

APPENDIX A. U.S. DEPARTMENT OF ENERGY COVER PAGE FOR SMALL BUSINESS INNOVATION RESEARCH (SBIR) AND SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAMS

Select Phase for this Application: Phase I

SOLICITATION NO. Enter Number

Application Number (Phase II ONLY)

DOE Grant Number (Phase II ONLY) Enter Number

09/13/04

NOTICE FOR HANDLING GRANT APPLICATIONS. This submission is to be used only for DOE evaluation purposes. All government and non-Government personnel handling this submission shall exercise extreme care to ensure that the information contained herein is not duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the submission, without the written permission of the offeror (except that if a grant is awarded on the basis of this submission, the terms of the grant shall control disclosure and use). This is a Government notice, and shall not by itself be construed to impose any liability upon the Government or Government personnel for any disclosure or use of data contained in this submission.

TITLE: Complex Coolant Fluid for PEM Cell Systems		Topic No.: 01 Subtopic: a
		Amount Requested (not to exceed Phase I \$100,000 or Phase II \$750,000): \$ 99,670

SMALL BUSINESS

FIRM NAME: Acme, Inc.	I.R.S Entity ID: 01-2345678	Address 123 First St. Suite A	City Anytown
WEB ADDRESS: http://www.acmeinc.com	DUNS #: 012-345-678		State MD
		Zip 20876-4567	

Principal Investigator Dr. John C. Doe Title: Research Scientist Email: doe@acmeinc.com Phone Number: (301) 555-1234 ext. 123	Corporate/Business Authorized Representative Mr. Robert P. Smith Jr. Title: President Email: smith@acmeinc.com Phone Number: (301) 555-1234 ext. 124
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Certification and Acceptance: I certify that the statements herein are true and complete to the best of my knowledge, and accept the obligation to comply with DOE terms and conditions if an award is made as the result of this submission. A willfully false certification is a criminal offense. (U.S. Code, Title 18, Section 1001)

Signature: DR. JOHN C. DOE Date: 9/28/04 Signature: MR. ROBERT P. SMITH, JR. Date: 9/28/04

RESEARCH INSTITUTION

<p>Required for Phase I Only</p> <p>Select from the drop-down field the type of application.</p> <p>If this grant application contains substantial collaboration with a research institution: select whether this application is STTR only or both SBIR and STTR.</p> <p>If this application does NOT use a Research Institution, then select SBIR only.</p> <p>Type of Application: both SBIR and STTR</p>	NAME OF RESEARCH INSTITUTION: University of Science	Amount of Subcontract \$27,500
	Address Department of Contracts 321 Second St. MS-32	City Anytown
		State MD
		Zip 20876-6141
	Certifying Official: Ms. Jane Jones	
	Title: Director of Contracts	
	Email: jones@science.edu	
	Phone number: (301) 555-4895 ext. 25	
<p>Certification: If this grant application is selected for award, I certify that the above research institution will conduct the work herein attributed to it.</p> <p>Signature: MS. JANE JONES Date: 9/28/04</p>		

OTHER SUBCONTRACTORS: INDICATE NAME AND DOLLAR AMOUNT

ABC Testing, \$1,100

CERTIFICATIONS AND QUESTIONS: Y (YES) OR N (NO) (See the DOE Solicitation Reference at the top of the page.)

<p>Y 1. The above applicant organization certifies that it is a small business and meets the definition stated in Section 2.3.</p> <p>Y 2. The applicant small business will comply with the provisions regarding: (1) lobbying, (2) debarment, suspension, and other responsibility matters, and (3) drug-free workplace requirements. (See Certifications Section.) Inability to certify to any or all statements requires explanation.</p> <p>Y 3. The Principal Investigator will have his/her primary employment with the small business at the time of the award.</p> <p>N 4. The application includes a subcontract with a Federal Lab?</p> <p>N 5. The applicant has received more than 15 Phase II SBIR awards in the preceding five fiscal years. (If yes, please provide information requested in Section 3.3.4.)</p>	<p>N 6. The applicant and/or Principal Investigator has submitted applications containing a significant amount of essentially equivalent work under other federal program solicitations, or received other federal awards containing a significant amount of equivalent work? If "yes", the application must include the required information requested in Section 3.3.2i.</p> <p>Y 7. If the proposed project does not result in an award, does the applicant permit the government to disclose the technical abstract of the application, and the name, address, and telephone number of the business official to any inquiring parties?</p> <p>N 8. Is the small business delinquent on any Federal debt? (If "yes," please include an explanation.)</p> <p>Y 9. All research by the applicant, research institution, consultants, and subcontractors will be performed in the United States.</p>
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PROPRIETARY NOTICE (SECTION 5.4) For any purpose other than to evaluate this submission, these data shall be protected to the extent allowed by law and not disclosed outside the Government. The Government shall have the right to duplicate, use, or disclose the data to the extent provided in the grant. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data in this submission subject to this restriction are contained on pages

Describe the problem or situation being addressed - be sure that the DOE interest in the problem is clear. (Typically, one to three sentences)

Due to the inherent inefficiencies of Proton Exchange Membrane (PEM) fuel cell stacks, a coolant must be used to remove the waste heat produced by the fuel cell. Deionized (DI) water or glycol/water solutions with a deionizing filter are commonly used as a fuel cell system coolant. Although these fluids are non-flammable and thermophysically efficient, the electrical conductivity increases rapidly, requiring frequent replacement of the deionizing filters and increasing fuel cell operating costs.

How is this problem being addressed? - i.e, What is the overall approach of the combined Phase I/Phase II project? (Typically, one to two sentences).

This problem will be addressed by developing a complex coolant fluid comprised of a base composition and an additive package. The base composition addresses the non-flammability, heat transfer, freezing point, and materials compatibility issues, whereas the proposed additive package will maintain the electrical conductivity of the coolant below a certain level for 2 to 3 years.

For Phase I grant applications: What is planned for Phase I? For Phase II: What was done in Phase I? (Typically, two or three sentences).

In Phase I, key ingredients of the additive package will be prepared and incorporated into the coolant fluid. The resultant complex coolant fluid formulations will be tested in a dynamic loop to determine the effectiveness of the additives in keeping the electrical conductivity of the coolant below 2 $\mu\text{S}/\text{cm}$.

For Phase I grant Applications: Leave blank. For Phase II grant applications: What is planned for the Phase II project? (Typically, two to three sentences.)

Commercial Applications And Other Benefits as described by the applicant. (Limit to space provided).

The new complex coolant fluid should significantly expand the versatility of the PEM fuel cells in both mobile and stationary applications by offering the advantages of freeze protection, corrosion inhibition, and low electrical conductivity in a single aqueous-based fluid, attributes that are not available in competitive alternates. The commercial applications include, but are not limited to, automotive fuel cell engines, power generation for residential and commercial buildings, back-up power for hospitals and other emergency establishments, fuel cells used in ships and space vehicles, and mobile machinery and equipment.

Key Words:

Proton Exchange Membrane, PEM, fuel cell, coolant, fluid

Summary For Members Of Congress: (Layman's Terms, Two Sentences Max.)

Proton Exchange Membrane (PEM) fuel cells can provide clean, efficient energy for a variety of applications (light duty transportation, portable power, distributed generation), but there are problems with the coolant used to remove the waste heat. This project will develop a complex coolant fluid to address these problems, leading to decreased fuel cell operating costs.

GRANT APPLICATION BUDGET

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT THIS FORM

A. PERSONNEL (Employees) NAME	ROLE IN PROJECT	EST. HOURS	HOURLY RATE	FRINGE BENEFITS	TOTAL COST
John Doe	Principal Investigator	288	\$55.00	1.10	\$17,424.00
Jane Smith	Physicist	190	\$45.00	1.10	\$9,405.00
William Gordon	Technician	120	\$25.00	1.10	\$3,300.00
Susan Phillips	Technician	50	\$15.00	1.10	\$825.00
				1.00	\$0.00
				1.00	\$0.00
TOTAL PERSONNEL COST					\$30,954.00
B. CONSULTANTS NAME	ROLE IN PROJECT	EST. HOURS	HOURLY RATE		
Felix Conrad	Consultant	40	\$50.00		\$2,000.00
C. LEASED EQUIPMENT (Specify Time and Rate, or Other Basis)					
ITEM Oscillator 5 months @ 1000/month					\$5,000.00
D. PURCHASED EQUIPMENT					
ITEM Power Supply				AMOUNT \$5,000.00 \$0.00 \$0.00	\$5,000.00
E. TRAVEL 1 trip for P.I. to U. of Science for 3 days					\$1,000.00
F. OTHER DIRECT COSTS					
1. Materials and Supplies				\$500.00	
2. Publication Costs				\$0.00	
3. Testing Services (Including work at Government Installations)				\$0.00	
4. Computer Services				\$0.00	\$29,100.54
5. Research Institution University of Science				\$27,500.53	
6. Other Subcontracts ABC Testing				\$1,100.01	
7. Other				\$0.00	
G. TOTAL DIRECT COSTS (A through F)					\$73,054.54
H. INDIRECT COST (Specify Rate and Base) OH @ 50% of \$30,954 (Direct Labor plus fringe) = \$15,477 G&A @ 10% of \$73,054 (Total Direct Costs) = \$7,305					
TOTAL INDIRECT COSTS					\$22,782.00
I. TOTAL COSTS (G plus H)					\$95,836.54
J. FEE OR PROFIT			Enter percentage (as decimal) to calculate based on TOTAL COST (Item I)	4.00%	\$3,833.46
K. TOTAL AMOUNT OF THIS REQUEST (Item I plus J)					\$99,670.00
L. Has any executive agency of the United States Government performed any review of your accounts or records in connection with any other grant or contract within the past year? Select Yes or No: Yes If Yes, give name, address, and phone number of reviewing office and official: DCAA, Washington, D.C., Walter Walter, (202) 555-4444					

FOR PHASE I APPLICATIONS ONLY

Applicant: Acme, Inc.

APPLICATION CHECKLIST

APPENDIX D

09/13/04

(Not Counted in the 25-page Limitation)

DOES THE APPLICATION SATISFY THE FOLLOWING REQUIREMENTS:

Use Drop-down
Menus

- | | |
|--|------------|
| √ DUNS # on cover page, if appropriate. | Yes |
| √ One, and only one, topic from the Technical Topics Section identified on the cover page. | Yes |
| √ One, and only one, subtopic from the Technical Topics Section identified on the cover page. | Yes |
| √ The cover page is completed and signature blocks filled with ALL CAPITAL NAME OF SIGNING AUTHORIZING PARTIES. | Yes |
| √ Principal Investigator will work a minimum of 195 hours or at least 5 hours/wk on the project. | Yes |
| √ All certifications and questions on cover page marked <u>Y (Yes)</u> or <u>N (No)</u> . | Yes |
| √ Amount requested from Government is not in excess of Phase I (\$100,000) or Phase II (\$750,000) limit. | Yes |
| √ Abstract contains no proprietary information and does not exceed space provided on the Project Summary Page (Appendix B). | Yes |
| √ Main Text (technical content) is included as requested in Section 3.3.2 | Yes |
| √ Application should not be more than 25 pages. However, this checklist (Appendix D) and the Documentation of Multiple Phase II Awards (Section 3.3.4) will not be included in the 25-page count. | Yes |
| √ No font smaller than 12 point times new roman in main text. | Yes |
| √ Level of effort in compliance with Section 3.3.1c. (For SBIR, the small business must perform at least 2/3 of the research and analytical effort. For STTR, the small business must perform at least 40% and the research institution must perform at least 30%.)* | Yes |

* For grant applications that are to be considered for both SBIR and STTR, prepare the grant application to meet the requirements of the SBIR Program. If the application is selected for STTR, budgetary adjustments can be completed during the negotiation period before the grant begins.

ATTENTION: GRANT APPLICATIONS NOT MEETING ALL THE ABOVE REQUIREMENTS WILL BE DECLINED WITHOUT FURTHER ACTION.

STATISTICAL INFORMATION

Use Drop-down
Menus

- | | |
|---|-----------|
| The proposing firm certifies that it is a socially and economically disadvantaged small business. | No |
| The proposing firm certifies that it is a woman-owned small business. | No |
| The proposing firm is located in a HUB Zone. | No |

WORKSHEET

For calculating the percent of the research and analytical effort performed by the small business, the research institution, if any, and other consultants or subcontractors.

	Small Business	Research Institution (if any)	Other Consultants and/or Subcontractors	TOTAL
(1) Total Value of Project	<i>(A+C+D+E+F1+F2+F7+H+J)</i> 69,069	<i>(F5)</i> 27,501	<i>(B+F3+F4+F6)</i> 3,100	<i>(line I + line J from budget page)</i> 99,670
(2) Value of leased, purchased, or in-kind equipment, and materials & supplies	<i>(lines C+D+F1 from budget page)</i> 10,500	(Applicable portion of Research Institution's subcontract) 0	(Applicable portion of consultant and/or other subcontracts) 0	 10,500
(3) = (1) - (2) Research or analytical effort	58,569	27,501	3,100	89,170
(4) Percentages (Divide entries on line (3) by total for line (3).)	66%	31%	3%	100%

NOTE: You may include commercial and/or in-kind contributions on this worksheet to determine the level of effort performed by all parties. We realize that the total value of the project may exceed the Phase I limit of \$100,000 or Phase II limit of \$750,000. However, the total request from DOE (Line K) must not exceed for Phase I (\$100,000) or Phase II (\$750,000) limit.