

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification							DATE: February 2005	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4					R-1 ITEM NOMENCLATURE 0603724N Navy Energy Program			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	4.572	7.719	1.595	1.607	1.591	1.755	1.805	1.860
0838/Mobility Fuels	1.694	1.479	1.595	1.607	1.591	1.755	1.805	1.860
2868/Proton Exchange Membrane Fuel Cells	2.878	2.774						
9498/Megawatt Molten Carbonate Fuel Cell Demo		3.466						

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

0848/Mobility Fuels - This program supports projects to evaluate, adapt, and demonstrate energy related technologies for Navy aircraft and ship operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) reduce energy costs; (c) apply energy technologies that improve environmental compliance; (d) relax restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels when military specification fuels are unavailable or in short supply; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. This program supports the achievement of legislated, White house, Department of Defense, and Navy Energy Management Goals. It also responds to direction from the Office of the Secretary of Defense, the Secretary of the Navy, and the Chief of Naval Operations to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure.

2868/Proton Exchange Membrane Fuel Cells - This is a Congressional add. Manufacture 12 Proton Exchange Membrane (PEM) Fuel Cell systems, install at Navy facility in Hawaii to be determined (TBD), operate for 12 months, collect and report performance data, remove systems and return sites to original condition. The purpose of the field test is to demonstrate the reliability and life of PEM fuel cell systems that incorporate an advanced membrane electrode assembly that enhances producibility, performance, and reduces cost. The military requirement addressed is the facility requirement for electrical power and the need to find alternative, affordable energy sources.

9498/Megawatt (MW) Molten Carbonate Fuel Cell Demo - This is a Congressional add. Design and manufacture one 1 MW molten carbonate fuel cell and install at a Navy facility in California TBD, operate for 12 months, collect and report performance data. The purpose of the field test is to demonstrate the feasibility of the molten carbonate fuel cell to interface with the associated power electronics for electrical grid connection and provide reliable electrical power. The military requirement addressed is the facility requirement for electrical power and the need to find alternative affordable energy sources.

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Exhibit R-2, RD TEN Budget Item Justification
(Exhibit R-2, page 1 of 13)

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-04	PROGRAM ELEMENT NUMBER AND NAME 0603724N Navy Energy Program				PROJECT NUMBER AND NAME 0838 Mobility Fuels			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	1.694	1.479	1.595	1.607	1.591	1.755	1.805	1.860

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides data through engine and fuel system tests which relate the effects of changes in Navy fuel procurement specification properties to the performance and reliability of Naval ship and aircraft engines and fuel systems. This information is required to: (a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; (b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military specification fuels are unavailable or in short supply; and (c) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. Recent problems with fuel quality have adversely affected ship and aircraft system performance and reliability and resulted in degradation of fuel in storage. The resulting readiness impacts, additional maintenance costs, and the cost of lost equipment, although difficult to quantify, are many times the cost of this product. Over the next decade, the potential for fuel quality related problems will increase because of changing industry practices required to comply with new environmental regulations. This project represents the only investment designed to maintain the Navy's ability to operate as a "smart" customer for fuels that cost over \$2.5 B per year for procurement, transport, storage and consuming and are essential to fleet operations.

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B. Accomplishments/Planned Program <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 04</th> <th style="width: 15%;">FY 05</th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> </tr> <tr> <td>Aircraft Fuels</td> <td>0.714</td> <td>0.700</td> <td>0.795</td> <td>0.800</td> </tr> </table> <p style="margin-top: 10px;">Performs development, test and evaluation work on Naval aircraft fuels to: a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; b) provide guidance to fleet operators for the safe use of military aircraft that include new additives or are from new sources including synthetics; and c) make needed periodic changes to the fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry.</p> <p>Continued development and evaluation of JP-5 copper contamination removal system. Initiated development of an equipment/fuel qualification procedure to evaluate and approve synthetic aircraft fuels. Completed evaluation of impacts of copper contamination on aircraft engine maintenance/performance.</p> <p>Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra clean, low sulfur jet fuels. Continue development and evaluation of JP-5 copper contamination removal system. Initiate development of shipboard-based sensors and instruments to rapidly determine critical jet fuel properties. Implement +100 thermal stability enhancing jet fuel additive across T-45 (Training aircraft fleet) fleet for shore-based application.</p> <p>Continue development of JP-5 copper contamination removal system. Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra-clean, low sulfur jet fuels. Continue development of shipboard-based sensors and instruments to rapidly determine critical jet fuel properties.</p> <p>Conduct field trial of copper contamination system. Continue development of shipboard-based sensors and instruments to rapidly determine critical jet fuel properties. Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra-clean, low sulfur jet fuels.</p>						FY 04	FY 05	FY 06	FY 07	Aircraft Fuels	0.714	0.700	0.795	0.800
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B. Accomplishments/Planned Program				
	FY 04	FY 05	FY 06	FY 07
Ship Fuels	0.980	0.779	0.800	0.807
<p>Performs development, test and evaluation work on Naval ship propulsion fuels to: a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military fuels are unavailable or in limited supply; and c) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accomodating evolutionary changes in the fuel supply industry.</p> <p>Continued assessment of the feasibility of specifying JP-5 (jet fuel) as the single fuel at sea for use by all Naval Systems (ships, aircraft and ground equipment). Continued review of the F-76 ship distillate fuel specification and test requirements evaluation to remove any unnecessary requirements to increase availability. Completed development and acceptance of commercial fuel specification American Society For teh Testing of Materials (ASTM D6985 Specification For Middle Distillate Fuel Oil- Military Marine Applications). Initiated development of a qualification procedure to evaluate and approve utilization of synthetic and ultr-clean. low sulfur ship fuels.</p> <p>Complete assessment of the feasibility of specifying JP-5 as the Single Fuel at-sea for use by all Naval Systems (ships, aircraft and ground equipment). Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra clean, low sulfur ship fuels. Complete F-76 specification and test requirements evaluation to determine, modify and/or remove any unnecessary requirements to increase availability.</p> <p>Conduct JP-5 single fuel at sea iniative field trial. Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra-clean, low sulfur ship fuels. Initiate development of shipboard-based sensors and instruments to rapidly determine critical ship fuel properties.</p> <p>Initiate Implementation of JP-5 as Single Naval Fuel At-Sea. Continue development of a qualification procedure to evaluate and approve utilization of synthetic and ultra-clean, low sulfur ship fuels. Continue development of shipboard-based sensors and instruments to rapidly determine critical ship fuel properties.</p>				

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COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	2.878	2.774						
RDT&E Articles Qty		12						
<p>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This is a Congressional add. Manufacture of 12 Proton Exchange Membrane (PEM) Fuel Cell systems, install at Navy facility in Hawaii to be determined (TBD), operate for 12 months, collect and report performance data, remove systems and return sites to original condition. The purpose of the field test is to demonstrate the reliability and life of PEM fuel cell systems that incorporate an advanced membrane electrode assembly that enhances producibility, performance, and reduces cost. The military requirement addressed is the facility requirement for electrical power and the need to find alternative, affordable energy sources. Project value includes potential for cost savings, environmental mitigation, and energy security for electrical power production.</p>								

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APPROPRIATION/BUDGET ACTIVITY RDTE, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603724N Navy Energy Program	PROJECT NUMBER AND NAME 2868 Proton Exchange Membrane		

C. PROGRAM CHANGE SUMMARY:

	FY 04	FY 05	FY 06	FY 07
Funding:				
Previous President's Budget:	2.942	0.000		
Current BES/President's Budget	2.878	2.774		
Total Adjustments	-0.064	2.774		
Summary of Adjustments				
Congressional program reductions				
Congressional undistributed reductions		-0.025		
Congressional rescissions				
SBIR/STTR Transfer	-0.061			
OSD		-0.001		
Navy (FMB/Sponsor/NAVAIR)	-0.003			
Economic Assumptions				
Reprogrammings				
Congressional increases		2.800		
Subtotal	-0.064	2.774		
Schedule:				
Not Applicable				
Technical:				
Not Applicable				

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D. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>To Complete</u>	<u>Total Cost</u>
N/A										
E. ACQUISITION STRATEGY:										
Program management and acquisition by Naval Air Warfare Center Weapons Division (NAWCWD). Technical management by NAWCWD. Contracting strategy is sole source firm fixed price contract with Hoku Scientific of Honolulu HI.										

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COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost		3.466						
RDT&E Articles Qty		1						
<p>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This is a Congressional add. Design and manufacture one 1 Megawatt molten carbonate fuel cell and install at a Navy facility in California (TBD), operate for 12 months, collect and report performance data. The purpose of the field test is to demonstrate the feasibility of the molten carbonate fuel cell to interface with the associated power electronics for electrical grid connection and provide reliable electrical power. The military requirement addressed is the facility requirement for electrical power and the need to find alternative, affordable energy sources. Project value includes potential for cost savings, environmental mitigation, and energy security for electrical power production.</p>								

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<p>C. PROGRAM CHANGE SUMMARY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 35%;"></th> <th style="text-align: right; width: 10%;">FY 04</th> <th style="text-align: right; width: 10%;">FY 05</th> <th style="text-align: right; width: 10%;">FY 06</th> <th style="text-align: right; width: 10%;">FY 07</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Previous President's Budget:</td> <td></td> <td style="text-align: right;">0.000</td> <td></td> <td></td> </tr> <tr> <td>Current BES/President's Budget</td> <td></td> <td style="text-align: right;">3.466</td> <td></td> <td></td> </tr> <tr> <td>Total Adjustments</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">3.466</td> <td></td> <td></td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td> Congressional program reductions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Congressional undistributed reductions</td> <td></td> <td style="text-align: right;">-0.033</td> <td></td> <td></td> </tr> <tr> <td> Congressional rescissions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> SBIR/STTR Transfer</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> OSD</td> <td></td> <td style="text-align: right;">-0.001</td> <td></td> <td></td> </tr> <tr> <td> Navy (FMB/Sponsor/NAVAIR)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Economic Assumptions</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Reprogrammings</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Congressional increases</td> <td></td> <td style="text-align: right;">3.500</td> <td></td> <td></td> </tr> <tr> <td> Subtotal</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">3.466</td> <td></td> <td></td> </tr> <tr> <td colspan="5" style="padding-top: 20px;">Schedule:</td> </tr> <tr> <td> Not Applicable</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="5" style="padding-top: 20px;">Technical:</td> </tr> <tr> <td> Not Applicable</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						FY 04	FY 05	FY 06	FY 07	Funding:					Previous President's Budget:		0.000			Current BES/President's Budget		3.466			Total Adjustments		3.466			Summary of Adjustments					Congressional program reductions					Congressional undistributed reductions		-0.033			Congressional rescissions					SBIR/STTR Transfer					OSD		-0.001			Navy (FMB/Sponsor/NAVAIR)					Economic Assumptions					Reprogrammings					Congressional increases		3.500			Subtotal		3.466			Schedule:					Not Applicable					Technical:					Not Applicable				
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R-1 SHOPPING LIST - Item No. 63

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Exhibit R-2, RD TEN Budget Item Justification
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