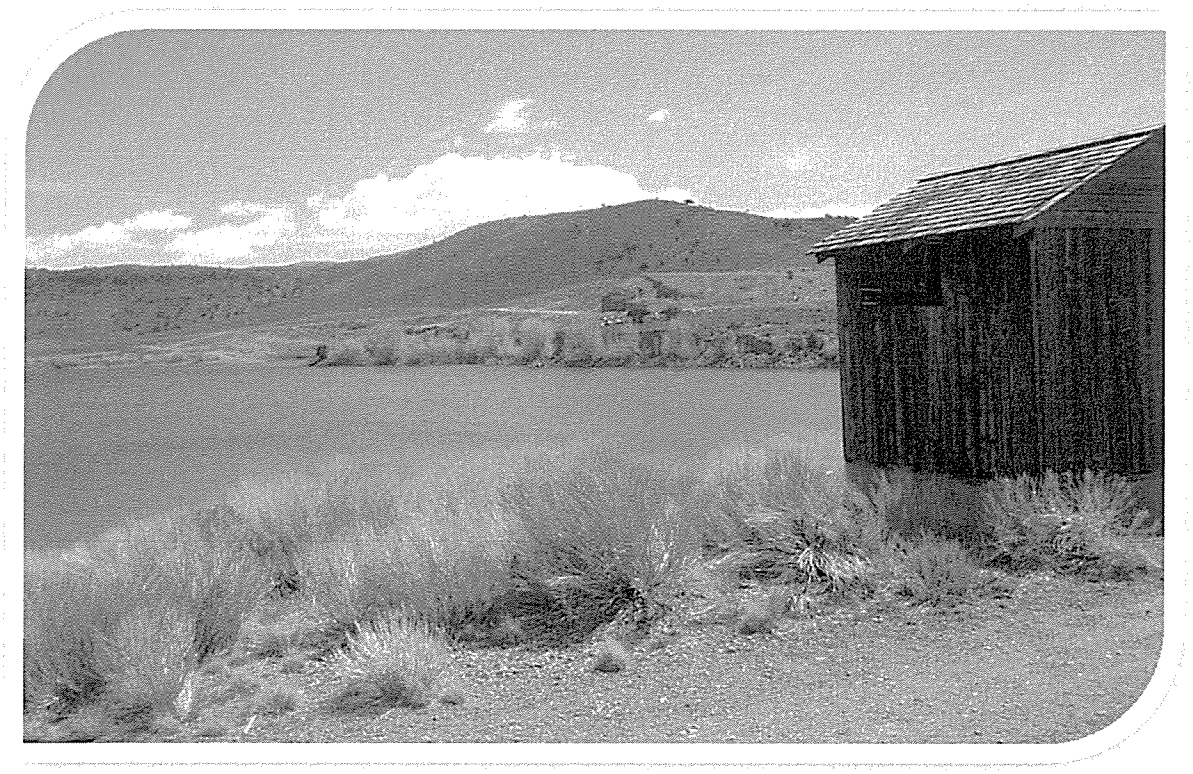
Improve Irrigation Efficiency and Provide Sustainability For Fremont Irrigation Company in Wayne County, Utah

WaterSMART (Sustain and Manage America's Resources for Tomorrow)
Water and Energy Efficiency Grants for Fiscal Year 2013
Funding Opportunity Announcement (FOA) No. R13SF80003



Mill Meadow Reservoir

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January 2013

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January 16, 2013

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The Fremont Irrigation Company is based in Loa, Wayne County, Utah. It currently supplies irrigation water to approximately 10,000 acres within Wayne County including secondary irrigation water to the towns of Fremont, Loa, Lyman and Bicknell. Water is diverted from the Mill Meadow Reservoir into their irrigation system. There is an increasing demand for water resources due to prolonged drought periods and climate change resulting in a strained effort to provide water needed for farming, human and environmental uses.

The applicant has had continual problems with the water conveyance channel from the Mill Meadow Reservoir (four miles northeast of Fremont, Utah) to the applicant's existing canal system. It is requesting financial assistance to 1) pipe water from Mill Meadow Reservoir approximately 13,300 feet downstream to a proposed hydroelectric plant and 2) pipe approximately 7,300 feet of two other canal sections (i.e. the Loa Ditch and the Loa Town Ditch). The goal to be accomplished with this project is four-fold:

1. Improve water conservation and management
2. Allow an energy-water nexus
3. Eliminate seepage from ditches into basements of nearby homes
4. Eliminate seepage from ditches into springs feeding the fish hatchery, which may be the cause of whirling disease

Water conservation is dramatically improved as piping eliminates several inherent problems with open-ditch and earthen canals, including seepage, distribution failure, operational waste, and evaporation. The conserved water will allow farmers to increase crop production. The piping also allows for an energy-water nexus with the installation of a hydroelectric plant, which will be installed along with the pipeline. The hydroelectric plant provides immediate economic assistance, but also, as it is a renewable energy source, it will generate a range of benefits at local, regional, and global levels.

A detailed cost estimate has been performed for the project, and it has been determined that the project fits under Funding Group II (up to $1,500,000 in Federal funds provided through this FOA). The applicant has been approved by the Board of Water Resources to receive a loan covering a portion of the project, the remainder of which the applicant will effectuate in-kind funding. The projected timeline includes all design work, survey, environmental compliance and easement procurement to occur in the first year, 2013. The second year, 2014, and a portion of the third year, 2015, is projected to include the construction of the project, including the pipeline and the hydroelectric facility, and all testing, training, and reporting.

Background Data

As mentioned earlier, the Fremont Irrigation Company is based in Loa, Wayne County, Utah. It was incorporated on December 16, 1904 and is registered in good standing with the State of Utah Department of Commerce. It has 8,840 shares that are held by approximately 525 shareholders. The applicant has received financial assistance 15 times in the past—all but two of which have been paid off—for projects ranging from dam construction and repair to small sprinkle irrigation projects constructed by company shareholders.

The stretch of the open channel from Mill Meadow Reservoir to the applicant's existing canal system is a source of significant amounts of debris that the applicant is required to clean out each year (see Figure A Vicinity Map, page 4). Adding to the problem is the difficulty in obtaining access to the channel with equipment that can remove debris and beaver dams. The applicant spends on average $6,500 annually on this stretch of channel in operation and maintenance, which does not include the time and work donated by shareholders.

The proposed project will significantly decrease the applicant's annual operation and maintenance costs and eliminate potential liability problems. The project will increase the efficiency of the applicant's conveyance system, saving approximately 5,668 acre-feet annually. Additionally, the control of flow will be moved from the Mill Meadow Reservoir to just outside Fremont, saving time in the delivery of water to shareholders.

The Fremont Irrigation Company services 525 users and has approximately 25 miles of existing open-ditch and earthen canals and 1 mile of piped irrigation. The system has approximately 25,512 acre-feet of storage including 6,300 acre-feet in Fish Lake, 10,350 acre-feet in Johnson Valley Reservoir, 3,639 acre-feet in Forsyth Reservoir, and 5,232 acre-feet in Mill Meadow Reservoir. Currently, the system provides irrigation for approximately 10,000 acres primarily used for growing alfalfa with some small grain crops. The source of water for the proposed project comes from Mill Meadow Reservoir which is fed by the Fremont River. The applicant's water rights consist of certificated rights, decreed rights, and diligence rights to the flow of the Fremont River and Spring Creek, and storage in Fish Lake, Johnson Valley, Forsyth, and Mill Meadow Reservoirs.

In addition to allowing farmers to increase crop production, as population increases, the demand for water is expected to grow well beyond the capacity of the system. Also, groundwater resources are depleting as the area continues to experience a prolonged drought. There is a significant concern for potential shortfalls in the future, which directly affects the livelihood of shareholders, farmers and consumers alike.

This proposed project is a result of the need to improve water conservation and management. In addition, it should be noted that the decision to follow through with the project follows a series of discussions held between the applicant's board members, farmers, the community, and engineers. Other options were discussed on a level economic feasibility versus effectiveness and include lining the channels with concrete, building additional storage facilities, using alternate piping locations, and imposing additional regulations on the farmers. It was determined that piping the canals and channel is the most effective solution.

The Fremont Irrigation Company has previously used Bureau of Reclamation Funding for the development of a Water Management and Conservation Plan.

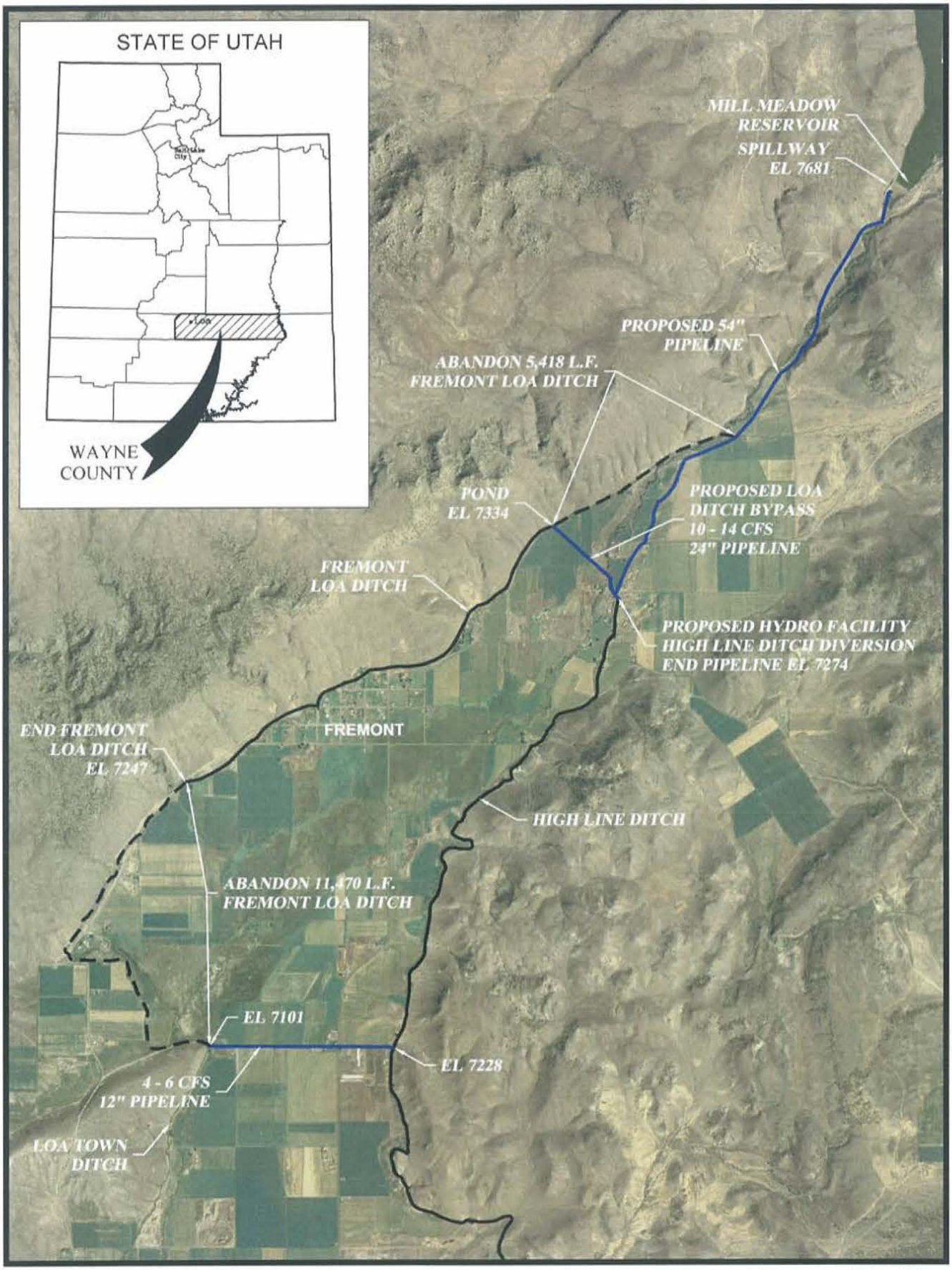

Figure A Vicinity Map

Technical Project Description

The Fremont Irrigation Company is currently undergoing a rehabilitation project for the existing outlet works of the Mill Meadow Reservoir. This involves replacing the existing outlet works with an improved pressure-rated structure, which will allow connecting into the proposed piping system. The proposed project will tie pressure-rated pipe into the new Mill Meadow Reservoir outlet structure and convey flows underground alongside the existing open water conveyance channel approximately 13,300 feet to the High Line Ditch Diversion (see Figure A Vicinity Map, page 4). The pipeline will parallel an existing 20-inch pipeline which currently serves the Fremont East Bench. It is also proposed to install approximately 2,500 feet of pipe from the tailrace of the hydroelectric plant to the Fremont Loa Ditch, which will eliminate 5,418 feet of open canal, and approximately 4,800 feet of pipe from the High Line Ditch to the Loa Town Ditch, which will eliminate the need for 11,470 feet of open canal (see Figure A Vicinity Map, page 4). Overall, the piping will effectively save 5,668 acre-feet per year as will be discussed in subsequent sections.

At the Highline Ditch Diversion, it is proposed to install a hydroelectric facility to take advantage of the available head provided by the piping. Historical data provided by available stream gauges was used to estimate average flows throughout the year, which ranged between 27 cfs and 126 cfs. Based on these flows, a 54-inch diameter pipe is proposed. An analysis of the system indicates that the facility will produce 7,967 MW-hrs annually.

Because it is proposed to pipe the existing Loa Ditch water with the High Line Ditch, water will need to be pumped from the tailrace of the hydroelectric plant northwest to the Loa Ditch. The amount of flow to be pumped is approximately 10 cfs with a lift of 65 feet. Based on this flow, a 24-inch diameter pipe is proposed for the length of 2,500 lineal feet. In order to pipe the Loa Town Ditch, which carries up to 6 cfs, a 12-inch diameter pipe is proposed for the length of 4,800 lineal feet.

By installing the pipe and hydroelectric facility as outlined above, various benefits are accomplished. A significant increase in water conservation occurs by eliminating seepage, evaporation, and other problems associated with open-ditch and earthen canals. This water conservation will provide additional irrigation to farmers who will in turn be able to produce a

higher crop yield. The hydroelectric facility creates a substantial source of income and renewable energy. Finally, more effective methods of measuring flows will be in place to improve water management. After the hydroelectric facilities are paid for, it is the intent of the Fremont Irrigation Company to use excess revenues derived from the sale of power to pipe their remaining ditches providing further water conservation.

Evaluation Criteria

Evaluation Criterion A: Water Conservation

No. A.1(a) – Quantifiable Water Savings

One of the principle advantages of the proposed project is the dramatic increase in water conservation accomplished through quantifiable water savings. Water losses occurring from seepage, distribution failure, operational waste, and evaporation are inherent to conveying flows through open-ditch and earthen canals. This project will replace 20,600 lineal feet of open-ditch and earthen canals with HDPE irrigation pipe.

The proposed project area is located in an area currently not included in the Natural Resources Conservation Service soil survey area. Based on site visits and engineer judgment, the area is considered to have gravel and sandy soils. Soils of this nature are estimated to have a percolation rate of 4.5 cubic inches per 100 square feet (Asawa. 2006. *Irrigation and Water Resources Engineering.* New Age International), which if water is running in the channel six months out of the year, equates to 5,321 acre-feet lost to seepage annually. This is calculated by taking the wetted area of the existing channels and multiplying it by the estimated percolation rate for the duration of six months. The three existing channels being abandoned, bypassed, or replaced by this project have a total length of 30,830 lineal feet. 13,940 feet of the channels have a wetted area of 32 square feet per lineal foot; 5,420 feet of the channels have a wetted area of 16 square feet per lineal foot; and 11,470 feet of the channels have a wetted area of 11 square feet per lineal foot.

Due to the exposure of water to atmosphere in an open-ditch and earthen canal, evaporation plays a role in water loss. Evaporation in the proposed project area accounts for water losses of 31 acre-feet annually. This is calculated by using evapotranspiration rates (Hill, R.W. 1994.

Consumptive Use of Irrigated Crops in Utah. Utah State University, Logan, UT) and applying them to the water surface area along the existing channels. The 13,940-foot portion of the channels has a water surface area of 30 square feet per lineal foot; the 5,420-foot portion of the channels has a water surface area of 15 square feet per lineal foot; and the 11,470-foot portion of the channels has a water surface are of 10 square feet per lineal foot. Calculations for the seepage and evaporation are included at the end of this report.

In addition to seepage and evaporation, additional water savings is achieved by converting on-farm system from flood irrigation to sprinklers. When the distribution system is converted to a pressurized pipe, on-farm systems are required to convert to sprinklers. The efficiency for flood irrigation is assumed to be approximately 30-35% while the efficiency for sprinklers is assumed to be approximately 60-65%. By converting irrigation of 100 acres to sprinklers, water savings of 316 acre-feet annually are achieved.

The total water savings are as follows:

Seepage Loss	5,321 acre-feet
Evaporation Loss	31 acre-feet
On-Farm Sprinklers	316 acre-feet
Total Conservation	**5,668 acre-feet**

Table 1 Total Water Savings

Upon completion of the proposed project, continual measurements will be taken at both the upstream and downstream ends of the pipeline and compared to pre-project data to verify the increase in water savings.

The benefits of conserving more water are most apparent in the ability to increase irrigation and improve the annual crop production. As shown in Table 1 Total Water Savings, there is a total of 5,668 acre-feet conserved with the proposed project that will be transferred to crop irrigation. This is in addition to the existing conservation and water storage methods already in place. A higher crop production has far reaching economic benefits beyond the local community.

No. A.1(b) – Improved Water Management

As part of the proposed project, meter instrumentation will be installed at critical points to enable accurate flow measurements. This includes more accurate measurements of flow being

distributed to the individual on-farm systems. Currently, a series of flumes are in place to measure flow distribution throughout the system.

As verifiable data, water savings of up to 42% were achieved by the Stockton East Water District in California by installing instrumentation to measure flow distribution (Stockton East Water District. 2001. *Metering of Agricultural Water. Water Use Efficiency Program, Request for Proposal.* California Department of Water Resources). Accurate meters will be installed within the proposed hydroelectric facilities and at the outlet works for Mill Meadow Reservoir that will enable similar flow measurements. For purposes of this application, it is assumed that the improved water management will result in savings of 30% to be conservative. The current annual water supply is estimated to be 18,056 acre-feet (Chappell, U.S. Bureau of Reclamation. 2006. *Water Management and Conservation Plan.* Fremont Irrigation Company). A 30% increase in management equates to an additional 5,417 acre-feet of water conservation per year.

$$\frac{EstimatedAmountofWaterBetterManaged}{AverageAnnualWaterSupply} \Rightarrow \frac{5{,}417acft}{18{,}056acft} = 30\%$$

Upon completion of the proposed project, continual measurements will be taken at both the upstream and downstream ends of the pipeline and compared to pre-project data to measure the increase in water management improvements.

No. A.2 – Percentage of Total Supply

As mentioned, the current annual water supply is estimated to be 18,056 acre-feet. Upon application of the water conservation methods described previously, an additional 11,085 acre-feet will be available annually, which is an increase of 61%.

$$\frac{EstimatedAmountofWaterConserved}{AverageAnnualWaterSupply} \Rightarrow \frac{11{,}085acft}{18{,}056acft} = 61\%$$

The total annual water supply available after the project will be 29,141. This will allow farmers to fully irrigate their crops and maximize production. Calculations for the required irrigation of 10,000 acres are included at the end of this report.

No. A.3 – Reasonableness of Costs

The estimated service life for HDPE irrigation pipe is 100 years (ASTM International. 2011. *A Service Life Assessment of Corrugated HDPE Drainage Pipe. Vol 8 Iss 6.* American Society for Testing and Materials). Also, according to the U.S. Department of Energy (DOE), the average service life of a hydroelectric facility is 100 years (Department of Energy, Energy Efficiency and Renewable Energy, July 2004. *Hydropower: Setting a Course for Our Energy Future*).

$$\frac{TotalCostPipe}{AcreFeetConserved \times ServiceLife} \Rightarrow \frac{\$4{,}004{,}500}{11{,}085 acft \times 100 yrs} = 3.6$$

$$\frac{TotalCostHydroelectricFacility}{AcreFeetConserved \times ServiceLife} \Rightarrow \frac{\$4{,}184{,}525}{11{,}085 acft \times 100 yrs} = 3.8$$

Evaluation Criterion B: Energy-Water Nexus

No. B.1 – Implementing Renewable Energy Projects Related to Water Management Delivery

The benefits of renewable energy extend beyond the income generated by such methods such as a reduced carbon footprint, use of natural resources, and the reduced dependence on nonrenewable sources. In addition, renewable energy is a more stable approach to providing long-term energy as it typically does not require costly fuel sources (Department of Energy, Energy Efficiency and Renewable Energy, July 2004. *Hydropower: Setting a Course for Our Energy Future*). The DOE has issued the *Guide to Integrating Renewable Energy in Federal Construction*, which is being followed by this project.

In order to calculate the amount of power produced by the hydroelectric facility, the following equations and criteria were used:

$$P = \varepsilon \times \left[\frac{Q \times H}{11.81} \right]$$

$$H = Z - L \times \left[\frac{Q}{0.432 \times C \times D^{2.63}} \right]^{1/0.54}$$

Where,

P = Power Output

ε = Efficiency, 78%

Q = Flow

Z = Elevation Difference

L = Length of Pipe

C = Hazen Williams Coefficient, 130

D = Diameter of Pipe

The elevation difference between the reservoir and the hydroelectric facility ranges from 397 feet when the reservoir is full and 354 feet when the reservoir is empty. The range in flows varied between 27 and 126 cfs throughout the year. The total power output per year is calculated to be 7,967 MW-hrs. These calculations are included at the end of this report.

According to the *Environmental Impact Calculator* as provided by Rocky Mountain Power, as this project produces 7,967 MW-hrs annually, 9,948,366 pounds of CO_2 are offset every year. This is equivalent to planting 116,948 trees. The output from the calculator is included at the end of this report.

The current published average rate from Rocky Mountain Power for qualifying electrical generation facilities is approximately $0.0488 per kWh produced, which calculates to an annual income of approximately $388,800. There are annual costs incorporated with the operation of the hydroelectric facility. Operation and maintenance is estimated to be $65,000 annually, and pumping costs are estimated to be $30,000 annually. The net income produced equates to $293,800.

Evaluation Criterion C: Benefits to Endangered Species

The proposed project does not provide any benefit to endangered species.

Evaluation Criterion D: Water Marketing

The additional water conserved by this project will be used to fill shortages in supply for agricultural operations. The local demand for irrigation water currently exceeds supply during

dry years. The conserved water produced by the proposed project will be used in filling that demand.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

The Fremont River is located in the upper stream portions of the West Colorado River Watershed. In September 2009, the entire Colorado River Basin was selected for funding for the "Colorado River Basin Water Supply and Demand Study" under the Bureau of Reclamation's Basin Study Program. The study was completed in December 2012 and defines current and future imbalances in water supply and demand within the Colorado River Basin for the next 50 years. The report addresses the critical importance of the basin as a source of water in the western United States. It provides water to nearly 40 million people for municipal use, irrigates nearly 5.5 million acres of land, and is the lifeblood for at least 22 federally recognized tribes, 7 National Wildlife Refuges, 4 National Recreation Areas, and 11 National Parks. Eventually the Colorado River is also used in the United Mexican States (Mexico) to meet both agricultural and municipal water needs. The report also addresses the periodic shortages that have occurred throughout the upper portions of the basin, which is where the Fremont River is located. The Colorado River has been recognized and documented by the Bureau of Reclamation as an over-allocated and highly variable system.

The basin study does not come up with direct resolutions to the problems or a direct adaptation strategy. Instead, it provides a common technical foundation and a range of solutions that may be implemented to resolve the problems. This proposed project will assist in meeting the challenges and complexities of enabling a sustainable water supply and meeting future demands by increasing water savings, improving water management, and more efficiently using water as a valuable resource. In Section 3.0 of the Colorado River Basin study, options are provided to resolve the supply and demand imbalance. The options accomplished by this project include:

Type	Category	Option
Increase Supply	Local Supply	Rainwater Harvesting
Reduce Demand	Agricultural Water Conservation	Agricultural Water Conservation
Modify Operations	System Operations	Evaporation Control via Canal Covers
Modify Operations	Water Transfers, Exchanges & Banking	Upper Basin Water Banking

Table 2 Colorado River Basin Study Solution Options

Along with making the proposed improvements, on-farm irrigation systems connected to the improvements will undergo substantial changes. Education of the irrigators will be necessary and also beneficial. The irrigators will need education on using crop requirement data to effectively distribute irrigation water and to conserve early-season flows for later use, all of which are facilitated by more accurate metering methods. Efficient methods of using irrigation water typically provides increases in crop yields of 15-30%, and based on common experience, every acre-foot of water saved, generates approximately $25 in crop production. Additionally, this project has a high potential of expediting future on-farm irrigation improvements that may further be eligible for NRCS funding.

Evaluation Criterion F: Implementation and Results

No. F.1 – Project Planning

The largest use of secondary water in Utah is for irrigation of crops. As discussed, a significant area of farming is irrigated from the Fremont River. One of the most effective ways of conserving water is using the existing water we have more efficiently through the use of efficient storage and distribution facilities. The Fremont Irrigation Company is dedicated to the mission of more fully integrating strategies and policies into their operations to address the development of water resources. This project is vital and hugely beneficial to realizing the potential of water resources within the area.

No. F.2 – Readiness to Proceed

Plans to proceed are well underway for the project. The Mill Meadow Reservoir is already undergoing a rehabilitation project to improve the outlet works such that the proposed pipeline will be able to effectively convey water out of the reservoir. This project was instigated and funded by the State of Utah Division of Dam Safety. Improvements were required as part of the Dam Safety program. This rehabilitation project of the Mill Meadow Reservoir outlet works is *not* part of the proposed project outlined in this application. The Fremont Irrigation Company understands that under no circumstances may an applicant begin any ground-disturbing activities on a project before environmental compliance is complete and the Bureau of Reclamation

explicitly authorizes work to proceed. An outline of the project timeline and implementation is shown on the following page under Table 3 Project Timeline.

Screening of Pipeline Alignment Options and Hydroelectric Facility Energy Options: All options should be pursued and due diligence given by qualified persons to assess more effective alternatives to the goals of this project. Alpha Engineering Company, a civil engineering consulting firm located in St. George, Utah, has performed preliminary studies on different alternatives including technical design issues, resource assessment, relevant policies and incentives, utility tariffs and interconnections issues, evaluations through the National Environmental Policy Act, and project funding mechanisms. The preliminary studies have resulted in the current pipeline alignment and hydroelectric facility locations.

Feasibility Study & Preliminary Survey: Data was gathered on the potential water savings and energy production. Preliminary construction costs have been determined along with a more detailed timeline of the project. Preliminary surveys have been performed to provide more accurate data.

Funding Acquisition: The costs associated with his project exceed the ability of the Fremont Irrigation Company to pay for without funding and assistance. Coordination with the engineer and other agencies are in effect to secure the economic assistance necessary to make this project possible.

Preliminary Hydraulic Engineering: A comprehensive report will be conducted detailing the technical design aspects of the project. This report will establish the final hydraulic components of the system, the details pertaining to the hydroelectric facility, final construction cost estimates, and all other design mechanisms of the project. This report will be provided to the Bureau of Reclamation for review and comment.

Final Design & Survey: Comments from the Bureau of Reclamation will be implemented into the report and final changes will be made to the design. The final design package will contain construction drawings and specifications as well as the operations manual.

Environmental Compliance & Easement Procurement: Coordination has already begun and will continue to take place with all local and federal agencies to ensure that the project is in

compliance with any archeological, environmental and legal statutes. An Environmental Assessment will be completed, and all easements will be recorded by the county and in place prior to construction.

Construction & Reporting: The Fremont Irrigation Company is committed to constructing the proposed project in an efficient manner. Care will be taken to minimize disturbance to the surrounding environment. Ongoing construction inspection will be performed throughout the duration of the project construction. Interim reports will be provided to the Bureau of Reclamation for continual review and input. The project timeline is as follows:

Completed Tasks	**Completed**
Screening of Pipeline Alignment Options and Hydroelectric Facility Energy Options	2010
Feasibility Study & Preliminary Survey	2010
Year 1 Tasks	**Scheduled**
Funding Acquisition	Spring 2013
Preliminary Hydraulic Engineering	Spring 2013
Final Design & Survey	Summer 2013
Environmental Compliance & Easement Procurement	Summer - Fall 2013
Bid Project	Winter 2013
Year 2 Tasks	**Scheduled**
Pipe Installation & Connections	Spring 2014 - Spring 2015
Hydroelectric Facility Construction	Fall 2014 - Spring 2015
Final Project Inspection & Completion	Spring 2015
Testing & Reporting	Project Duration

Table 3 Project Timeline

No. F.3 – Performance Measures

Prior to construction of the project, detailed and accurate measurements will be taken to provide a pre-construction analysis of the existing conditions. The measurements will include storage capacity within the Mill Meadow Reservoir, outlet flows, downstream channel flows, flow duration times and volumes, and samples of on-farm system data.

Upon completion of the project, the applicant will implement a monitoring plan that will clearly define the goals of the project, encourage use of appropriate analysis, and accurately delineate

data pertaining to the goals of the project. A fundamental part of the monitoring plan will be to ensure accurate results. The following section outlines in more detail the performance measures taken to provide the necessary data for analysis.

Evaluation Criterion G: Additional Non-Federal Funding

There is not any additional non-federal funding being provided for this project.

Evaluation Criterion H: Connection to Reclamation Project Activities

There is not a connection to other Reclamation project activities.

Description of Performance Measures

Performance Measure No. A: Projects with Quantifiable Water Savings

Performance Measure No. A.1 – Canal Lining/Piping: To establish pre-project estimations of baseline data, ponding tests *and* inflow/outflow testing will be performed. Several tests have already been performed and historical data has been compiled for the project area. Post-project methods for quantifying the benefits will include inflow/outflow testing and comparing them to pre-project data. The data will also continue to be compared to historical data as more data becomes available to ensure a more accurate perspective of the benefits from the project.

Performance Measure No. A.2 – Measuring Devices: Pre-project estimations are based on knowledge obtained from the watermaster and historical data gathered from existing gauges within the vicinity. The United States Geological Survey Department has a gauge (USGS 09330000) near Bicknell, Utah that has measured discharge and gauge height since 2007. This project proposes to install pressure gauges and flow meters within the hydroelectric facility to provide more accurate data at the project site. A series of flumes are used to measure flows within the individual ditches and their use will be continued and recorded after completion of the project.

Performance Measure No. B: Projects with Quantifiable Energy Savings

Performance Measure No. B.1 – Implementation of Renewable Energy Improvements Related to Water Management and Delivery: The hydroelectric facility will be equipped with an electronic monitoring system to collect power production data.

Performance Measure No. C: Projects that Benefit Endangered Species

This section is not applicable.

Performance Measure No. D: Projects that Establish a Water Market

This section is not applicable.

Environmental Compliance

Because a small portion (approximately 0.86 miles) of the project is being constructed on BLM property within an existing pipeline right-of-way for the Fremont East Bench Irrigation Company, the Fremont Irrigation Company will complete an Environmental Assessment (EA). It is anticipated all pipelines will be located within existing right-of-ways. A few minor realignments through private property will need to be obtained. The applicant will also need to obtain a stream alteration permit as part of the process.

The proposed pipeline alignment is designed to be on property owned by the Fremont Irrigation Company, Bureau of Land Management (BLM) property, and some private farm properties. The section on BLM property will be placed in an existing right of way. New easements will be obtained on the private farm properties. These owners have been made aware of the project, and no problems are anticipated in obtaining the easements.

As we are applying for Funding Group II, the following are responses (*in italics*) to the questions (**in bold**) posed in Section IV.D.1 of the FOA:

1. **Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.** *During construction, soil and water will be disturbed. Care will be taken to eliminate the transport of sediment by use of erosion control methods (i.e. silt fence, check dams, etc.). Where construction takes place in agricultural land, it will be reseeded into annual or perennial vegetation in the next crop cycle. If it is not agricultural land, it will be reseeded into perennial vegetation.*
2. **Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?** *The Utah Conservation Data Center (CDC) has compiled an interactive map that identifies sighting of*

threatened and endangered species. The map indicates that there have been sightings of 7 such species, although the project area has not been designated as critical habitat for any of the species. The species are:

- *Pygmy Rabbit*
- *Burrowing Owl*
- *Western Toad*
- *Bald Eagle*
- *Greater Sage Grouse*
- *Utah Prairie Dog*
- *Ferruginous Hawk*

In addition, the following table is a species report taken from the U.S. Fish & Wildlife Service website:

Group	***Name***	***Status***
Birds	*California Condor*	*Experimental Population, Non-Essential*
Birds	*Yellow-Billed Cuckoo*	*Candidate*
Birds	*Greater Sage-Grouse*	*Candidate*
Birds	*Mexican Spotted Owl*	*Threatened*
Birds	*Southwestern Willow Flycatcher*	*Endangered*
Fishes	*Humpback Chub*	*Endangered*
Fishes	*Colorado Pikeminnow*	*Endangered*
Fishes	*Bonytail Chub*	*Endangered*
Fishes	*Razorback Sucker*	*Endangered*
Flowering Plants	*Maguire Daisy*	*Recovery*
Flowering Plants	*Wright Fishhook Cactus*	*Endangered*
Flowering Plants	*Last Chance Townsendia*	*Threatened*
Flowering Plants	*San Rafael Cactus*	*Endangered*
Flowering Plants	*Winkler Cactus*	*Threatened*
Flowering Plants	*Barneby Reed-Mustard*	*Endangered*
Flowering Plants	*Ute Ladies-Tresses*	*Threatened*
Mammals	*Utah Prairie Dog*	*Threatened*

Table 4 U.S. Fish & Wildlife Service Species Report for Wayne County

3. **Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States?" If so, please describe and estimate any impacts the project may have.** *The proposed project does contain wetlands. Construction will require a Section 404 Joint Application for Permits from the U.S. Army Corps of Engineers and Utah State Water Resources. Due to the disturbance of the wetlands being temporary, we feel that construction will be approved under an*

agricultural exemption. Specifications will be made to ensure that the pipe remains pressure-rated and does not experience measurable seepage.

4. **When was the water delivery system constructed?** *The Fremont Irrigation Company has used canals in the vicinity since the early 1900s.*
5. **Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.** *The Mill Meadow Reservoir was constructed in the early 1950s. All other modifications have been on-going and applied to private on-farm systems.*
6. **Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.** *There are no items on the National Register of Historic Places in the vicinity of this project. This has been confirmed by checking the register.*
7. **Are there any known archeological sites in the proposed project area?** *There are currently no known archeological sites in the proposed project area. Further coordination will be ongoing with the State Historical Preservation Office.*
8. **Will the project have a disproportionately high and adverse effect on low income or minority populations?** *No, the project appears to benefit all affected populations.*
9. **Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?** *Our current understanding is that there will be no impact on tribal lands or ceremonies.*
10. **Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?** *As the study area will continue to act as a channel to surface flows, it is anticipated that the project will have no effect on any existing noxious weeds or non-native invasive species.*

Required Permits and Evaluations

All rivers and irrigation canals are considered waters of the U.S. and subject to regulations by U.S. Army Corps of Engineers. The Fremont Irrigation Company is dedicated to comply with all necessary requirements associated with the permitting process. All available exemptions will be investigated and based on recommendations from the local U.S. Army Corps of Engineers representative.

During the preliminary planning process, all permits, easements and necessary approvals will be identified. As mentioned earlier, portions of the alignments will require easements as they fall on property owned by others. Some of the easements already exist, while other easements will be newly acquired.

The Public Utilities Policy Act of 1978 created an obligation of electric utilities to offer to purchase power from and interconnect with qualifying generation projects. The Federal Energy Regulatory Commission (FERC) has established a set of rules to comply with in order to be considered a qualifying project. This project complies with these rules and the coordination for the project has already been made with the local electric cooperative. Pursuant to Section 23(b)(1) of the Federal Power Act (FPA), hydropower projects must be licensed, or granted an exemption from licensing, pursuant to the FPA. This project is eligible for a conduit exemption according to FERC regulations.

Continual coordination with the Bureau of Reclamation will resume throughout the design and construction phases to ensure that any additional permits, approvals, and/or authorizations are pursued and addressed.

Funding Plan & Letters of Commitment

The Utah State Division of Water Resources have committed to fund $2,890,000 of the pipeline portion of the project cost. It is anticipated a conventional loan can be provided to fund the remainder. If this request for funding is not approved, the project will become unfeasible and not be constructed. Approximately $25,000 has been spent to date (January 2013) in performing site surveys, preparation of alternatives and costs associated with the project. Commitment and support letters are attached at the end of this report.

Funding Source	**Type**	**Amount**	**Status**
1. Division of Water Resources	Loan	$2,890,000	Approved
2. Conventional Loan	Loan	$3,697,025	On Hold
3. Fremont Irrigation Company Cash	Inkind	$100,000	Approved
4. Fremont River Conservancy District	Inkind	$1,000	Approved
5. Wayne County Water Conservancy District	Inkind	$1,000	Approved
Non Federal Subtotal		$6,689,025	
Requested Reclamation Funding		$1,500,000	
Total Project Funding		$8,189,025	

Table 5 Funding Sources

As we are applying for Funding Group II Project, we propose the following funding process:

Year 1 (FY 2013)	Year 2 (FY 2014)
$750,000.00	$750,000.00
Funding for engineering, survey, easement procurement, vicinity archeological and environmental compliance, and permit acquisition.	Funding for pipe and hydroelectric facility construction, inspections, testing, training, and reporting.

Table 6 Funding Group II Process

Project Budget Proposal

Budget Narrative

1. **Administrative and Legal Expenses:** This cost classification is interpreted as the costs incurred by the Fremont Irrigation Company in their efforts to facilitate and manage the preparation and construction of the proposed project. The project manager is Andrew Taft, President of the Fremont Irrigation Company. Other key personnel include Kyle Torgerson and Bryan Peterson. Their hours and wages are not included in this narrative, nor is there a cost associated with this item as their work is included in their current salary and wages. An estimated 3% of the construction cost was budgeted for legal, fiscal, environmental, and other costs associated with the Fremont Irrigation Company's administration of the project.
2. **Land, Structures, Rights-of-Way, Appraisals, Etc.:** As discussed earlier, the proposed pipeline alignment is designed to be on property owned by the Fremont Irrigation Company, Bureau of Land Management (BLM) property, and some private farm properties. The section on BLM property will be placed in an existing right-of-way. New easements will be obtained on the private farm properties. These owners have been made aware of the project, and no problems or costs are anticipated in obtaining the easements. Assistance in the easement acquisition will be facilitated by the project engineer.
3. **Relocation Expenses and Payments:** This cost classification is interpreted as the costs incurred by the construction contractor through mobilization and project preparations. It is calculated as approximately 5%-6% of the construction costs accounted for in *Item 7, Site Work* and *Item 9, Construction*.
4. **Architectural and Engineering Fees:** This cost classification is interpreted as the costs incurred by the project engineer. It includes preliminary design work, funding procurement, final design reports, easement acquisition, preparation of construction drawings and specifications, assistance in the bid process, inspections, and project management. It is calculated as approximately 6% of the construction costs accounted for in *Item 7, Site Work* and *Item 9, Construction* per American Society of Civil Engineer guidelines.

5. **Other Architectural and Engineering Fees:** There are not any architectural and engineering fees additional to those accounted for in *Item 4, Architectural and Engineering Fees.*
6. **Project Inspection Fees:** Project management and inspection fees are costs incurred by the project engineer and are calculated as 6% of the construction costs accounted for in *Item 7, Site Work* and *Item 9, Construction* per American Society of Civil Engineer guidelines.
7. **Site Work:** This cost classification is interpreted as the cost to perform work on, to provide materials for and to construct the hydroelectric facility structure. All associated site work, materials and construction including fencing, parking, concrete flatwork, and excavation is included. This does not include costs for providing power service to the building or the turbine, generator and switchgear.
8. **Demolition & Removal:** Demolition and removal for the proposed project is minimal limited to clearing and grubbing native soil and vegetation. All costs to perform this work are accounted for in *Item 9, Construction.*
9. **Construction:** This cost classification is interpreted as the cost to provide materials for and to construct the pipeline and facilities not covered in *Item 7, Site Work.* This includes all appurtenances to the pipeline; power service to the hydroelectric facility; the turbine, generator and switch gear; and the supervisory and control system within the hydroelectric facility. A more detailed breakdown of the costs associated with the pipeline and hydroelectric facility are attached with this application.
10. **Equipment:** This cost classification is interpreted as the cost for equipment that can be removed from the site upon completion of the project. Equipment rental, if necessary, will be comparable to the county average and is accounted for in *Item 9, Construction.*
11. **Miscellaneous:** There are no additional costs or fees associated with the proposed project that have not been accounted for in the preceding items.
13. **Contingencies:** This cost classification has been estimated to be 10% of the construction costs accounted for in *Item 7, Site Work* and *Item 9, Construction.*

Budget Form (Form SF 424C)

- next page -

Attachments:

- Water Conservation (Evaporation & Seepage) Calculations
- Irrigation Efficiency Calculations
- Cost Estimates by Phase
- Hydroelectric Calculations
- Blue Sky Calculator Output
- Board of Water Resources Feasibility Report
- Engineer's Letter of Feasibility
- Support & Commitment Letters
    - Wayne County
    - Wayne County Water Conservancy District
    - Natural Resources Conservation Service
    - Fremont River Conservancy District

Water Conservation Calculations

Seepage

Percolation Rate

4.5 in^3/sec per 100 sf

Channel Geometry

13940 ft	Length1
32 ft	Wetted Area1
5420 ft	Length2
16 ft	Wetted Area2
11470 ft	Length3
11 ft	Wetted Area3

Seepage

14.90 ft^3/sec

Annual Seepage
5321 ac ft

Evaporation

Water Area

13940 ft	Length1
30 ft	Surface Area1 per Lineal Foot
5420 ft	Length2
15 ft	Surface Area2 per Lineal Foot
11470 ft	Length3
10 ft	Surface Area3 per Lineal Foot
614200 sf	Total Surface Area

Month	May	Jun	Jul	Aug	Sep
Evapotranspiration Rate (inches per acre)	3.76	7.28	5.95	5.69	3.96
Evaporation (ac ft)	4.42	8.55	6.99	6.69	4.65

Annual Evaporation
31.30 ac ft

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Pumping Cost Estimator

County: WAYNE Site: LOA Power: GARKANE

Crop: ALFALFA 100 Acres

Add Crops

Well and Pump

Pumping Lift (ft - below ground):	100
Bowl Depth (ft - below ground):	140
Pressure (psi):	50
Head Loss & Other (ft):	15
Pump Efficiency (%):	70
Motor Efficiency (%):	90
*Design Flow (gpm/acre):	15.40
*System Flow Rate (gpm):	1,971.28

* If Unkown, Leave Blank

Power Costs

Demand Charge ($/kW):	4.35
Basic Charge per Month:	20.00

Usage Charge

Charge Before Cutoff:	0.0550
Cutoff Usage (kWhr):	10000
Charge After Cutoff:	0.0415

Irrigation Efficiency

Irrigation Efficiency (%): 30

Defaults Reset Calculate->

Click HERE for help, or click a title for detail explanation.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
ALFALFA - 100 Acres									
Evapotranspiration Inches:			3.76	7.28	5.95	5.69	3.96		26.64
Irrigation Req'd (inches):			3.18	6.87	5.06	4.48	3.16		22.75
Irrigation Req'd (ac-ft):			88.33	190.83	140.56	124.44	87.78		631.94
Pumping Costs:			2,038.82	3,674.34	2,872.09	2,615.02	2,029.96		13,230.23

Total Dynamic Head (ft)	236.80	Total Pumping Costs (+ Annual Service Costs)	13,230.23
Required Flow Rate (gpm)	1,540.00	Total Cost per Acre	132.30
Water Horse Power	92.09	Total Cost per Acre Ft	20.94
Brake Horse Power	131.56		
Electric Power Req'd (Kw)	109.04		

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Pumping Cost Estimator

County: WAYNE Site: LOA Power: GARKANE

Crop: ALFALFA 100 Acres

Add Crops

Well and Pump

Pumping Lift (ft - below ground):	100
Bowl Depth (ft - below ground):	140
Pressure (psi):	50
Head Loss & Other (ft):	15
Pump Efficiency (%):	70
Motor Efficiency (%):	90
*Design Flow (gpm/acre):	15.40
*System Flow Rate (gpm):	1,971.28

* If Unkown, Leave Blank

Power Costs

Demand Charge ($/kW):	4.35
Basic Charge per Month:	20.00

Usage Charge

Charge Before Cutoff:	0.0550
Cutoff Usage (kWhr):	10000
Charge After Cutoff:	0.0415

Irrigation Efficiency

Irrigation Efficiency (%): 60

Defaults Reset Calculate->

Click HERE for help, or click a title for detail explanation.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
ALFALFA - 100 Acres									
Evapotranspiration Inches:			3.76	7.28	5.95	5.69	3.96		26.64
Irrigation Req'd (inches):			3.18	6.87	5.06	4.48	3.16		22.75
Irrigation Req'd (ac-ft):			44.17	95.42	70.28	62.22	43.89		315.97
Pumping Costs:			1,334.08	2,151.84	1,750.72	1,622.18	1,329.65		8,188.48

Total Dynamic Head (ft)	236.80	Total Pumping Costs (+ Annual Service Costs)	8,188.48
Required Flow Rate (gpm)	1,540.00	Total Cost per Acre	81.88
Water Horse Power	92.09	Total Cost per Acre Ft	25.92
Brake Horse Power	131.56		
Electric Power Req'd (Kw)	109.04		

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Pumping Cost Estimator

County: WAYNE Site: LOA Power: GARKANE

Crop: ALFALFA 10000 Acres

Add Crops

Well and Pump

Pumping Lift (ft - below ground):	100
Bowl Depth (ft - below ground):	140
Pressure (psi):	50
Head Loss & Other (ft):	15
Pump Efficiency (%):	70
Motor Efficiency (%):	90
*Design Flow (gpm/acre):	7.11
*System Flow Rate (gpm):	71,079.94

* If Unkown, Leave Blank

Power Costs

Demand Charge ($/kW):	4.35
Basic Charge per Month:	20.00

Usage Charge

Charge Before Cutoff:	0.0550
Cutoff Usage (kWhr):	10000
Charge After Cutoff:	0.0415

Irrigation Efficiency

Irrigation Efficiency (%): 65

Defaults Reset Calculate->

Click HERE for help, or click a title for detail explanation.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
ALFALFA - 10000 Acres									
Evapotranspiration Inches:			3.76	7.28	5.95	5.69	3.96		26.64
Irrigation Req'd (inches):			3.18	6.87	5.06	4.48	3.16		22.75
Irrigation Req'd (ac-ft):			4,076.92	8,807.69	6,487.18	5,743.59	4,051.28		29,166.67
Pumping Costs:			87,101.48	162,587.15	125,560.31	113,695.35	86,692.35		575,636.64

Total Dynamic Head (ft)	236.80	Total Pumping Costs (+ Annual Service Costs)	575,636.64
Required Flow Rate (gpm)	71,079.94	Total Cost per Acre	57.56
Water Horse Power	4,250.44	Total Cost per Acre Ft	19.74
Brake Horse Power	6,072.05		
Electric Power Req'd (Kw)	5,033.06		

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MILL MEADOW PIPELINE PROJECT
PHASE 1 - PIPELINE
Preliminary Engineer's Opinion of Probable Construction Costs

Date - January 2013

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	ITEM PRICE
1	Mobilization @ 5%	1	L.S.	$152,600.00	$152,600.00
2	54" Diameter Pipeline	13,300	L.F.	$200.00	$2,660,000.00
3	54" Valves	2	Each	$28,000.00	$56,000.00
4	24" Pipeline (Loa Ditch Connection)	2,500	L.F.	$30.00	$75,000.00
5	Loa Ditch Pump	1	L.S.	$110,000.00	$110,000.00
6	12" Pipeline (Loa Town Ditch Connection	4,800	L.F.	$20.00	$96,000.00
7	Air/Vacuum Valves	6	Each	$9,000.00	$54,000.00
				SUBTOTAL OF SCHEDULE	$3,203,600.00
				10% CONTINGENCY	$320,360.00
				15% ENGINEERING, LEGAL, FISCAL	$480,540.00
				TOTAL OF SCHEDULE	**$4,004,500.00**

MILL MEADOW PIPELINE PROJECT
PHASE 2 - HYDROPOWER
Preliminary Engineer's Opinion of Probable Construction Costs

Date - January 2013

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	ITEM PRICE
1	Mobilization @ 6%	1	L.S.	$175,400.00	$175,400.00
2	Power House	1	L.S.	$250,000.00	$250,000.00
3	Turbine, Generator, & Switchgear	1	L.S.	$2,232,220.00	$2,232,220.00
4	Power Interconnection	1	L.S.	$650,000.00	$650,000.00
5	Supervisory & Control System	1	L.S.	$40,000.00	$40,000.00
				SUBTOTAL OF SCHEDULE	$3,347,620.00
				10% CONTINGENCY	$334,762.00
				15% ENGINEERING, LEGAL, FISCAL	$502,143.00
				TOTAL OF SCHEDULE	**$4,184,525.00**

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Fremont Irrigation Company
Mill Meadow Hydro Project

Date	Average Reservoir Elev. (ft)	Ave Flow (cfs)	Gross Head (ft)	Head Loss (ft)	Net Head (ft)	Power Output (KW)	Time (hrs)	Power Generated (kWh)	2013 Rocky Mtn Power Price Per kW	Revenue ($)
5-May	7681	27.43	397	4.81	392.2	710.5	120	85,262	$0.0488	$4,161
10-May	7681	41.53	397	10.36	386.6	1060.5	120	127,261	$0.0488	$6,210
15-May	7680	63.92	396	23.02	373.0	1574.6	120	188,950	$0.0488	$9,221
20-May	7679	83.67	395	37.90	357.1	1973.3	120	236,800	$0.0488	$11,556
25-May	7676	102.85	392	55.55	336.5	2285.4	120	274,254	$0.0488	$13,384
31-May	7675	109.45	391	62.33	328.7	2375.9	144	342,124	$0.0488	$16,696
5-Jun	7672	117.12	388	70.66	317.3	2454.7	120	294,566	$0.0488	$14,375
10-Jun	7669	119.49	385	73.33	311.7	2459.6	120	295,157	$0.0488	$14,404
15-Jun	7667	125.73	383	80.58	302.4	2511.3	120	301,354	$0.0488	$14,706
20-Jun	7665	124.97	381	79.68	301.3	2487.0	120	298,443	$0.0488	$14,564
25-Jun	7666	120.67	382	74.68	307.3	2449.3	120	293,915	$0.0488	$14,343
30-Jun	7668	108.77	384	61.61	322.4	2316.0	120	277,914	$0.0488	$13,562
5-Jul	7669	96.80	385	49.65	335.4	2144.0	120	257,276	$0.0488	$12,555
10-Jul	7670	98.42	386	51.20	334.8	2176.3	120	261,153	$0.0488	$12,744
15-Jul	7669	105.20	385	57.92	327.1	2272.5	120	272,705	$0.0488	$13,308
20-Jul	7669	113.00	385	66.13	318.9	2379.8	120	285,578	$0.0488	$13,936
25-Jul	7667	115.71	383	69.09	313.9	2398.9	120	287,872	$0.0488	$14,048
31-Jul	7664	122.50	380	76.79	303.2	2453.2	144	353,257	$0.0488	$17,239
5-Aug	7663	99.18	379	51.93	327.1	2142.4	120	257,090	$0.0488	$12,546
10-Aug	7662	83.41	378	37.69	340.3	1874.7	120	224,970	$0.0488	$10,979
15-Aug	7662	72.67	378	29.20	348.8	1674.1	120	200,892	$0.0488	$9,804
20-Aug	7664	67.02	380	25.13	354.9	1570.8	120	188,494	$0.0488	$9,198
25-Aug	7667	58.29	383	19.41	363.6	1399.8	120	167,971	$0.0488	$8,197
30-Aug	7668	54.24	384	16.99	367.0	1314.8	120	157,772	$0.0488	$7,699
5-Sep	7669	49.05	385	14.10	370.9	1201.6	120	144,186	$0.0488	$7,036
10-Sep	7670	53.58	386	16.60	369.4	1307.2	120	156,863	$0.0488	$7,655
15-Sep	7667	60.29	383	20.66	362.3	1442.8	120	173,136	$0.0488	$8,449
20-Sep	7664	69.06	380	26.57	353.4	1612.0	120	193,446	$0.0488	$9,440
25-Sep	7661	76.42	377	32.05	345.0	1741.1	120	208,926	$0.0488	$10,196
30-Sep	7658	81.04	374	35.73	338.3	1810.6	120	217,266	$0.0488	$10,603
5-Oct	7654	79.22	370	34.26	335.7	1756.7	120	210,800	$0.0488	$10,287
10-Oct	7650	70.92	366	27.91	338.1	1583.6	120	190,034	$0.0488	$9,274
15-Oct	7647	58.27	363	19.40	343.6	1322.4	120	158,683	$0.0488	$7,744
20-Oct	7644	50.90	360	15.10	344.9	1159.5	120	139,135	$0.0488	$6,790
25-Oct	7640	42.93	356	11.02	345.0	978.1	120	117,378	$0.0488	$5,728
31-Oct	7638	38.55	354	9.03	345.0	878.3	144	126,479	$0.0488	$6,172
							Total:	**7,967,362**		**$388,807**

Pipe ID	48"	Hazen-Williams	130	Efficiency	78%	Tailrace Elev.	7284

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BLUE SKY renewable energy

Utah - Small Non-Residential

Environmental Impact Calculator

More information is provided by clicking on the question mark icons.

How would you like to support renewable energy?

Choose an option below to calculate your estimated cost and equivalent environmental benefits.

I have a fixed amount to spend.

I have $ 4773 budgeted for renewable energy

Calculate

Complete one option, and then click Calculate.

OR... I want to offset a percentage of the monthly energy use of my business.

How much will offsetting percent cost based on kwh monthly usage?

Calculate

OR... I want to become a Business Partner or change my current participation level.

Supporter Champion Visionary

...based on kwh monthly usage.

Calculate

You chose to spend $4,773.00 on renewable energy per month.

This means you can purchase 6,640 blocks at the Blue Sky QS price. Over 12 months, your investment means:

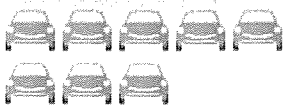
kwh renewable energy : 7,968,000

7,968,000

Miles not driven : 10,080,987

0 0 8 0 9 8 7

Cars off the road : 860



CO_2 offset : 9,948,366 lbs

Number of trees planted : 116,948

Legend: 1 = 1 mile; = 100 cars; = 1,000,000 lbs; = 25,000 trees

The bottom line

Participating in Blue Sky at this level will cost $4,773.00 per month—in addition to your regular monthly bill.

Sign Up Now!

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ALPHA ENGINEERING COMPANY
43 South 100 East, Suite 100, St. George, Utah 84770-3442; Tel: (435) 628-6500 Fax: (435) 628-6553

MEMO

Date: January 4, 2013

To: Fremont Irrigation c/o Andrew Taft

From: Brent E. Gardner

Re: Irrigation Pipeline and Hydro Project

Items:

We have prepared the following information for your consideration concerning the irrigation pipeline and hydroelectric project for the Fremont Irrigation Company:

1) We have analyzed the potential power production of a hydroelectric facility being placed near the High Line Ditch diversion dam with a pressurized irrigation pipeline being extended from this diversion to the Mill Meadow Reservoir. An analysis of the system indicates that an average annual income of $388,807 may be derived from the hydroelectric facility based on an average power sale price of $0.0488 per kW-hr.
2) We will need to pump water from the tailrace of the hydro plant back to the Loa Ditch. An average of 10 cfs would be pumped annually with a lift of 65 feet (4 cfs of the water for the Loa Town ditch will be diverted from the High Line Ditch downstream). It is estimated the annual cost for pumping and operation and maintenance of the pump would be $30,000.
3) It is assumed there would be annual operation and maintenance costs for the hydroelectric facility of approximately $65,000 per year initially. In addition the pumping costs are estimated to be $30,000 per year. The net income from the hydroelectric generation would then be $293,807.
4) If we assume the cost of power increases at an annual rate of inflation of 3% per year the annual revenue could increase to $394,852 in 10 years and $530,648 in 20 years.
5) We have also updated the preliminary estimates of probable costs for the construction of the irrigation line and the hydroelectric facilities for the project of $4,004,500 and $4,184,525 respectively (see attached).
6) As you know the Board of Water Resources has approved a loan of $2,890,000 at 2% interest for 27 years with annual payments of $140,000 towards the project. We recommend pursuing the WaterSMART program for a grant of $1,500,000 to make the project economically viable. With this funding we would have a balance of $3,697,025 to fund the entire project. If we amortize the balance of $3,697,025 at 5% for 20 years the payments are $296,660 annually which is essentially covered by the revenues obtained by

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the hydro plant. The irrigation company would then need to assess an annual share assessment of $16 to pay for the loan with the Board of Water Resources. This amount would go down each year as power revenues increase.

7) As excess funds are obtained you can continue to pipe the ditches within the system such that eventually your entire system is piped.

It appears that the project is economically viable with the grant from the WaterSMART program through the Bureau of Reclamation. Let me know if there is any additional information I can provide for your analysis. We have attached the application for your signature.

We look forward to working with you on this project.

BOARD OF WATER RESOURCES

Feasibility Report

Conservation and Development Fund

Appl. No.: *E-279*
Received: 5/10/10
Approved: 5/27/10

To be Presented at the March 16, 2011 Board Meeting

SPONSOR: ***FREMONT IRRIGATION COMPANY***

President: Andrew Taft

LOCATION: The proposed project is located four miles northeast of Fremont in Wayne County.

EXISTING CONDITIONS & PROBLEMS: The sponsor supplies irrigation water to about 12,000 acres from above Fremont to below Bicknell, including secondary irrigation water to the towns of Fremont, Loa, Lyman, and Bicknell. Water is diverted from the Fremont River and local creeks and springs. The sponsor has storage rights in Fish Lake and Johnson Valley, Forsyth, and Mill Meadow Reservoirs.

The stretch of the Fremont River from Mill Meadow Reservoir to the sponsor's canal system is a source of a significant amount of debris that the sponsor has to clean out each year. Adding to the problem is the difficulty in obtaining access to the river with equipment that can remove debris and beaver dams. The sponsor spends, on average, $6,500 annually on this stretch of river in operation and maintenance, which does not include the time and work donated to the sponsor by shareholders.

PROPOSED PROJECT: The sponsor is requesting financial assistance from the board to install approximately 13,000 feet of 54-inch diameter pipeline from the reservoir, as well as about 7,500 feet of smaller pipeline in two other canal sections in the system: the Loa Ditch and the Loa Town Ditch. The pipelines will eliminate the transportation of sediment and trash into the canal and save up to 1,700 acre-feet currently lost to seepage. Technical assistance will be provided by Alpha Engineering.

The project fits in Prioritization Category 3 (agricultural project that provides a significant economic benefit for the local area).

COST ESTIMATE: The following cost estimate is based on the engineer's preliminary design and has been reviewed by staff:

Item	Description	Quantity	Unit Price	Amount
1.	Mobilization	LS	$100,000	$ 100,000
2.	PIPELINE			
	a. 54-inch	13,000 LF	170	2,210,000
	b. 24-inch	2,600 LF	30	78,000
	c. 12-inch	4,800 LF	20	96,000
3.	54-in. Valves	3 EA	28,000	84,000
4.	Loa Ditch Pump	LS	110,000	110,000
5.	Air/Vacuum Valves	6 EA	9,000	54,000
Construction Cost				$2,732,000
Contingency				274,000
Legal and Administrative				33,000
Design and Construction Engineering				361,000
Total				$3,400,000

COST SHARING & REPAYMENT: The recommended cost sharing and repayment are:

Agency	Cost Sharing	% of Total
Board of Water Resources	$ 2,890,000	85%
Sponsor	510,000	15
TOTAL	$ 3,400,000	100%

If the board authorizes the project, it is suggested it be purchased at 2% interest over 27 years with annual payments of approximately $140,000, with the balance being paid in the final year.

ECONOMIC FEASIBILITY: Putting these portions of the conveyance system into pipe will enable the sponsor to reduce some of its operation and liability problems, while saving about 1,700 acre-feet lost to seepage.

Crop production will be increased by approximately 1/5 ton per acre on 8,000 acres of irrigated alfalfa. The project will increase the water conveyance efficiency of the canal from 75% to 80%, and will

result in an increase in annual net income to the farmers of approximately $166,000. When the project's benefits to farmers are compared to project costs and discounted to present value, the benefit/cost ratio is 1.08.

FINANCIAL FEASIBILITY:

The proposed project results in an increase in annual net income to $166,000, as shown in the table below:

Annual Benefit of Increased Crop Production	$159,500
Savings in Annual O&M Costs	6,500
ANNUAL NET BENEFIT	$166,000

The board requires that 85%, or its percent cost share, be applied to the annual net income to calculate the amount the sponsor is able to repay to the loan on an annual basis ($141,100).

The sponsor is currently making payments on loans with the board that have annual payments of approximately $8,200 and $11,300 until 2011 and 2033, respectively.

As a result of the proposed loan terms the sponsor will need to increase annual share assessments by approximately $16 per share, from $15 to $31.

BENEFITS:

The proposed project will decrease the sponsor's annual operation and maintenance costs by approximately $6,500, and eliminate potential liability problems. The project will increase the efficiency of the sponsor's conveyance system, saving approximately 1,700 acre-feet annually. This will increase alfalfa production approximately 1/5 ton per acre. Additionally, the control of flow will be moved from the Mill Meadow Dam to just outside Fremont, saving time in the delivery of water to shareholders.

PROJECT SPONSOR:

The Fremont Irrigation Company was incorporated on December 16, 1904 and is registered in good standing with the state Department of Commerce. Its 8,840 shares are held by approximately 200 shareholders.

The sponsor has received financial assistance 15 times in the past for projects ranging from dam construction and repair to small sprinkle irrigation projects constructed by company shareholders. All but two of these projects have been paid off. Annual payments of $8,200 and $11,300 are being paid on loans for a Forsyth Dam repair until 2011 and a

pipeline project until approximately 2033, respectively.

WATER RIGHTS & SUPPLY: The sponsor's water rights consist of certificated rights, decreed rights, and diligence rights to the flow of the Fremont River and Spring Creek, and storage in Fish Lake, Johnson Valley, Forsyth, and Mill Meadow Reservoirs. The board presently holds title to all of these water rights.

EASEMENTS: The proposed pipeline alignment is designed to be on the sponsor's property, Bureau of Land Management (BLM) property, and some private farm ground. The section on BLM property will be placed in an existing right-of-way. Obtaining easements on the private farm ground should not be a problem.

ENVIRONMENTAL: Because the project is being constructed on BLM property, the sponsor is planning to complete an Environmental Assessment (EA). As part of the EA the sponsor will assess the impact of more efficient use of 1,700 acre-feet that would have otherwise ended up in the Fremont River. The sponsor will need to obtain a stream alteration permit.

WATER CONSERVATION: The proposed project will conserve up to 1,700 acre-feet and allow the sponsor to distribute water to its shareholders more efficiently.

SPONSOR'S RESPONSIBILITIES: If the board authorizes the proposed project, the sponsor must do the following before construction can begin:

1. Obtain a stream alteration permit from the Division of Water Rights.

2. Obtain all easements, rights-of-way, and permits required to construct, operate, and maintain the project.

3. Pass a resolution by the appropriate (as defined in the company's Articles of Incorporation and Bylaws) majority of company stock authorizing its officers to do the following:

   a. Assign properties and easements required for the project to the Board of Water Resources.

b. Enter into a contract with the Board of Water Resources for construction of the project and subsequent purchase from the board.

4. Have an attorney give the Board of Water Resources a written legal opinion that:

a. The company is legally incorporated for at least the term of the purchase contract and is in good standing with the state Department of Commerce.

b. The company has legally passed the above resolution in accordance with the requirements of state law and the company's Articles of Incorporation and Bylaws.

c. The company has obtained all permits required for the project.

d. The company owns all easements and rights-of-way for the project, as well as the land on which the project is located, and that title to these easements, rights-of-way, and the project itself can be legally transferred to the board.

5. Obtain approval of final plans and specifications from the Division of Water Resources.

6. Update the water management and conservation plan, and obtain approval of it from the Division of Water Resources.

7. Submit a letter to the Division of Water Resources noting completion and acceptance of a Water Conveyance Facilities management Plan as described within the time frame required by the First Substitute House Bill 60, as passed by the 2010 State Legislature. Also, be in compliance with House Bill 298.

PROJECT CONTACT PEOPLE:

President: Andrew Taft
54 West 100 South
Loa, UT 84747
Phone: 435-836-2045 (office)
435-691-4975 (cell)

Secretary: Kyle Torgerson
Box 246
Loa, UT 84747
Phone: 435-836-2045

Engineer: Brent Gardner
Alpha Engineering Company
43 South 100 East, Ste 100
St. George, UT 84770
Phone: 435-628-6500

Wayne County
18 South Main
Loa, Utah 84747
Phone 435-836-2765
Fax 435-836-2479

January 14, 2012

Andrew G. Taft
Fremont Irrigation Company
45 West 100 South
Loa, Utah 84747

Dear Mr. Taft,

The Wayne County Board of Commissioners supports you applying for a grant from the Bureau of Reclamation WaterSMART program. We know the grant will be used to accomplish its purpose to conserve water and provide other benefits as you have stated in your application.

Thank you for your effort to improve and conserve the resources of Wayne County. Wayne County will benefit as well as the state of Utah and beyond.

If you need further support to help with the grant, please feel free to contact us.

Sincerely,

Wayne County Board of Commissioners

Wayne County Water Conservancy District
HC 70
Box 150
Caineville, Utah 84775

January 11, 2013

Andrew G. Taft
Fremont Irrigation Company
45 West 100 South
Loa, Utah 84747

Dear Mr. Taft,

It has come to our attention that the Fremont Irrigation Company has made application with the Bureau of Reclamation WaterSMART for a grant to help fund the Mill Meadow pipeline project to improve the efficiency and sustainability of your system.

These types of projects fit the functions and goals of our conservation district. We express our full support of this project and obligate $1,000.00 towards the implementation of this grant.

Sincerely yours,

John D. Jackson
Chairman

COPY

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
Richfield Area Office
340 N 600 W
Richfield, UT 84701
Phone: (435) 896-6441 x.3
Fax: (435) 896-9339

January 14, 2013

RE: BOR WaterSMART Grant Application
Fremont Irrigation Company
Loa, UT 84747

ATTN: Grant Committee Members

The United States Department of Agriculture - Natural Resource Conservation Service (USDA-NRCS) located in the Richfield, Utah Area Office, serving Wayne County is in full support of the Fremont Irrigation Company's WaterSMART grant proposal to address water conservation issues on the company's current irrigation system infrastructure. The application will assist the company in potentially conserving water for close to 8,500 acres in the Fremont River drainage. The Fremont Irrigation company has been very proactive in the past in addressing water conservation issues in their local area. USDA-NRCS has been working with the company recently on many irrigation improvements on the system, and feel that the Company has been a leader in addressing water quantity natural resource issues in the county.

The USDA-NRCS supports the action to request from the Bureau of Reclamation assistance to improve the overall efficiency of the existing infrastructure through the WaterSMART grant program.

Sincerely,

Travis L. Thomason
ASTC-FO Area 2

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An Equal Opportunity Provider and Employer

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FREMONT RIVER CONSERVATION DISTRICT

"Conserving Natural Resources For Our Future"

January 9, 2013
Loa, Utah

Bureau of Reclamation
Water SMART
(Sustain and Manage America's Resources for Tomorrow)
Water & Energy Efficiency Grants for Fiscal Year 13
Funding Opportunity Announcement (FOA) No. R13SF80003

Greetings;

It has come to our attention that the Fremont River Irrigation Company is applying for a grant to implement piping water from the Mill Meadow Reservoir to the Fremont Irrigation Company water diversion, piping the Loa and Loa Town Ditches and installing a hydro-generation plant at or near their diversion.

The Fremont Conservation District has authority under the Utah State Annotated Code, Chapter 3, 17D-3-103, 2a, (iii), (viii) & (E), to make recommendations, "...to conserve, develop, (or), utilize...water on state or private land; "to make recommendations within the conservation district, including: the development or restoration, or both,...(of) natural resources, whether in private state or federal ownership;".

Therefore, we recommend and support the implementation of the project listed above. We feel that the pipelines will conserve water by reducing deep percolation into the soil and evaporation into the air. They will reduce the amount of trash that plugs downstream irrigation water diversions, they will prevent flooding of basements in the town of Fremont, Utah and will help reduce

the incidence of 'whirling-disease' in the Utah Division of Wildlife Resources fish hatchery. We feel that their plans to install a hydro-generating plant will provide a source of clean energy, and a revenue source for future maintenance of the project and for other water conservation measures.

The Fremont Irrigation Company is the largest provider of irrigation water in Wayne County and so will have a positive effect on most of the irrigated crop land in the county. This project is listed as being beneficial in the Wayne County Natural Resource Assessment recently completed by the Fremont River Conservation District, accepted by the Wayne County Commission on Sept. 4,2012, and presented to the Wayne County Coordinating Council on October 22, 2012.

This proposal is good conservation: we support it. The Fremont River CD doesn't have taxing authority so our funding is limited, however we will commit $1,000.00 toward this project.

Sincerely,

Mack C Mone CD Treasurer

Dean Chappell - Member

Boone K. Taylor Vice chair Fremont River CD

Richard Fillmore member Fremont River CD

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