

(v) 52.233-1, Disputes (Jul 2002). ALT I

(vi) 52.244-6, Subcontracts for Commercial Items (Mar 2007).

(vii) 52.253-1, Computer Generated Forms (Jan 1991).

(b) The Contractor shall comply with the following FAR clauses, incorporated by reference, unless the circumstances do not apply:

(1) The clauses listed below implement provisions of law or Executive order:

(i) 52.222-19, Child Labor--Cooperation with Authorities and Remedies (FEB 2008) (E.O. 13126).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Sept 2006) (38 U.S.C. 4212) (Applies to contracts of \$100,000 or more).

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (June 1998) (29 U.S.C. 793). (Applies to contracts over \$10,000, unless the work is to be performed outside the United States by employees recruited outside the United States.) (For purposes of this clause, United States includes the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.)

(v) 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Sept 2006) (38 U.S.C. 4212) (Applies to contracts of \$100,000 or more).

(vii) 52.223-5, Pollution Prevention and Right-to-Know Information (Aug 2003) (E.O. 13148) (Applies to services performed on Federal facilities).

(viii) 52.223-15, Energy Efficiency in Energy-Consuming Products (DEC 2007) (42 U.S.C. 8259b) (Unless exempt pursuant to 23.204, applies to contracts when energy-consuming products listed in the ENERGY STAR Program or Federal Energy Management Program (FEMP) will be--

(A) Delivered;

(B) Acquired by the Contractor for use in performing services at a Federally-controlled facility;

(C) Furnished by the Contractor for use by the Government; or

(D) Specified in the design of a building or work, or incorporated during its construction, renovation, or maintenance.)

(ix) 52.225-1, Buy American Act--Supplies (June 2003) (41 U.S.C. 10a-10d) (Applies to contracts for supplies, and to contracts for services involving the furnishing of supplies, for use in the United States or its outlying areas, if the value of the supply contract or supply portion of a service contract exceeds the micro-purchase threshold and the acquisition--

(A) Is set aside for small business concerns; or

(B) Cannot be set aside for small business concerns (see 19.502-2), and does not exceed \$25,000.)

(x) 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration (Oct 2003). (Applies when the payment will be made by electronic funds transfer (EFT) and the payment office uses the Central Contractor Registration (CCR) database as its source of EFT information.)

(xi) 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration (May 1999). (Applies when the payment will be made by EFT and the payment office does not use the CCR database as its source of EFT information.)

(xii) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (Feb 2006) (46 U.S.C. Appx 1241). (Applies to supplies transported by ocean vessels (except for the types of subcontracts listed at 47.504(d).)

(2) Listed below are additional clauses that may apply:

(i) 52.209-6, Protecting the Government's Interest When Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (Sept 2006) (Applies to contracts over \$30,000).

NRC-DR-03-08-081

(c) FAR 52.252-2, Clauses Incorporated by Reference (Feb 1998). This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

(d) Inspection/Acceptance. The Contractor shall tender for acceptance only those items that conform to the requirements of this contract. The Government reserves the right to inspect or test any supplies or services that have been tendered for acceptance. The Government must exercise its postacceptance rights--

(1) Within a reasonable period of time after the defect was discovered or should have been discovered; and

(2) Before any substantial change occurs in the condition of the item, unless the change is due to the defect in the item.

(e) Excusable delays. The Contractor shall not be be liable for nonperformance that is is caused by an occurrence beyond the reasonable control of the Contractor and without its fault or negligence, such as acts of God or the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather, and delays of common carriers. The Contractor shall notify the Contracting Officer in writing as soon as it is reasonably possible after the commencement of any excusable delay, setting forth the full particulars in connection therewith, shall remedy such occurrence with all reasonable dispatch, and shall promptly give written notice to the Contracting Officer of the cessation of such occurrence.

(f) Termination for the Government's convenience. FAR CLAUSE 52.249-5 (SEP 1996), inserted by reference

(g) Termination for cause. The Government may terminate this contract, or any part hereof, for cause in the event of any default by the Contractor, or if the Contractor fails to comply with any contract terms and conditions, or fails to provide the Government, upon request, with adequate assurances of future performance. In the event of termination for cause, the Government shall not be liable to the Contractor for any amount for supplies or services not accepted, and the Contractor shall be liable to the Government for any and all rights and remedies provided by law. If it is determined that the Government improperly terminated this contract for default, such termination shall be deemed a termination for convenience.

52.213-3	NOTICE TO SUPPLIER	APR 1984
52.222-42	STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES	MAY 1989
52.222-50	COMBATING TRAFFICKING IN PERSONS	AUG 2007
52.223-6	DRUG-FREE WORKPLACE	MAY 2001
52.225-13	RESTRICTIONS ON CERTAIN FOREIGN PURCHASES	JUN 2008
52.233-1	DISPUTES ALT I	JUL 2002
52.233-4	APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM	OCT 2004
52.237-1	SITE VISIT	APR 1984
52.243-1	CHANGES--FIXED-PRICE ALT V	AUG 1987

A.5 NRC Acquisition Clauses - (NRCAR) 48 CFR Ch. 20

2052.209-72	CONTRACTOR ORGANIZATIONAL CONFLICTS OF	JAN 1993
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INTEREST

A.6 Other Applicable Clauses

See Addendum for the following in full text (if checked)

52.216-18, Ordering

52.216-19, Order Limitations

52.216-22, Indefinite Quantity

52.217-6, Option for Increased Quantity

52.217-7, Option for Increased Quantity Separately Priced Line Item

52.217-8, Option to Extend Services

52.217-9, Option to Extend the Term of the Contract

A.7 SEAT BELTS

Contractors, subcontractors, and grantees, are encouraged to adopt and enforce on-the-job seat belt policies and programs for their employees when operating company-owned, rented, or personally owned vehicles.

A.8 WHISTLEBLOWER PROTECTION FOR NRC CONTRACTOR AND SUBCONTRACTOR EMPLOYEES (JULY 2006)

(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.

(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.

NRC-DR-03-08-081
Attachment No. 1



A. JAMES CLARK
SCHOOL OF ENGINEERING

Michael J. Case, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission

February 5, 2008

Dear Mr. Case:

This letter is to detail the tasks and costs of the research project to be conducted by the selectee of the Intergovernmental Personnel Act (IPA) Mobility Program at the University of Maryland under my direction. This project will be conducted over the next two years under the IPA Mobility Program provisions. The purpose of the IPA Mobility Program is to provide program and developmental experience which will enhance the assignee's performance in his or her regular job as well as assisting the transfer and use of new technologies and approaches to solving NRC problems. The goals of the proposed project are twofold, the first is to apply a multiscale analysis, (from molecular to complete reactor component), to understand the properties of graphite under high temperature, high irradiation conditions and make precise lifetime predictions from property changes associated with damage and healing. And the second part of the project is to develop the fundamental knowledge of graphite by integrating the Twinkling Fractal Percolation Theory, Irradiation Experiments and Computer Simulations which will allow precise predictions for mechanical, thermal and fatigue properties as a function of the changes in microscopic bonding parameters with temperature and irradiation flux of the next generation high temperature nuclear reactors. The scope of the project is outlined herein.

For the first time, a new fundamental approach to nuclear graphite will be used which integrates Irradiation Experiments, the Rigidity Percolation Twinkling Fractal Theory, Computer Simulations, Microstructure Analysis of Damage and Healing and Reactor Component Composite Modeling; combined these will allow precise predictions for mechanical, thermal and fatigue lifetime properties as a function of the changes in microscopic bonding parameters. The experimental programs with irradiated graphite involve SANS, SAXS, WAXS, ICPS-AES, EELS, EDS, TEM, Magnetic Susceptibility, ESR, Chemical Reactivity, Raman, fracture and mechanical properties. The damage and healing processes in graphite will be clearly identified experimentally and related to fracture strength and lifetime predictions through the new Twinkling Fractal and Percolation Theory of fracture and yield. The unique strength of this proposal is that it conducts irradiation experiments at all scales which measure changes in the graphite microstructure and chemical impurities with temperature and radiation dosage.

The Very High Temperature Reactor (VHTR) is one of the leading designs among the six Generation IV Reactor Systems because of its high output temperature, passive safety design, and potential for cogeneration of electricity and hydrogen. Graphite will be a major structural component, moderator and reflector in the VHTR. It functions to protect the fuel and maintain the fission reaction by moderating neutrons in the core. While the general effects of neutron irradiation on graphite are reasonably well understood, little data for irradiation behavior of graphite at temperatures above 1000 °C exist. It is also essential to gain a better understanding

of the relationship between the rate of graphite degradation, the concentration of naturally occurring impurities in the graphite and impurities in the helium coolant. Clearly, there are many individual factors, such as neutron damage, graphite impurities, and diffusion of fission products that lead to the damage of graphite operating under reactor core conditions. In order to achieve the desired goals, the following tasks must be completed.

Task 1: Preparation of Irradiated Graphite Samples:

Graphite samples will be irradiated at multiple dose levels and multiple temperatures. All irradiations will be performed at the University of Maryland Nuclear Reactor and the University of Maryland Gamma Facility and samples will be transported to the appropriate campus laboratory for analysis.

Neutron Exposure Plan

(A) All exposures will be conducted in the Maryland University Training Reactor (MUTR). The MUTR staff will fabricate and calibrate a resistance based heater capable of raising the temperature of the graphite samples up to a level of 1200°C. The heater will be based on a standard temperature controller such as an Omega model CN77333 coupled to a custom manufactured oxide resistor furnace capable of being installed into the reactor experimental area. The furnace will be designed to accommodate cylindrical samples of 0.5 x 2 cm, and will be mounted into a cylindrical "sled" to reduce heat transfer into the reactor components.

(B) Initial sample characterization will be conducted at 50°C, 100°C and at 100°C intervals until the 1200°C target temperature is reached.

(C) After the initial characterization of the unirradiated samples, each temperature level will be exposed to a level of thermal neutrons sufficient to create an understanding of the effects of the neutron damage at each of the thirteen temperature levels. Assuming five differing flux levels, this will result in a total of 78 samples.

(D) After the initial curves are created to illustrate the damage versus dose versus temperature, each data point will be duplicated three times to create a mathematical understanding of the original data created.

Gamma Exposure Plan

(E) All gamma exposures will be conducted in the Gamma Laboratory at the University of Maryland. This Laboratory is equipped with a 4.63 PBq Cobalt-60 source capable of providing doses in excess of 100 kGy hr⁻¹ to the oven described in (A).

(F) The base line characterization collected in (A) will be utilized for this set of experiments.

(G) After the initial characterization of the unirradiated samples, samples at each temperature level will be exposed to a gamma dose sufficient to create an understanding of the effects of the gamma rays at each of the thirteen temperature levels. Assuming five differing dose levels, this will result in a total of 65 samples not including the base line unirradiated samples.

(H) After the initial curves are created to illustrate the damage versus dose versus temperature, each data point will be repeated three times to create a mathematical understanding of the original data created in Task 1.

Task 2: Neutron Activation Analysis:

(A) For this application, a High Purity Germanium (HP-Ge) counting system will be utilized. This system consists of the HP-Ge detector, a high voltage power supply, and all associated electronics and software required for a minimum of 2,000 channels of energy resolution with both quantitative and qualitative isotope identification.

(B) Unirradiated samples will be counted on the above system(s) to establish a base line before being exposed to the MUTR to investigate the possibility of naturally occurring isotopes such as K-40. Samples will be marked with an identifier and weighed prior to exposure to the neutron field.

(C) Immediately after each neutron exposure the samples will be removed from the oven and be placed into a position that will allow counting by a high resolution gamma spectroscopy system capable of detecting impurities in the samples.

(D) Results will be cataloged to allow comparison of the identified impurities and the associated quantities with the defect mechanisms identified.

Task 3: Electron Spin Resonance (ESR) Spectroscopy:

ESR spectroscopy will be used to measure the radiolytically produced free radicals in the graphite at various radiation levels and temperature. The University of Maryland maintains a Bruker ESR spectrometer. The free radical concentrations in terms of number of unpaired spin per gram will be determined as follows: For measuring the exact radiation-induced free radical concentrations (in number of spin per gram), $MnSO_4 \cdot H_2O$ was used as standard. The concentration of the paramagnetic (free radical concentration in number of spin per gram, [X]) will give a measure of broken bonds for the percolation analysis. [X] will be measured, using the following equation:

$$[X] = \frac{[std] A_x R_x (scan_x)^2 G_{std} M_{std} (g_{std})^2 [s(s+1)]_{std}}{A_{std} R_{std} (scan_{std})^2 G_x M_x (g_x)^2 [s(s+1)]_x}$$

where: A is the measured area under the absorption curve, Scan (Sweep Width), Horizontal scale in G per unit length on the chart paper, G: Relative gain of the signal amplifier, and M is the Modulation amplitude in gauss.

Task 4: Microscopic damage analysis of irradiated Advanced Gas-cooled Reactors (AGR) samples

Microscopic damage analysis of the irradiated AGR samples will be performed by transmission electron microscopy (TEM) at the University of Maryland. Using electron diffraction patterns, bright/dark field imaging and high resolution lattice imaging we will be able

to observe extended defects such as stacking faults, and partial and perfect dislocations produced by irradiation.

The IPA Mobility Program selectee will also investigate the possibility of coalescence of impurities in the graphite during irradiation at high temperatures. These impurities can become highly mobile at high temperatures giving rise to layers of foreign atoms in between the graphite planes. If foreign atoms coalesce into a small planar interstitial region (stacking fault) they can be detected by high resolution TEM imaging. Furthermore, the foreign atoms can be identified and their concentration can be measured quantitatively using Electron Energy Loss Spectra (EELS) and energy dispersive X-ray spectroscopy in TEM.

In order to accomplish these tasks the following financial support is anticipated:

		Year 1	Year 2
1	Materials & Supplies	3,000	3,000
2	Test Fixture including oven and controller	4,000	2,000
3	Facility and Equipment charges* * Includes SEM, TEM, Reactor, Gamma and other testing facilities	8,500	11,000
	TOTAL COST \$	15,500	16,000

If I can provide additional technical or budgetary information, please contact me at your convenience. My staff and I are looking forward to an enlightening experience from this project.

Sincerely,



Mohamad Al-Sheikhly, Professor and
Director Radiation Facilities.
University of Maryland
Department of Materials Science and Engineering

**BILLING INSTRUCTIONS FOR
COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)**

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

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

Number of Copies: A signed original and supporting documentation shall be submitted. If the voucher/invoice includes the purchase of any property with an initial acquisition cost of \$50,000 or more, a copy of the signed original is also required.

Designated Agency Billing Office: The preferred method of submitting vouchers/invoices is electronically to the Department of the Interior at NRCPayments@nbc.gov

If the voucher/invoice includes the purchase of capital property with an initial acquisition cost of \$50,000 or more, a copy of the signed original shall be electronically sent to: Property@nrc.gov

However, if you submit a hard-copy of the voucher/invoice, it shall be submitted to the following address:

Department of the Interior
National Business Center
Attn: Fiscal Services Branch - D2770
7301 West Mansfield Avenue
Denver, CO 80235-2230

If you submit a hard-copy of the voucher/invoice and it includes the purchase of capital property with an initial acquisition cost of \$50,000 or more, a copy of the signed original shall be mailed to the following address:

U.S. Nuclear Regulatory Commission
NRC Property Management Officer
Mail Stop: O-4D15
Washington, DC 20555-0001

HAND-CARRIED SUBMISSIONS WILL NOT BE ACCEPTED

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.

**BILLING INSTRUCTIONS FOR
COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)**

Frequency: The contractor shall submit claims for reimbursement once each month, unless otherwise authorized by the Contracting Officer.

Format: Claims shall be submitted in the format depicted on the attached sample form entitled "Voucher/Invoice for Purchases and Services Other than Personal" (see Attachment 1). The sample format is provided for guidance only. The format is not required for submission of a voucher/invoice. Alternate formats are permissible provided all requirements of the billing instructions are addressed. The instructions for preparation and itemization of the voucher/invoice are included with the sample form.

Task Ordering Contracts: If the contractor bills for more than one task order under a voucher/invoice, detailed cost information for each individual task order shall be submitted, together with a cumulative summary of all charges billed on the voucher/invoice. This includes all applicable cost elements discussed in paragraphs (a) through (n) of the attached instructions.

Fee Recovery Billings: Pursuant to the provisions of 10 CFR Part 170 and 171 on license fees, the NRC must recover the cost of work performed. Accordingly, the contractor must provide the total amount of funds billed during the period, fiscal year to date and the cumulative total for each task or task assignment by facility or report. The fee recovery billing reports shall be on a separate page, and shall be in the format provided (see Attachment 1). The billing period for fee recovery costs should be from the first day of each calendar month to the last day of the same month. Each separate fee billing report must be attached to the monthly invoice and cover the same period as the invoice.

Each report will contain a docket number or other unique identifier. The NRC will provide a unique identifier for all work performed. Costs should be reported as whole number to the nearest cent. For work that involves more than one facility at the same site, each facility should be listed separately and the costs should be split appropriately between the facilities. Common costs, as defined below, shall be identified as a separate line item in the fee recovery billing report each month.

Common costs are those costs that are not licensee unique and associated with the performance of an overall program that benefit all similar licensees covered under that program or that are required to satisfactorily carry out the program. Common costs include costs associated with the following: preparatory or start-up efforts to interpret and reach agreement on methodology, approach, acceptance criteria, regulatory position, or technical reporting requirements; efforts associated with the "lead plant" concept that might be involved during the first one or two plant reviews; meetings and discussions involving the above efforts to provide orientation, background knowledge or guidance during the course of a program; any technical effort applied to a docket or other unique identifier; and project management. Common costs must be reporting monthly for each docket or unique identifier. Common costs must be

**BILLING INSTRUCTIONS FOR
COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)**

computed based on the proportion of direct costs incurred against each docket or unique identifier for the billing period.

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

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

Currency: Billings may be expressed in the currency normally used by the contractor in maintaining his accounting records and payments will be made in that currency. However, the U.S. dollar equivalent for all vouchers/invoices paid under the contract may not exceed the total U.S. dollars authorized in the contract.

Supersession: These instructions supersede any previous billing instructions.

R:\txtselden\billing instructions CR revised 2008

(SAMPLE FORMAT)

**COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)
INVOICE/ VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL**

1. Official Agency Billing Office

Department of the Interior
National Business Center
Attn: Fiscal Services Branch - D2770
7301 West Mansfield Avenue
Denver, CO 80235-2230

2. 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. 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 Central Contractor Registration (CCR) database at <http://www.ccr.gov> and shall be paid by EFT in accordance with the terms of this contract. See Federal Acquisition Regulation 52.232-33(g) Payment by Electronic Funds Transfer - Central Contractor Registration (October 2003).
- c. Contract Number. Insert the NRC contract number.
Task Order No. Insert the task order number (If Applicable).
- d. Voucher/Invoice. The appropriate sequential number of the voucher/invoice, 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.
- e. Date of Voucher/Invoice. Insert the date the voucher/invoice is prepared.
- f. Billing period. Insert the beginning and ending dates (day, month, year) of the period during which costs were incurred and for which reimbursement is claimed.

(SAMPLE FORMAT)

COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)
INVOICE/ VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

g. 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</u> <u>Category</u>	<u>Hrs.</u> <u>Billed</u>	<u>Rate</u>	<u>Total</u>	<u>Cumulative</u> <u>Hrs.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) Capitalized Non Expendable Equipment. 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) the item number for the specific piece of equipment listed in the property schedule of the contract; or (b) the Contracting Officer's approval letter if the equipment is not covered by the property schedule.

- (4) Non-capitalized Equipment, Materials, and Supplies. These are equipment other than that described in (3) above, plus consumable materials, 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) Consultants. 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	\$

- (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.

(SAMPLE FORMAT)

**COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)
INVOICE/ VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL**

- h. 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 claimed.
- i. Fixed Fee. If the contract provides for a fixed fee, it must be claimed as provided for by the contract. Cite the formula or method of computation. Include this information as it applies to individual task orders as well.
The contractor may bill for fixed fee only up to 85% of total fee.
- j. Total Amount Billed. Insert the total amounts claimed for the current and cumulative periods.
- k. Adjustments. For cumulative amount, include outstanding suspensions.
- l. Grand Totals.

Further itemization of vouchers/invoices shall only be required for items having specific limitations set forth in the contract.

3. Sample Voucher Information

This voucher represents reimbursable costs for the billing period from ___through___.

<u>Amount Billed</u>
<u>Current Period</u> <u>Cumulative</u>

- (a) Direct Costs
 - (1) Direct labor*.....
 - (2) Fringe benefits (% , if computed as percentage).....
 - (3) Capitalized non-expendable equipment (\$50,000 or more - see instructions)*.....
 - (4) Non-capitalized equipment, materials, and supplies.....
 - (5) Premium pay (NRC approved overtime).....
 - (6) Consultants*.....
 - (7) Travel*.....
 - (8) Subcontracts*.....
 - (9) Other costs*.....

Total Direct Costs

(SAMPLE FORMAT)

**COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)
INVOICE/ VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL**

- (b) Indirect Costs
 - (A) Overhead ___ % of _____(Indicate Base).....
- (c) Fixed-Fee (Cite Formula):
- (d) Total Amount Billed.....
- (e) Adjustments.....
- (f) Grand Totals.....

* (Requires Supporting Information -- See Sample below)

SAMPLE SUPPORTING INFORMATION

1) Direct Labor - \$2400

Labor Category	Hours		Cumulative	
	Billed	Rate	Total	Hrs. Billed
Senior Engineer I	100	\$14.00	\$1400	975
Engineer	50	\$10.00	\$ 500	465
Computer Analyst	100	\$ 5.00	<u>\$ 500</u>	320
			<u>\$2400</u>	

3) Capitalized Non-Expendable Equipment

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

4) Non-capitalized Equipment, Materials, and Supplies

10 Radon tubes @ \$110.00 = \$1100.00

6 Pairs Electrostatic gloves @ \$150.00 = \$900.00
\$2000.00

5) Premium Pay

Walter Murphy - 10 hours @ \$10.00 Per Hour = \$100
(This was approved by NRC in letter dated 6/1/08)

6) Consultants' Fee

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

(SAMPLE FORMAT)

COST REIMBURSEMENT TYPE CONTRACTS (JUNE 2008)
INVOICE/ VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL

7)	<u>Travel</u>		
	<u>Start Date</u>	<u>Destination</u>	<u>Costs</u>
	6/1/08	Wash., DC	\$200

4. FEE RECOVERY BILLING REPORT

FIN:

Facility Name or Report Title:

TAC or Inspection Report Number:
(or other unique identifier)

Docket Number (if applicable):

Cost Categories	Period Amt.	Period Cost Incurred	Fiscal Year To Date Costs	Total Cumulative Costs
Labor				
Materials				
Subcontractor/ Consultant				
Travel				
Other (specify)				
Common Costs				
Total				

Remarks: