AEA-09-004 - RENEWABLE ENERGY GRANT APPLICATION

CHIGNIK LAGOON HYDROELECTRIC PROJECT

October 8, 2008

prepared for

CHIGNIK LAGOON POWER UTILITY

PO Box 130

Chignik Lagoon, Alaska 99565

prepared by

polarconsult alaska, inc.

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Table of Contents

SECTION 1. - APPLICANT INFORMATION

Name	Chignik Lagoon Power Utility (CLPU)
Type of Entity:	Public Utility
Mailing Address	PO Box 31 Chignik Lagoon, AK 99565
Physical Address	PO Box 31 Chignik Lagoon, AK 99565
Telephone	907-840-2277
Fax	
Email	diana.clpu@ak.net

1.1. Applicant point of contact

Name	Diana Moore Chignik Lagoon Power Utility
Title:	Project Manager
Mailing Address	PO Box 31 Chignik Lagoon, AK 99565
Telephone	907-840-2277
Fax	
Email	diana.clpu@ak.net

1.2. Applicant minimum requirements

As an Applicant, we are: (put an X in the appropriate box)

X	An electric utility holding a certificate of public convenience and necessity under AS 42.05, or
	An independent power producer, or
	A local government, or
	A governmental entity (which includes tribal councils and housing authorities);

Endorsements

Yes	Attached to this application is formal approval and endorsement for its project by its board of directors, executive management, or other governing authority. If a collaborative grouping, a formal approval from each participant's governing authority is necessary. (Indicate Yes or No in the box)
Yes	As an applicant, we have administrative and financial management systems and follow procurement standards that comply with the standards set forth in the grant agreement.
Yes	If awarded the grant, we can comply with all terms and conditions of the attached grant form. (Any exceptions should be clearly noted and submitted with the application.)

SECTION 2. - PROJECT SUMMARY

2.1. Project Type

Hydropower project - Feasibility, Design, and Permitting

2.2. Project Description

The Chignik Lagoon Hydroelectric Project is located on Packers Creek in Chignik Lagoon. The 190 kW project can provide for most of the communities current power needs, which peak at about 125 kW. The plant would eliminate about 85% of 50,000 gallons of diesel consumed by the generators annually. There will also be excess energy that could be used for heating the school and other local structures. The project would also enable the community to add a freezer/processing facility to further improve the local economy.

2.3. Project Budget Overview

The first tasks for CLPU will be to get the project engineer to perform all the necessary surveying, geology investigation, and final design. The surveying may be accomplished using either lidar or traditional on the ground topographical methods. The cost for either method is about the same. The geology investigation is required to determine footing requirements for the powerhouse and to design and anchor the pipeline system. Once all field data is collected, the final project design can proceed.

A construction cost estimate will then be prepared so that CLPU will know how much, if any, additional funds may be required to construct the Project. Permits will then be applied for while CLPU, in conjunction with the engineer, will then decide on a construction method – whether to put the Project out to bid or to hire local labor with an experienced construction supervisor and engineer to oversee the work.

Total Project costs are estimated to be about $1.9 million. The work in this grant represents about $150,000 of that total.

2.4. Project Benefit

The hydroelectric power generating system on Packers Creek will allow for improvements to the local infrastructure and alleviate economic hardships by offsetting the ever-increasing costs of diesel generated electric power. Environmentally, renewable energy will significantly reduce the necessity of hauling, storing, and consuming fossil fuels. The permitting of project will be simple because the land is locally owned. There are no unusual terrain or other factors that will make construction difficult. There is even equipment within the community to construct the plant. All of the local residents strongly support this project.

The project is expected to displace 42,500 gallons of fuel. The last purchase price for fuel, in May of 2008, was $4.62/gallon. This equates to a savings of about $196,000 per year. Over the life of the project, 30 years, this savings has a present value of $3.8 million using a net rate of 3% (5% discount, 2% inflation).

2.5. Project Cost and Benefit Sumary

2.5.1 - Total Project Cost	$1,900,000
2.5.2 - Grant Funds Requested in this application	$150,000
2.5.3 - Other Funds to be provided (Project match)	

2.5.4 - Total Grant Costs (sum of 2.5.2 and 2.5.3)	$150,000
2.5.5 - Estimated Benefit (Savings)	$3,800,000
2.5.6 - Public Benefit	$2,000,000

SECTION 3. - PROJECT MANAGEMENT PLAN

3.1. Project Manager

The owner and developer of the Project is the Chignik Lagoon Power Utility. Diana Moore has performed exceptionally well as the head of CLPU. CLPU will contract with Polarconsult to provide design services and construction management. Polarconsult has extensive experience in the construction of small hydroelectric systems in Alaska. Included in the supplementary information is some information on Polarconsult's experience with hydroelectric project design and construction.

3.2. Project Schedule

Permitting work will begin immediately after the grant is awarded. Initial surveying and other fieldwork will be performed in the early summer of 2009. Design work will begin in the fall of 2009 and should be completed by early 2010.

3.3. Project Milestones

The basic project milestones, based on the schedule shown above, are the following:

- Apply for permits.
- Install a stream gage.
- Perform lidar or gps survey of the project area.
- Check geology along the project centerline.
- Complete project design and cost estimate.

3.4. Project Resources

CLPU plans to contract with Polarconsult for this Project. Polarconsult has extensive experience working on small hydroelectric projects. Additionally, Polarconsult has done stream gaging and a feasibility study for a hydroelectric project in Chignik Lagoon. Daniel Hertrich will serve as Polarconsult's project manager. A Polarconsult brochure and resume for Daniel Hertrich is attached.

3.5. Project Communications

Diana Moore of CLPU will be the primary point of communications. She will coordinate all efforts between the AEA and CLPU consultant. CLPU will require such progress reports as needed to track the progress of it's consultant. CLPU will also require backup for all invoices including timesheets and receipts. CLPU will forward all information and any other required information to the grant administrator.

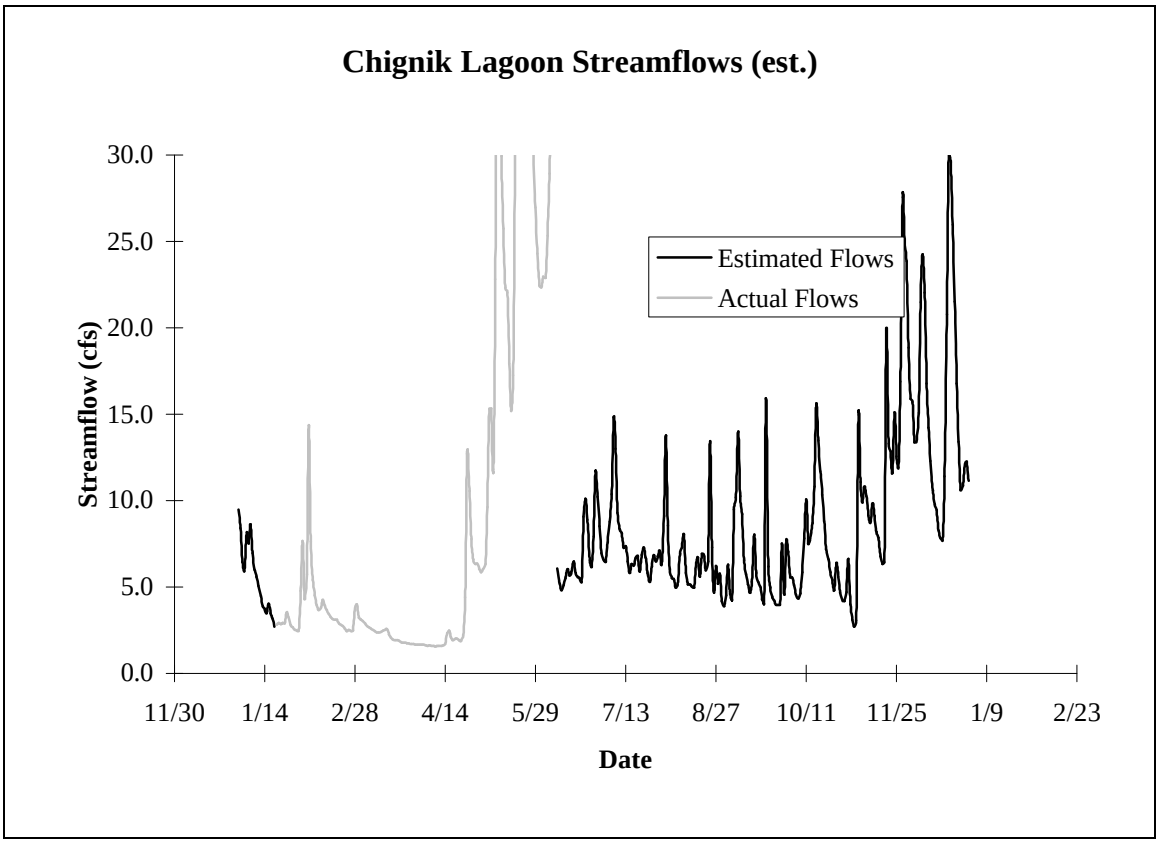
3.6. Project Risk

The primary risk with this project is going to be cost overruns and the amount of water available. Cost overruns primarily apply to the construction phase. As part of the permitting and design work, a stream gage will installed to shore up the existing hydrology data.

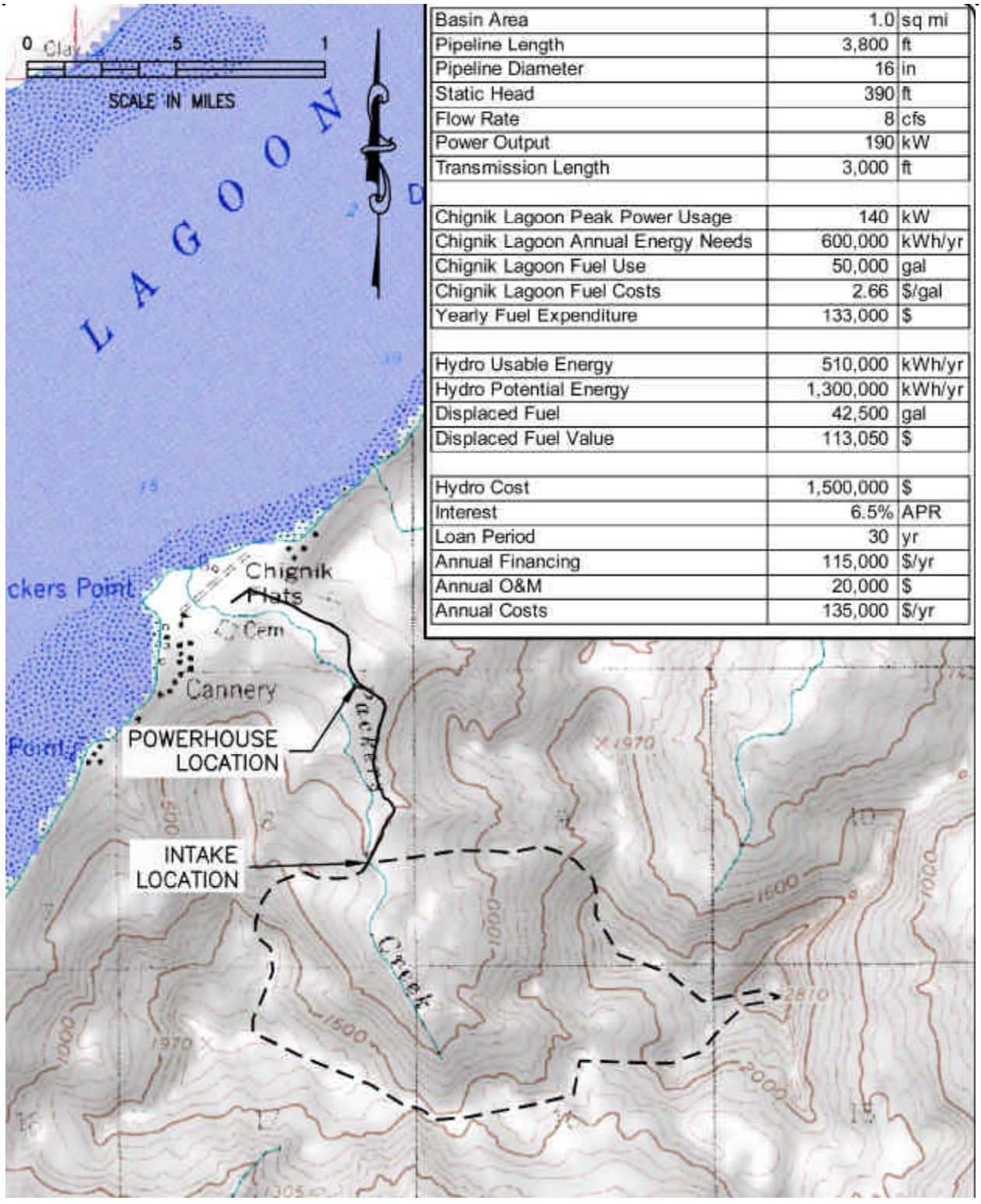
SECTION 4. - PROJECT DESCRIPTION AND TASKS

4.1. Proposed Energy Resource

The following chart represents the expected streamflows at the intake location of Packers Creek. The chart is taken from the June 26th, 1995 feasibility study performed by Polarconsult.



The following map details the basic parameters of the proposed hydroelectric project.



Basin Area	1.0	sq mi
Pipeline Length	3,800	ft
Pipeline Diameter	16	in
Static Head	390	ft
Flow Rate	8	cfs
Power Output	190	kW
Transmission Length	3,000	ft
Chignik Lagoon Peak Power Usage	140	kW
Chignik Lagoon Annual Energy Needs	600,000	kWh/yr
Chignik Lagoon Fuel Use	50,000	gal
Chignik Lagoon Fuel Costs	2.66	$/gal
Yearly Fuel Expenditure	133,000	$
Hydro Usable Energy	510,000	kWh/yr
Hydro Potential Energy	1,300,000	kWh/yr
Displaced Fuel	42,500	gal
Displaced Fuel Value	113,050	$
Hydro Cost	1,500,000	$
Interest	6.5%	APR
Loan Period	30	yr
Annual Financing	115,000	$/yr
Annual O&M	20,000	$
Annual Costs	135,000	$/yr

4.2. Existing Energy System

4.2.1. Basic configuration of Existing Energy System

Chignik Lagoon currently meets all of its electrical energy demand through diesel generation. In 2007 CLPU generated 540,000 kWh while burning 47,000 gallons of fuel.

4.2.2. Existing Energy Resources Used

Chignik Lagoon relies exclusively on diesel fuel for their electrical and heating needs. The hydroelectric project will significantly reduce the use of diesel fuel for electrical generation.

4.2.3. Existing Energy Market

The primary impact of this project will be the stabilization of energy rates. If a significant portion of construction is eventually funded then the impact on the local energy market will be a reduction in electrical rates.

4.3. Proposed System

4.3.1. System Design

The physical features of the Project include an intake and desander to collect and filter water, a 3800’ pipeline to transport water to the powerhouse that will contain the pelton turbine, generator, controls, and switchgear. The final component is a transmission line to convey the power to the community.

The intake will consist of a low height structure (less than 10') that will impound the water enough to collect it into a desander box and transport it by gravity flow to the powerhouse. The intake may be out of rock filled gabions, concrete, or even rock fill. The location of the intake is just below the confluence that occurs at about elevation 540'.

The desander box will be constructed from concrete or all weather wood and will ensure that sand, gravel, leaves, and other debris carried by the creek does not enter into the penstock and damage the turbine.

The penstock, or pipeline, which conveys the water to the powerhouse, will be 16 inch in diameter. In the upper part of the Project where the pressure is low the buried pipeline will be constructed from High Density Polyethylene. In the lower, higher pressure, areas the pipeline will be constructed form either PVC or coated steel stab joint pipe.

The powerhouse will consist of a treated wood or metal structure with a single impulse or cross flow turbine. The dimensions of the powerhouse will be approximately 20 x 22 feet. The generator will likely be a 480V three phase generator directly coupled to the turbine.

The controls for the powerhouse will be solid state, PLC based with a load-controlled governor and a head level control from the intake. This type of governor will allow easy and less expensive application of a system to capture excess electricity and displace heating fuel.

The 3000' power line to the town will be three phase at 7.2/l2.4 kV and will be either buried or on poles. A communications wire will also be included and will be used for data and voice transmission. There will be a 250 kVA step up transformer from the 480 volt to transmission voltage. A summary of the Project features is below.

4.3.2. Land Ownership

All of the project is located on land owned by the local native corporation and the village.

4.3.3. Permits

Federal Energy Regulatory Commission (FERC) - Declaration/Non-juridiction.
US Army Corps of Engineers (USACE) - Wetlands Permit
State of Alaska, Department of Environmental Conservation - Water Quality Certificate
State of Alaska, Division of Mining, Land, and Water - Water Rights Permit
Additional stream gaging will likely be required by DNR.
State of Alaska, Office of Habitat Management and Permitting - Consistency and Coastal Review
State of Alaska, Alaska Department of Fish and Game - Anadromous Fish Passage Permit
The powerhouse will be located above fish habitat.

4.3.4. Environmental

There are no significant environmental impacts associated with this project.

4.4. Proposed New System Costs (Total Estimated Costs and proposed Revenues)

4.4.1. Project Development Cost

The current state of project development dictates that only a simple cost estimate is able to be made. The following table details the major project items and the estimated costs.

land	$	30,000
materials		
pipe	$	180,000
turbine	$	150,000
controls	$	50,000
intake	$	50,000
powehouse	$	80,000
transmission	$	50,000
labor	$	200,000
equipment	$	100,000
shipping	$	200,000
engineering	$	200,000
subtotal	$	1,260,000
contingency (20%)	$	252,000
administrative	$	50,000
profit/overhead (25%)	$	315,000
total	$	1,877,000

CLPU is asking for State grant funding for Permitting and Design work for fiscal year 2009.

4.4.2. Project Operating and Maintenance Costs

Because the hydroelectric project will practically displace all diesel generation the operations and maintenance costs for the electric utility should decrease. The hydroelectric project will certainly not require the major overhaul and rebuilding expenses associated with the diesel plant. However, there may be some troubleshooting costs during the first years of the hydroelectric operation. For this

reason, CLPU is assuming that the entire maintenance budget will simply be applied to the hydroelectric project. Thus, rates will not be affected by the project.

4.4.3. Power Purchase/Sale

Because CLPU, the local utility, will own and operate the project there won't be a requirement for a power purchase agreement. CLPU may be required to obtain bonds or other financing to build the project. The savings in fuel costs from the displaced diesel operations would fund the necessary financing.

4.4.4. Cost Worksheet

Attached is a completed cost worksheet for the project.

4.4.5. Business Plan

CLPU will utilize existing personnel and procedures for operation and maintenance of the project. As part of the design and construction a complete operations and maintenance procedure will be implemented.

4.4.6. Analysis and Recommendations

The project has the potential to stabilize, or with construction grant assistance, reduce power generation rates in the community of Chignik Lagoon. With the utilization of the excess power the hydroelectric project is the best opportunity for the community of Chignik Lagoon to maintain and improve their economic status and stimulate the potential for future improvements and growth. With the reduction in reliance on diesel generation Chignik Lagoon will be an asset to the State.

SECTION 5. - PROJECT BENEFIT

The hydroelectric power generating system on Packers Creek will allow for improvements to the local infrastructure and alleviate economic hardships by offsetting the ever-increasing costs of diesel generated electric power. Environmentally, renewable energy will significantly reduce the necessity of hauling, storing, and consuming fossil fuels. The permitting of the project will be simple because the land is locally owned. There are no unusual terrain or other factors that will make construction difficult. There is even equipment within the community to construct the plant. All of the local residents strongly support this project.

The village is presently in a crisis situation due to the exploding fuel costs to operate their diesel electric generators. The board members of the Chignik Lagoon Power Utility (CLPU) are trying to address this crisis and develop a plan to keep the utility solvent in the short term, and viable in the long term with an alternative energy source of a hydroelectric generation system that will be affordable and will help ensure the economic survival of the village.

With increased utilization of the excess Project power the local residents could realize additional economic benefits at virtually no additional costs. The local processing plant burned to the ground this past summer. They probably will not rebuild, but rather have floating processor and tender fish to Kodiak and Sand Point like they did after the plant burned down. Other Kodiak buyers are paying more money and taking more and more of the salmon and cod, and it this makes it less feasible to rebuild the local facility. There are 12 local boats that have halibut quota. There is no local market for this fleet to sell to now that the plant has burned down. The fleet has to run clear to Sand Point or Kodiak. If we had cheap power the little plant could proccess all of the halibut. This

would bring in about $750,000 to the fleet in ex vessel prices. Taxes would be paid on this amount. Total contribution would be over one million dollars for both the fishermen and plant combined.

Also there is no market for the cod jig quota of 730,000 lbs and rockfish quota of 100,000 lbs. The remoteness of the fleet from a processing facility leaves this product un harvested. Prices for jig cod are $.70 lb. and rockfish is $.50 lb. There is around a dozen vessels with jiggers that can not fish because there is no buyer. This is another $500,000 ex vessel that the local fleet could make if we can get the hydro faciltiy.

The processing facility would have a cold storage that would hold up to 60,000 lbs of capacity. This product would be frozen and stored until the fall when the salmon season has ended. Local fishermen could then smoke this product to value add just a very small portion of their catch. This amount would bring in over $1,000,000 to the local economy.

These products plus a little salmon fillets would bring in an additional $2,000,000 per season. This would provide a revenue stream for a tax base that could provide the money for jobs to maintain the local infrastructure.

Not only does rising fuel costs impact the electrical generation rates, it has a significant impact of the operating costs of the fishing boats. Alleviating the burden of paying high electrical rates will allow the local residents to absorb the additional costs for their only economic base – fishing.

SECTION 6. - GRANT BUDGET

BUDGET INFORMATION
PERMITTING AND DESIGN

Milestone or Task	Federal Funds	State Funds	Local Match Funds (Cash)	Local Match Funds (In-Kind)	Other Funds	TOTAL
1 Permitting		$25,000				$25,000
2 Stream Gage		$20,000				$20,000
3 Surveying		$40,000				$40,000
4 Design		$65,000				$65,000
Total	$0	$150,000	$0	$0	$0	**$150,000**

BUDGET INFORMATION
PERMITTING AND DESIGN

Milestone or Task	Direct Labor and Benefits	Travel, Meals, or Per Diem	Equipment	Supplies	Contractual Services	Construction Services	Other Direct Costs	TOTAL
1 Permitting					$25,000			$25,000
2 Stream Gage					$20,000			$20,000
3 Surveying					$40,000			$40,000
4 Design					$65,000			$65,000
Total	$0	$0	$0	$0	$150,000	$0	$0	**$150,000**

SECTION 7. - ADDITIONAL DOCUMENTATION AND CERTIFICATION

A. Resumes of Applicant's Project Manager, key staff, partners, consultants, and suppliers per application form Section 3.1 and 3.4
B. Cost Worksheet per application form Section 4.4.4
C. Grant Budget Form per application form Section 6.
D. An electronic version of the entire application per RFA Section 1.6
E. Governing Body Resolution per RFA Section 1.4

F. CERTIFICATION

The undersigned certifies that this application for a renewable energy grant is truthful and correct, and that the applicant is in compliance with, and will continue to comply with, all federal and state laws including existing credit and federal tax obligations.	
Print Name	DIANA MOORE
Signature	Diana Moore
Title	ADMINISTRATOR
Date	10-8-08