APPLICANT – ALASKA FISHERIES DEVELOPMENT FOUNDATION

Project Title – Determining Fuel Savings for Fuel Catalysts Deployed in the Seafood Industry

Partner –
University of Alaska Sea Grant
Marine Advisory Program

March 9, 2012

Total Project Cost:	Grant Funds Requested:	Match Committed:
$202,000	$166,000	$36,000

Alaska Fisheries Development Foundation, Inc.

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PREVIOUS PROJECTS/APPLICATIONS: N/A

Abstract

1) **Project Summary**

a. Project Description:

Alaska Fisheries Development Foundation (AFDF) will conduct cooperative research with the seafood industry and in partnership with the University of Alaska Sea Grant Marine Advisory Program (MAP). This project will test a brand of fuel catalysts on diesel engines deployed in the seafood industry to determine fuel savings rates, will analyze fuel samples before and after exposure to the catalyst, and will provide outreach regarding results to the seafood industry and communities in Alaska.

b. Project Eligibility:

This project is eligible for funding under this grant, because it fulfills the requirement to be commercial ready within five years (the fuel catalyst is already commercially available) and also fits the following three categories listed in the RFA:

i. **Test emerging energy technology** – This project will specifically conduct a third-party test of the fuel savings rates of fuel catalysts deployed in the seafood industry.

ii. **Improve an existing energy technology** – This project will improve on a very common energy technology - diesel engines – through the use of a new technology designed to improve the fuel efficiency of diesel engines.

iii. **Deploy an existing technology that has not previously been demonstrated in the state** – This project will begin to deploy a new energy technology in the Alaska seafood industry which, to the best of our knowledge, is not being currently used by fishermen or processors in Alaska. [In full disclosure, a handful of units were ordered during Pacific Marine Expo in (Nov., 2011) by fishermen and are expected to be operational in summer 2012.]

c. Project Innovation:

Energy technology companies supplying fuel catalysts claim the catalysts transform diesel into superior fuel, allowing combustion diesel engines to extract the maximum amount of energy with minimal emissions, thereby producing fuel savings, less pollution, and increased longevity of engines. The fuel catalyst is a poly metallic alloy that reformulates fuel molecules of gasoline, diesel, heating oil, and kerosene. The fuel catalyst uses a solid media over which the fuel is passed causing a subtle reaction which changes the structure of the molecules to a state that allows a more thorough combustion. Energy technology companies claim the following benefits to using fuel catalysts: improved octane in gasoline, improved cetane and lubricity in diesel, reduced emissions and soot build-up, extended engine longevity, reduced overall engine maintenance, and increased fuel savings. One energy technology company has patented a fuel catalyst with a simple installation process in the fuel line, similar to a fuel filter. A single catalyst is warranted to perform for 10,000 engine hours, and the company produces varying model units depending upon the displacement size of the engine, with costs ranging from $300 - $10,000. The company has produced internal testing and documentation showing fuel savings in the ranges of 3-11%, however, these results were either produced by the company or paid for by the company.

This project will focus on producing third-party verification of this energy technology's ability to produce fuel savings, which lower operating costs and reduce carbon footprint.

d. **Priority:**
This project meets all four priority categories. 1) AFDF is an Alaska organization (more information about AFDF included under section 4 – Project Team Qualifications). 2) AFDF is working in partnership with the University of Alaska Sea Grant Marine Advisory Program (MAP). 3) The project is supported by in-kind industry partnerships. Participating seafood processing companies will dedicate staff time and tender vessel time to the project. Participating energy technology companies will dedicate staff time and staff travel to the project. 4) If results are successful, the project has high potential for widespread deployment in the state due to the simplicity of the technology, the ease of adaptation, the relatively low capital investment, the decrease in operating costs, and the high number of diesel engines currently in use.

2) <u>Technology Validation and Research Methodology</u>

a. **Objectives:**
This project has three objectives: 1) test a brand of fuel catalyst on diesel engines deployed in the seafood industry in order to determine fuel savings rates, 2) analyze fuel samples before and after exposure to the catalyst in order to determine effects of catalyst to fuel over time, and 3) provide outreach regarding results to the seafood industry and municipalities in Alaska. The fuel catalyst has been identified as an appropriate energy technology for this project based upon prior background research. Energy technologies applicable to the seafood industry were identified and each was given consideration against the following criteria: 1) to what extent are there documented results of fuel savings, 2) how complicated is the installation and maintenance of the technology on fishing vessels and in seafood processing plants, and 3) if there are any documented results of fuel savings, do the benefits outweigh the costs of the technology. The fuel catalyst rated high when considered against these criteria.

b. Methodology:
AFDF and MAP will determine which brand of fuel catalyst is most appropriate. AFDF will develop and conduct an application process in order to select seafood processing companies who wish to cooperate in this research by volunteering their engineer and tender vessels time (in-kind services) to conduct the trials in exchange for ownership of the equipment at the completion of the project. A goal of the project is to deploy and test the technology in several areas of operation in the seafood industry. For purposes of planning, the scope will encompass 3-5 processing plants, and 5-10 tender vessels. (Cost estimates have been received from an energy technology company and are included in the budget summary, however, exact costs will depend upon the total number of engines tested, and the exact specifications of each engine.) Appropriate equipment will be acquired by AFDF. After completion of the project, ownership of the catalyst units will transfer to participating seafood processing companies or tender vessel owners in order to provide for long-term deployment of equipment. Exact testing methodology will be designed by a cooperative working group comprised of representation from the seafood processing company (plant/vessel engineer), the MAP, and AFDF, with technical information being supplied by the energy technology company. This working group will set up parameters for the

collection of the baseline data and the comparative tests using the fuel catalyst. Tests of fuel saving technologies will be conducted in order to determine the difference in fuel consumption (fuel saving rates) of each engine with the new equipment. The equipment will be installed on selected vessels and plants with support by a representative of the energy technology company (in-kind services). The seafood processing company and MAP agent will oversee installation of equipment and conducting of tests. Every effort will be made to keep the independent variables (i.e. distance, weather, load, RPMs, balance, tide, time) constant during the experiments, while the dependent variable (the fuel used) is measured in each trial. Data will be collected in cooperation between the seafood processing company, the MAP agent, and/or AFDF. Fuel samples will be taken from three different tank sources throughout project locations. Samples will be labeled by source and associated engine, then shipped to appropriate fuel testing company, where an analysis of the chemical properties of the fuel samples will be conducted prior to and after exposure to the catalyst. Outreach will be conducted by AFDF and MAP through posting of results on both organizations' websites, as well as on the new interactive web tool AEA is designing. Results will be distributed to communities via a report and/or presentations on the project to the Alaska Regional Development Organizations (ARDORs).

3) Summary of Project Schedule and Summary of Project Budget

Project Schedule	2012	2013				2014	
Objectives	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**
Acquire equipment, form working group, design exact methodology	x	x					
Test catalyst to determine fuel savings rates		x	x	x	x		
Analyze fuel samples to determine effects of catalyst				x	x		
Conduct outreach regarding results in Alaska					x	x	x

Budget Summary			
Cost Categories	**Grant Funds Requested**	**In-Kind**	**Total Project Costs**
Personnel Salaries/Benefits	$ 61,500	$ 15,000	$ 76,500
Travel	$ 10,000	$ 6,000	$ 16,000
Equipment	$ 50,000	$ -	$ 50,000
Supplies	$ 2,500	$ -	$ 2,500
Contractual	$ 25,000	$ -	$ 25,000
Other	$ -	$ 15,000	$ 15,000
Indirect Costs	$ 17,000	$ -	$ 17,000
Total Project Costs	**$ 166,000**	**$ 36,000**	**$ 202,000**

4) Project Team Qualifications

Applicant: Alaska Fisheries Development Foundation (AFDF). Founded in 1978, AFDF is a collaboration of harvesters, processors and Alaskan coastal communities dedicated to identifying problems common to the Alaska commercial fishing industry and developing efficient, sustainable solutions. AFDF is a

501(c) 3 non-profit and has a Board of Directors which is representative of fishermen, processors and the fishing support sector. Below are examples of AFDF projects related to energy efficiency: sponsored conferences such as "Energy Use In Fisheries" (Seattle, Nov. 2010) and "International Conference on Seafood Technology" (Anchorage, May 2010), and developing fishing vessel energy audit pilot project including determining baseline end-use energy consumption data.

Lead Principle Investigator: James Browning, AFDF. Browning has over 25 years experience in fisheries management and research working for the Alaska Department of Fish and Game (ADFG). Browning is currently the Executive Director of AFDF where he has managed research projects, personnel, and numerous grant projects totaling over $2 million.

Co-Principle Investigator: Terry Johnson, Alaska Sea Grant Marine Advisory Program (MAP). Johnson is currently a Professor of Fisheries at the University of Alaska Sea Grant MAP. Johnson has been with the University for twenty years and most recently has written several publications for the University regarding fuel efficiency on fishing vessels - *Fuel-Saving Measures for Fishing Industry Vessels* (2011), and *Fishing Vessel Energy Efficiency Self-Audit Workbook* (2011). Johnson has also been a speaker on this topic at the Pacific Marine Expo (2011) and the International Energy Efficiency in Fisheries Symposium (2010).

Grant Manager: Zoya Ponomareva, AFDF. Ponomareva has over 10 years of analytical, financial, project and operations management experience, with over 8 years in non-profit sector. She has successfully managed projects with budgets ranging between $8,000 and $8.5 million. She is responsible for all aspects of daily operations of AFDF such as accounting, human resource management, grant management and reporting, as well as ensuring compliance with all federal, state, local regulations and AFDF's by-laws.

Outreach: Julie Decker, AFDF. Decker has 17 years of experience working in the Alaska seafood industry and is currently working as Development Director at AFDF. Her family owns and operates a commercial fishing vessel in Southeast Alaska. Decker has a bachelor's degree and completed coursework for the UAS Master of Public Administration with a concentration in natural resource policy. Decker has also served on various boards and committees (i.e. United Fishermen of Alaska, Southeast Conference, AFDF, Wrangell Economic Development Committee, and the SE Ocean Products Cluster).

5) **Discussion of Commercialization of Funded Technology**

This project will advance the commercialization of fuel catalysts in three ways: 1) by deploying fuel catalysts in the seafood industry in Alaska, 2) by providing third-party validation of fuel savings rates and changes to fuel composition, 3) by providing outreach in Alaska (within the seafood industry and municipalities) regarding effectiveness of fuel catalysts at reducing fuel consumption. The key to commercial acceptance of fuel catalysts is third-party validation under circumstances which are similar to what the consumer might expect. At a recent presentation made to the Board of Directors of the United Fishermen of Alaska (UFA), industry expressed a need for this type of information in making investment decisions regarding energy efficiency upgrades. Conversely, without this information, industry is hesitant about making investments in energy technology.

6) **Signed Applicant Certification**

"By signature on this application, I certify that we are complying and will comply with the amount of matching funds being offered."

James Browning, Executive Director, AFDF — 3/7/2012 Date