

NOTE TO: Diane Dandois  
Glenda Jackson

DATE: June 12, 2001

FROM: Joel Dorfman



SUBJECT: REIMBURSABLE AGREEMENT RELATED TO THE PEBBLE BED MODULAR REACTOR

DPBA has received for concurrence the attached Modification 1 to our reimbursable agreement with DOE related to Pebble Bed. The agreement has been re-titled, "Advanced Gas Reactor Framework, Technology and Fuel Evaluation," and provides NRC with \$480,000, for both contract support and NRC staff costs.

Mod 1 to reimbursable agreement was originally drafted in April, 2001. At that time, both DPBA and OGC expressed concerns that the Statement of Work (SOW) defined NRC's activities as developing a regulatory framework for licensing reactors. After discussions with OGC, RES agreed to revise the SOW to focus on NRC performing a technology assessment or generic research (see attached markup which was approved by Brian Kildee, OGC). Rather than the Economy Act, the reimbursement would be authorized under NRC's cooperative research authority. The NRC accepts funds under our cooperative research authority to perform research which falls within NRC's statutory mission.

Please note that RES wishes to charge costs of the June 12-13 meeting with Exelon to the agreement. The meeting activities with Exelon appear to be licensing and regulatory in nature, and not billable to DOE. The agreement is ambiguous regarding charging costs incurred prior to signature.

If possible, I would appreciate any comments on this agreement by June 14.

cc: Sandi Park  
David Drucker

c:\wp\sum01\pebblebeddafnote.wpd

B/13

**ROUTING AND CONCURRENCE SHEET**

**DATE: 6/11/2001**

**INITIALS**

**1. MAITCHESON - CONCUR** MA **DATE: 6// /2001**

**2. RROUGH - CONCUR** \_\_\_\_\_ **DATE: 6/ /2001**

**PLEASE RETURN TO M. AITCHESON, T-10 D11**

**3. MFARR - CONCUR** \_\_\_\_\_ **DATE: 6/ /2001**

**4. TKING - CONCUR, SIGN** \_\_\_\_\_ **DATE: 6/ /2001**

**RETURN TO M. AITCHESON**

**SUBJECT: DOE/NRC REIMBURSABLE AGREEMENT RE: ADVANCED  
GAS REACTOR TECHNOLOGY, REGULATION AND FUEL EVALUATION  
(FORMERLY KNOWN AS PEBBLE BED MODULAR REACTOR (PBMR)  
TECHNOLOGY AND FUEL EVALUATION**

**THE ORIGINAL IS IN THE MAIL AND WILL BE PLACED IN THIS  
PACKAGE AS SOON AS IT IS RECEIVED.**

**THE \$480K OF FUNDS PROVIDED UNDER THIS MODIFICATION NO. 1  
WILL PAY FOR: \$25K TRAVEL, \$155K FTE, \$300K CONTRACT  
ASSISTANCE**

**ANY QUESTIONS, PLEASE CONTACT MARIANNE AITCHESON**

**FROM: M. AITCHESON 415-5822 EMAIL MMR**

**DISTR**

**Subj: PBMR PROJECT**

**J. Dorfman, OCFO/DPBA**

**T. King, DRAA**

**M. Farr, DRAA**

**M. Aitcheson, PMG/PMPDAS**

**N. Price, FMG/PMPDAS**

**T. Stevenson, OCFO/DAF**

**S. Rubin, DSARE/RES**

**D. Drucker, OCFO**

United States Department of Energy Washington, D.C. 20585 DOE Interagency Agreement/Amendment Part I-General Information	1. DOE IA Identification (ID) No.: DE-AI01-01-NE-23069		4. TA No.:			
	2. Servicing Agency IA ID No. (If known):		5. Modification No: A001			
	3. DOE Procurement Request No.: 01-NE23069.002					
6. Name and Address of DOE Technical Office: U.S. Department of Energy Office of Nuclear Energy, Science and Technology NE-20 19901 Germantown Road Germantown, MD 20874-1290		7. Name and Address of Servicing Agency: U.S. Nuclear Regulatory Commission (NRC) One White Flint North 11555 Rockville Pike Rockville, Maryland 20852-2738				
8. Project Title: Advanced Gas Reactor Framework, Technology and Fuel Evaluation						
9. DOE Project Officer (Name, Address, Phone No.): Tom Miller Office of Nuclear Energy, Science and Technology NE-20 19901 Germantown Road Germantown, MD 20874-1290 301-903-7731		10. Servicing Agency Project Officer (Name, Address, Phone No.): Thomas L. King Office of Nuclear Regulatory Research U.S. Nuclear Regulatory Commission Washington, D.C. 20555 Mail Stop: T-10 E50				
11. Project Period: 2/23/01 -12/15/02		12. Budget Period: 2/23/01 -12/15/02				
13. Scope of Work: See Exhibit 1A						
14. Deliverables/Reporting Requirements: See Exhibit 2A						
15. (a) This IA is issued pursuant to the Economy Act of 1932, as amended (31 U.S.C. 1535)		[ X ] Yes   [ ] No				
(b) This IA is issued to provide Financial Assistance support for Project Activities If yes, provide Statutory Authority		[ ] Yes   [ X ] No				
Funds/Obligations		Previous Amount	Amount This	Amended Total		
16. DOE Amount		20,000	480,000.00	500,000.00		
17. DOE In-Kind Amount		0	0	0		
18. Servicing Agency Amount		0	0	0		
19. Servicing Agency In-Kind Amount		0	0	0		
20. Total Project Cost		\$20,000.00	\$480,000.00	\$500,000.00		
21. DOE FUNDS COMMITTED						
22. App Symbol	23. B&R No.	24. Dollar Amt	25. Allot	26. Object	27. AFP	28. CFA
89X0224	AF-37-40	180,000.00 <del>200,000.00</del>	CR1491	253	NE/YA	11685361
89X0224	AF-37-30	300,000.00	CR1491	253	NE/YA	11689712
PROJECT MANAGER/INITIATOR						
29. Name Tom Miller		30. Signature <i>Thomas P. Miller</i>		31. Date 5/7/01		32. Office Code: NE-20
						33. Telephone No.: 3-4517
PROGRAMS OFFICIALS, We hereby certify that the funds cited in items 22-28 are being appropriately used.						
34. Reviewing Official's Name Shane Johnson		35. Signature <i>Shane Johnson</i>			36. Date 5/15/01	
37. Budget Official's Name Wade Carroll		38. Signature <i>Wade Carroll</i>			39. Date 5/15/01	
40. Type of Procurement Action (TPA) Code X1			41. Negotiator Code C103			
42. Security. Will employees require security clearances for performance of this procurement? [ ] Yes [ X ] No						

C/O:

Rec'd 5/29/01

OFFICIAL RECEIPT DATE BY *[Signature]*  
HEADQUARTERS PROCUREMENT SERVICES

43. Energy Policy Act. Is this procurement subject to the Energy Policy Act of 1992 (EPACT); i.e., will it directly satisfy an EPACT requirement or objective?  Yes  No If yes, does it involve either a research and development program or a demonstration of a commercial application?  Yes  No If yes, see the Notice related to this item. Amount of EPACT funding: \_\_\_\_\_

CERTIFYING OFFICIAL, I hereby certify that the funds cited in Item 24 are available.

FORRESTAL FINANCIAL  
OPERATIONS DIVISION

45. Signature

*Diane Wilkin*

46. Date

5/23/01

47. Initiating Official/Local Office Use

Part II - Approved Budget - DOE Contribution  
Plus Servicing Agency Contribution

Doc ID No.: DE-A101-01-NE-23069

48. Budget Categories	Itemization of This Action	Itemization of Previous Actions	Itemization of All Actions to Date
(a) Personnel	\$155,000.00	0	\$155,000.00
(b) Fringe Benefits			
(c) Travel	\$25,000.00	\$20,000.00	\$45,000.00
(d) Equipment			
(e) Supplies			
(f) Procurement/Assistance	\$300,000	0	\$300,000
(g) Construction			
(h) Other			
(i) Total Direct Charges			
(j) Indirect Costs: Rate % Base \$			
(k) Total (DOE Share 100%) (Servicing Agency Share %)	\$480,000.00	\$20,000.00	\$500,000.00

49. Is equipment authorized to be furnished by DOE or leased, purchased, or rented with DOE funds?  Yes  No  
(Identify all equipment costing \$1,000 or more)

50. Are any of these funds being used on contracts and/or financial assistance  Yes  No (See Item 48f)

Type of Contract and/or Financial Assistance  Grant  Cooperative Agreement  Procurement (Includes small purchase order)

Contractor/Recipient Name	Total Extramural Amount Under This Project	Percent Funded by DOE (if known)
TBD	N/A	TBD

Part III - Funding Methods and Billing Instructions

**51. Funds-Out Agreement/Disbursement Agreement**

Reimbursement, or Request for repayment of actual costs must be itemized on OPAC or other Form previously approved by DOE's Contracting Officer and submitted to the U.S. Department of Energy, Accounts Payable Division, PO Box 500, Germantown, MD 20875-0500. Quarterly cost reports will be forwarded to the U.S. Department of Energy, Accounts Payable Division, P.O. Box 500, Germantown, MD 20875-0500.

Monthly  Quarterly  Upon Completion of Work

Advance Only available for use by Federal agencies on working capital funds or with appropriate justification of need for this type of payment method. Unexpended funds at completion of work will be returned to DOE. Quarterly cost reports will be forwarded to the U.S. Department of Energy, Accounts Payable Division, P.O. Box 500, Germantown, MD 20875-0500.

Part IV - Acceptance Conditions

DOE IA ID No. DE-AI01-NE-23069

**52. General Conditions**

The Servicing Agency covenants and agrees that it will expeditiously initiate and complete the project for which funds have been awarded under this agreement.

**Special Conditions:**

A. Patents and Technical Data. Disposition of rights to inventions made in any contract, grant, or cooperative agreement under this Agreement with any small business firm or domestic nonprofit organization will be in accordance with 35 U.S.C. 200-212. In all other contracts, grants, or cooperative agreements under this agreement, the Servicing Agency shall coordinate the disposition of rights to inventions with the DOE Patent Counsel.

B. Issue Resolution. Unless otherwise indicated below, it is expected that programmatic guidance will be handled through discussions between the staff of the Servicing Agency's Project Officer listed on the Face Page, Item 10 and the DOE Project Officer, Face Page, Item 9. Any administrative issues including billing questions, unresolved items or issues requiring a formal change to this Agreement shall be addressed to the DOE Contracting Officer, page 3 of 3, Item 54.

C. Termination. DOE may terminate this Agreement upon 30 calendar days written notice of such termination addressed to the Servicing Agency. In the event of such termination the Servicing Agency shall be reimbursed, to the extent permitted, for obligations actually incurred to the effective date of the termination and for commitments extending beyond the effective date of termination to a date not later than the date upon which the Agreement would have expired if not terminated under this paragraph, which the Servicing Agency, in the exercise of due diligence, is unable to cancel. Payments under this Agreement, including payments under this article shall not exceed the amount(s) committed under this Agreement.

D. Other. Government estimate for the Project Period shown in Block 11 is \$ 500,000.00

**PART V - OFFER AND ACCEPTANCE**

Note: The agreement/modification must be accepted by the Servicing Agency official in duplicate and one original returned to the party named in Item 54. The agreement/modification must be forwarded to the address cited in Item 54 after acceptance signature.

Receipt of a written refusal or failure to return the properly executed document will result in rejection of all payment requests to the DOE's Controller's Office.

DOE IA Awarding and Administrative Office  
(for Administrative Assistance)

DOE Program Office  
(for Technical Assistance)

54. Organization/Address  
U.S. Department of Energy  
Office of Program Services  
Attn: DE-AI01-01-NE-23069  
1000 Independence Avenue, S. W.  
Washington, DC 20585

55. Organization/Address  
Tom Miller, NE-20  
U.S. Department of Energy  
19901 Germantown Road  
Germantown, MD 20874

## Advanced Gas Reactor Technology, Regulation and Fuel Evaluation

As the U.S. Government agency responsible for the development and execution of civilian nuclear energy research and development programs, the Department of Energy (DOE) seeks the assistance of the U.S. Nuclear Regulatory Commission (NRC) to help assess advanced gas reactor technology and fuels to support potential future deployment of these advanced nuclear energy systems in the United States.

### Phase II Activities:

1. Gas Reactor Framework (\$300k) - Conduct work, in coordination with the Department of Energy (DOE) and industry to assess the technical and safety issues associated with the technology that supports advanced high temperature gas reactors (HTGR). New advanced gas reactor concepts such as the Pebble Bed Modular Reactor (PBMR), and the Gas Turbine Modular Helium Reactor (GT-MHR) have been identified by DOE as reactor technologies for possible near-term deployment in the United States. An assessment that addresses the unique features of gas reactor technology and their associated key safety and technical issues affecting HTGRs is necessary.

#### Key Deliverables:

- Identification of technical and safety issues- December 2001
- Identification of resolution paths or methods - September 2002

2. Gas Reactor Analysis Codes V&V (\$100k) - assess adequacy of HTGR safety, transient and neutronics codes for modeling, data and verification.

#### Key Deliverable:

- Report on analysis codes to be used on HTGR designs.

3. Participation in International Gas Reactor Safety Activities (\$60k) - support NRC participation in conferences and meetings on technical and safety issues for HTGRs.

#### Key Deliverables:

- Conference and meeting reports.

4. HTGR Fuel Test Program Development (\$20k) - Assist DOE in the development and implementation of a HTGR Fuel Qualification Program. Activities will include program planning and development, fuel irradiation experiments, tests and analysis specification, identification of performance requirements for advanced gas reactor fuels. Initial tasks involve one technical expert in the planning of the fuel qualification program.

<b>CERTIFICATION</b>		
All signers certify that the statements made on this form and all attachments thereto are true, accurate, and complete.		
Department of Energy Contracting Officer		
56. Signature <i>Richard G. Lewis</i>	Richard G. Lewis Contracting Officer Typed Name and Title	6/6/01 Date
Acceptance by the Authorizing Official on Behalf of the Servicing Agency		
57. Signature	Thomas L. King, Director Division of Risk Analysis and Applications, Office of Nuclear Regulatory Research, NRC Typed Name and Title	Date

<b>1. Program/Project Title</b> Advanced Gas Reactor Technology, Regulation and Fuel Evaluation	<b>2. Identification number</b> DE-AI01-01-NE-23069		
<b>3. Participant Name and Address</b> Thomas L. King Office of Nuclear Regulatory Research U.S. Nuclear Regulatory Commission Washington, D.C. 20555 Mail Stop: T-10 E50			
<b>4. Planning and Reporting Requirements</b>  <b>A. General Managements</b> <input type="checkbox"/> Management Plan <input type="checkbox"/> Status Report <input checked="" type="checkbox"/> Summary Report  <b>B. Schedule/Labor/Cost</b> <input type="checkbox"/> Milestone Schedule/Plan <input type="checkbox"/> Labor Plan <input type="checkbox"/> Facilities Capital Cost of Money Factors Computation <input type="checkbox"/> Contract Facilities Capital and Cost of Money <input type="checkbox"/> Cost Plan <input type="checkbox"/> Milestone Schedule/Status <input type="checkbox"/> Labor Management Report <input type="checkbox"/> Cost Management Report  <b>C. Exception Reports</b> <input type="checkbox"/> Conference Record <input type="checkbox"/> Hot Line Report  <b>D. Performance Measurement</b> <input type="checkbox"/> Management Control System Description <input type="checkbox"/> WBS Dictionary  <input type="checkbox"/> Index <input type="checkbox"/> Element Definition  <input type="checkbox"/> Cost Performance Reports  <input type="checkbox"/> Format 1 - WBS <input type="checkbox"/> Format 2 - Function <input type="checkbox"/> Format 3 - Baseline	<u>Frequenc</u> Y   F	<b>E. Financial Incentives</b> <input type="checkbox"/> Statement of Income and Expense <input type="checkbox"/> Balance Sheet <input type="checkbox"/> Cash Flow Statement <input type="checkbox"/> Statement of Changes in Financial Position <input type="checkbox"/> Loan Drawdown Report <input type="checkbox"/> Operating Budget <input type="checkbox"/> Supplementary Information  <b>F. Technical</b> <input type="checkbox"/> Notice of Energy RD&D Project (Required with any of the following)  <input type="checkbox"/> Technical Progress Report  <input type="checkbox"/> Draft for Review <input type="checkbox"/> Final for Approval  <input type="checkbox"/> Topical Report <input type="checkbox"/> Final Technical Report  <input type="checkbox"/> Draft for Review <input type="checkbox"/> Final for Approval  <input type="checkbox"/> Software <input type="checkbox"/> Other (Specify) _____	<u>Frequenc</u> Y
<b>5. Frequency Codes</b> A - As Required                      M - Monthly                      S - Semi-annually C - Change to Contractual Agreement      O - Once After Award              X - With Proposal/Bid/Application or Changes F - Final (end of effort)                      Q - Quarterly                      Y - Yearly or Upon Renewal of Agreement			
<b>6. Special Instructions (Attachments)</b> <input checked="" type="checkbox"/> Report Distribution List/Addressees <input type="checkbox"/> Reporting Elements <input type="checkbox"/> Due Dates  <input type="checkbox"/> Analysis Thresholds <input type="checkbox"/> Work Breakdown Structure <input type="checkbox"/> Other			



7. Prepared by (Signature and Date)

*Thomas P. Miller*  
Tom Miller Date 5/7/01

8. Reviewed By (Signature and Date)

*Joseph A. Battista for*  
Shane Johnson Date 5/15/01

Addressee:

Tom Miller  
Office of Nuclear Energy, Science and Technology  
NE-20  
19901 Germantown Road  
Germantown, MD 20874-1290  
301-903-4517

As the U.S. Government agency responsible for the development and execution of civilian nuclear energy research and development programs, the Department of Energy (DOE) seeks the assistance of the U.S. Nuclear Regulatory Commission (NRC) to help ~~develop a technical and assess regulatory framework~~ for advanced gas reactor technology to support potential future deployment of these advanced nuclear energy systems in the United States.

Phase II Activities:

*Framework*

*Land fuels*

*Technology Assessment*

*DOE and*

1. Gas Reactor ~~Regulatory Framework~~ (\$300k) - Conduct work, in coordination with industry, ~~leading to the development of policy and regulatory framework for the licencing of high temperature gas reactors (HTGR). The existing regulations have evolved over time for application to light water reactor technology. New advanced gas reactor concepts such as the Pebble Bed Modular Reactor (PBMR), and the Gas Turbine Modular Helium Reactor (GT-MHR) have been identified by DOE as reactor technologies for possible near-term deployment in the United States. A regulatory framework needs to be developed that addresses the unique features of gas reactor technology and the associated licensing requirements. The Gas Reactor Regulatory Framework will include:~~
  - ~~Identification of key policy and technical issues affecting HTGRs~~ *will be performed.*
  - ~~Identification of current licensing criteria that are applicable to HTGR designs.~~
  - ~~Identification of additional licensing criteria unique to HTGR design applications.~~

*associated with the technology that supports*

Key Deliverables:

- ~~Identification of necessary HTGR policy & regulation changes~~ - December 2001
  - ~~Establish HTGR regulatory framework and policy~~ - September 2002
- technical and safety issues*  
*Identificatio of path to resolution*

2. Gas Reactor Analysis Code ~~V&V~~ (\$100k) - ~~initiate development of NRC capability, expertise and confidence with HTGR safety, transient and neutronics codes, for adequacy of modelling, data and verification.~~ *assess*

Key Deliverable:

- ~~Plan for conducting independent activities to verify and validate analysis codes to be used on HTGR designs.~~
- Report on*

3. Participation in International Gas Reactor Safety Activities (\$60k) - support NRC participation in conferences and meetings to ~~establish international safety standards for HTGRs.~~ *on technical and issues*

Key Deliverables:

- Conference and meeting reports.

4. HTGR Fuel Test Program Development (\$20k) - Assist DOE in the development and implementation of a HTGR Fuel Qualification Program. Activities will include program planning and development, fuel irradiation experiments, tests and analysis specification, identification of performance requirements for advanced gas reactor fuels. Initial tasks involve one technical expert in the planning of the fuel qualification program.