

***Uncompahgre Project
Headgate Automation, Remote Monitoring
& SCADA System***

A proposal submitted to:

WaterSMART

Water and Energy Efficiency Grants for FY 2013

On behalf of:

Uncompahgre Valley Water Users Association

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Table of Contents

Cover Page (SF 424)	1
Assurances (SF 424 D)	6
Title Page	8
Table of Contents	9
Technical Proposal & Evaluation Criteria	10
Executive Summary.....	10
Background Data.....	11
Technical Project Description	15
Evaluation Criteria.....	17
Description of Performance Measures	35
Environmental & Cultural Resources Compliance	36
Required Permits and Approvals	39
Letters of Project Support	N/A
Official Resolution	40
Project Budget	41
Funding plan	41
Budget Proposal Narrative	43
Budget Proposal Form.....	44
Letter of Commitment UVWUA.....	46
Budget Form SF-424 C.....	47
Statement of Agreement for Ag Operations	48

TECHNICAL PROPOSAL

EXECUTIVE SUMMARY

January 15, 2013

Applicant Name: Uncompahgre Valley Water Users Association

City: Montrose

County: Montrose

State: Colorado

Project Start: May 1, 2013

Project End: December 31, 2014

Category: Funding Group I

Project Summary: This project proposes to utilize WaterSMART funds to completely replace the existing hardwired relay control system on the M&D and Ironstone Canals in the federal Uncompahgre Project Area with a new Programmable Controller (PLC) based system for automatic gate control (sluiceway gate) as well as SCADA remote monitoring / alarming capability. The current relay control system is over fifty years-old and experiencing frequent failures which affects the delivery system efficiency. In addition, the current system does not provide a means of accurately accounting for water delivery through the canals. The proposed project accomplishes multiple goals of the WaterSMART Program by: 1) increasing on-farm water use efficiency by providing a reliable water supply, 2) improving water efficiency by reducing spills, over-deliveries, and seepage, 3) preventing water-related conflicts due to canal control failure resulting in flooding of private property, 4) serving as a pilot-test for canal automation and SCADA remote monitoring / alarming which will be employed throughout the entire Uncompahgre Project area as part of an off-farm system-wide optimization and efficiency effort, 5) addressing water resource challenges due to climate change and drought, and 6) preventing potential local water-related crisis or conflicts under the Endangered Species and Clean Water Acts.

BACKGROUND DATA

One of the oldest Reclamation projects, the Uncompahgre Project (UP), stretches across much of western Colorado in Delta and Montrose counties. It operates in Reclamation's Upper Colorado Region and contains one storage dam at Taylor Park Dam and Reservoir in Gunnison County, 7 diversion dams, 128 miles of canals, 438 miles of laterals and 216 miles of drains. Montrose County contains the East Portal before the Gunnison Tunnel, East Canal, Loutzenhizer, Montrose/Delta (M&D), Ironstone and Selig Diversion Dams. Delta County contains the Garnet Diversion Dam (http://www.usbr.gov/projects/Project.jsp?proj_Name=Uncompahgre+Project). The UP area includes mesa and valley land at an elevation between 5,000 and 6,000 feet above sea level.

The UP draws water from the Uncompahgre River through the West Canal System and from the Gunnison River from Blue Mesa Reservoir through the Gunnison Tunnel and the South Canal System and is then delivered to irrigated acreage. There are approximately 76,300 irrigated acres served by the Project and approximately 3,500 stockholders. Project water is used for irrigation water (agricultural and municipal), stock water, and power generation.

Water resources serving the UP include the 1904 Gunnison Tunnel Water Right from the Gunnison River (1,300 cfs) and the 1882 Uncompahgre River Right (1,225.64 cfs), and 1937 Taylor Park Reservoir Storage Right. Total direct flow water rights are therefore 2,400.64 cfs.

Canal automation and remote monitoring and control allows for a quicker response to meet the water demands of the canal. In addition, during heavy rain events the UVWUA will be able to monitor and/or respond to changes in canal flow.

Shortfalls in water supply affect the UVWUA during periods of drought and when senior water right holders place calls on the rivers. In certain areas of the UP, there may be shortfalls in water supplies for landowners at the end of the lateral due to uneven flows at the headgate or in the lateral due to fluctuating river flows/levels. A remote monitoring and SCADA system will help address fluctuations in the system.

The M&D Canal was the first canal purchased for the Uncompahgre Valley Project. Upon acquisition, the canal was upgraded and extended to carry water diverted from the Uncompahgre River to the mesas on the west side of the Uncompahgre Valley from south of the City of Montrose to north of the City of Delta to irrigate 33,600 acres. The canal is presently 15 miles in length and was designed to carry 650 cfs. The M&D Canal serves 75 laterals and sub-laterals totaling 72.75 miles in length.

The Ironstone Canal, also known as the California Mesa System, was one of the last ditch systems to come into the Project. Upon acquisition, the ditch was enlarged and extended to irrigate 26,000 acres of the valley floor west of the Uncompahgre River and north to Delta. The Ironstone Canal diverts water from the Uncompahgre River south of Olathe and was designed to carry 400 cfs. The Ironstone Canal is 19.5 miles long. The Ironstone Canal serves 45 laterals and sub-laterals totaling 77.75 miles in length.

The Uncompahgre Valley Water Users Association (UVWUA), a 501(c)(12) not for profit entity, was incorporated in 1903 and is contracted with Reclamation to operate and maintain the Uncompahgre Project Area facilities. The UUVUA maintains a professional staff of organizational and fiscal managers, water masters, office staff, ditch riders and skilled laborers. As of December 31, 2012 the UUVUA has completed 64.15 miles of canal and lateral lining and piping with a total of 94.2 miles contracted through Phase 8 of the East Side Laterals Piping Projects.

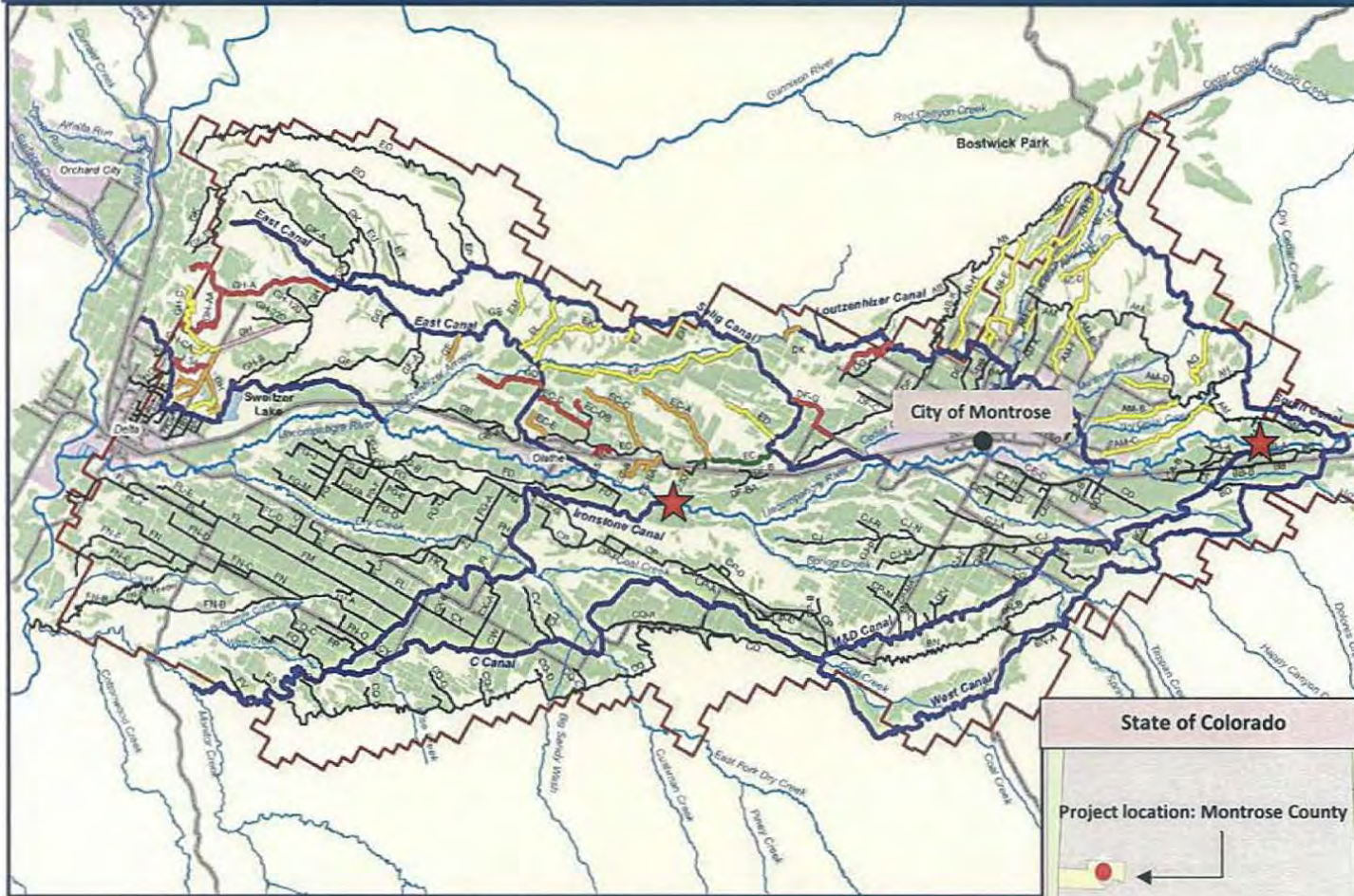
Rainfall in the area averages less than 10 inches per year. Average high temperatures are 87 degrees Fahrenheit and average lows are 15 degrees. The growing season in the Uncompahgre Project Area extends from approximately April 1 to October 31.

Principal crops produced within the area include corn, alfalfa, beans, peppers, onions, broccoli, potatoes, apples, pears, cherries, apricots, grass hay, pasture forages, wheat, barley, and oats. Livestock operations include beef cattle, dairy cattle, sheep, hogs, horses, and chickens.

Soils in the area are derived from Mancos Shale which has naturally high concentrations of salts and selenium. The underlying bedrock in the region consists predominantly of crystalline and sedimentary rocks, with alluvial deposits in the valleys. The application of water to these soils via seepage from open earthen canals and laterals and on-farm irrigation deep percolation, mobilizes salts and selenium and creates hydraulic gradients that result in the discharge of saline and seleniferous groundwater into irrigation drains and local waterways.

There is increasing pressure on local water users and the UUVUA to address water-quality impairment issues under the Clean Water Act (CWA) and the effects of pollutants such as selenium on endangered species under the Endangered Species Act (ESA). Numerous stream segments in the UP have been listed as being impaired for selenium under section 303(d) of the federal CWA. High selenium concentrations have been shown to cause reproductive failure and deformities in aquatic birds and fish. The lower Gunnison River, from the confluence of the Uncompahgre River, serves as critical habitat to four listed endangered fish species (razorback sucker, humpback chub, bonytail chub, and Colorado pikeminnow). The federal UP area and the Uncompahgre River Basin have been identified as the source of 60% of the selenium loading in the lower Gunnison River (Reclamation, 2006). This project serves as a pilot-test for canal automation, remote monitoring, and SCADA/alarming throughout the entire UP. The benefits of this project throughout the system include better water management, reduced selenium concentrations and loads in local waterways by increasing irrigation delivery system efficiency through better regulation of canal deliveries, and minimizing deep percolation from the canal delivery system. More reliable water supplies in the UP have resulted in improvements in on-farm irrigation efficiency which may lead to reductions in deep percolation and selenium loading.

Map: Uncompahgre Project Headgate Automation, Remote Monitoring & SCADA System



1:150,000

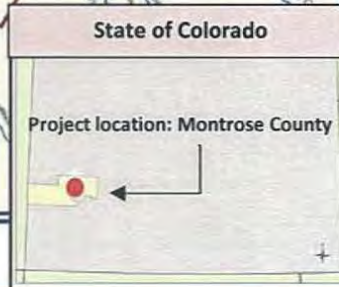
Project Locations

Facilities and Lands

- Phase 7 Lateral Piping
- Phase 5 Lateral Piping
- Phases 1-4 Lateral Piping
- Phase 6A Lateral Lining
- Lateral - Previously Piped
- Canal - Unimproved
- Lateral - Unimproved
- Irrigated Acre
- UFWUA Boundary

Base layers

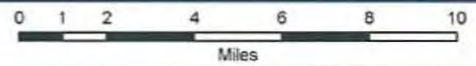
- Highway
- Major Road
- Stream
- Reservoir



Map produced by:
 U.S. Bureau of Reclamation
 2764 Compass Drive
 Grand Junction, Colorado 81506
 Phone: (970) 249-0600
 Date Printed/Revised: December 1, 2011
 File name: UNLateralPipingLnd11x17v1.mxd

Data Sources:
 Reclamation, US Census Bureau,
 BLM, USGS, USDA, State of CO,
 CDOIT, CDSS, Mesa County

DISCLAIMER: This map is meant as an aid for the operation and maintenance of irrigation facilities. This map may graphically depict property boundaries. Property boundaries are for general reference only and do not represent legal descriptions.



Uncompahgre Phase 2 (2007) and Safety Canal Improvements
 All other data are the property of the respective agencies.

This proposal to completely replace the existing hardwired relay control system on the M&D and Ironstone Canals and install remote monitoring and SCADA / alarming will also involve 20 watt solar panels for energy efficiency.

The UVWUA has significant prior experience working successfully with Reclamation and has contracted to carry out 7 phased, large lateral piping projects (8th contract currently being negotiated), other irrigation delivery system efficiency projects, and a current Project wide system optimization study and plan (see summary below). UVWUA staff work directly with Reclamation designers, engineers, surveyors, grant officers, and environmental compliance staff to carry out multiple aspects of on-going projects. In addition, the UVWUA has served alongside Reclamation on stakeholder groups working to educate the public and address issues associated with water-quality and endangered species concerns.

Previous projects include the:

- Lower Gunnison River Winter Water Program - This program was funded through the Colorado River Basin Salinity Control Program for the construction of stock water taps which were provided in lieu of water being diverted through the Gunnison Tunnel from October 15 through April 15 of each year with an estimated 41,330 tons/year of salt controlled and an estimated range of 1,653 to 3,306 lbs/year of selenium controlled.
- PHASE I - Montrose Arroyo Demonstration Project (Contract No. 98-FC-40-1300). The project involved piping 7.5 miles of open, earthen laterals for salinity control during the period 9/23/98 to 12/31/01.
- PHASE II – East Side Laterals Piping Project (Contract No. 04-FC-40-2243). The project involved piping 21 miles of open, earthen laterals for salinity control during the period 9/27/04 to 12/31/09.
- PHASE III – East Side Laterals Piping Project (Contract No. 07-FC-40-2568). The project involved piping 10 miles of open, earthen laterals for salinity control during the period 5/15/07 to 12/31/11.
- PHASE IV – East Side Laterals Piping Project (Contract No. 09AP40866). The project involved piping 11.4 miles of open, earthen laterals for salinity control during the period 5/15/07 to 12/31/12. This project was jointly funded by the Basinwide Salinity Control Program and the State of Colorado Non Point Source Program.
- PHASE V – East Side Laterals Piping Project (Agreement No. R11AC40020). This project involved piping 19 miles of open, earthen laterals for salinity control during the period 8/09/11 to 12/31/15.
- PHASE VI – EC Lateral Lining (Agreement No. – See contract #'s below). The goal of the project was to demonstrate that a new canal lining technology could be

employed in the Uncompahgre Project area to reduce selenium and salt loading to the lower Gunnison and Colorado River systems. The first demonstration phase involved lining 0.29 miles and was highly successful. Subsequent phases are in the process of being implemented and will total 2.0 miles at project completion. Project partners are identified below:

- State of Colorado Species Conservation Trust Funds: “EC Canal Lining Demonstration Project” (Contract No. C-154160) (Construction Period: 02/09/10 to 6/30/13)
- Salinity Program Parallel Funds (Colorado Department of Agriculture): \$1.5 M (Contract No. 22911) (Construction Period: 10/01/10 to 09/30/12)
- Colorado River District Grant (Contract No. CG09019) (Construction Period: 08/27/09 to 04/30/12)

- PHASE VII – East Side Laterals Piping Project (Agreement No. R11AC40025). The goal of this project was to pipe 12.7 miles of open, earthen laterals for salinity control during the period 8/09/11 to 12/31/16

A total of 65,144 tons/year of salt has been controlled and an estimated range of 2,605 to 5,211 lbs/year of selenium controlled.

TECHNICAL PROJECT DESCRIPTION

The *Uncompahgre Project Headgate Automation, Remote Monitoring, and SCADA System* project proposes to replace the existing (50+ year old) failing hardwired relay control system in the M&D and Ironstone Canals in the federal UP with a completely new Programmable Controller (PLC) based system for automatic headgate control (sluiceway gate) and SCADA remote monitoring / alarming system.

The M&D Canal headgate automation project will be initiated first. Submersible sensors for the headgates must be installed in the canal prior to water being turned on within the UP system. Other tasks which take place outside of the canal (e.g. removing existing hardwiring and purchasing and installing new equipment in the control box) can continue throughout April, May and/or June when a funding agreement is in place with Reclamation. The Ironstone Canal will be initiated second with the majority of work occurring in late 2013 and early 2014. Installing the submersible sensors in the canal will again be a priority before water is turned on in the system. All tasks remain the same between the two projects.

A summary of the goals, objective and major tasks associated with this project is provided below. A project timeline and milestone table is also provided on pg. 34.

Goal: Improve irrigation system management and efficiency related to the M&D and Ironstone Canals.

Objective: Replace the existing 50+ year old relay control system with a new canal headgate automation, remote monitoring and SCADA / alarming system.

Tasks: Carry out the following tasks in order to implement the project.

Task 1 Research headgate automation options, develop scope of work and obtain subcontractor bids for work.

Task 2 Execute a contract with subcontractor.

Task 3

Subtask 3.1 – M& D Canal: Remove existing hardware at Ironstone including circuit breakers, relays, pushbuttons and switches. Purchase new components including Allen Bradley Micrologix PLC system (PLC) with analog input module for monitoring forebay level and controlling gate; Red Lion operator interface terminal for providing local view / control of the system as well as data logging and remote interface / alarming capabilities; and submersible level sensor for continuous monitoring of forebay levels. Replace old components with new equipment on a new backpanel (subcontractor will make use of enclosures and field side wiring to the motors). Install a new hinged “front panel” on which to mount switches, pushbuttons and the operator interface. Install new Universal Power Supply (UPS) for control system power back-up.

Subtask 3.2 – Ironstone Canal. Repeat 3.1 tasks for the Ironstone.

Task 4 Purchase a computer for the Olathe satellite office for headgate automation needs (e.g. maintaining software for download of hand-held delivery data, downloading and maintaining data, monitoring headgates and SCADA alarming needs). Purchase network server for the headquarters office for the purpose of handling networking and data needs associated with this project.

Task 5 Install a new submersible level sensor for continuous monitoring of forebay levels.

Task 6 Install PLC and Red Lion operator interface systems for monitoring and controlling the headgate, develop wiring diagrams and provide software copies to UVWUA. Initiate training on headgates.

Task 7 Install solar panels.

Task 8 Purchase hand-held devices and software.

Task 9 Program hand-helds, create necessary application for storing data, develop procedures for integrating data, and initiate training on remotes / handhelds.

Task 10 Submit semi-annual financial and progress reports (2) and final report (1) at the end of the project.

EVALUATION CRITERIA

Subcriterion No. A.1(b)—Improved Water Management

Up to 5 points may be awarded if the proposal will improve water management through measurement, automation, advanced water measurement systems, or through implementation of a renewable energy project, or through other approaches where water savings are not quantifiable.

Describe the amount of water better managed. For projects that improve water management but which may not result in measurable water savings, **state the amount of water expected to be better managed, in acre-feet per year and as a percentage of the average annual water supply.** (The average annual water supply is the amount actually diverted, pumped, or released from storage, on average, each year. This does not refer to the applicant's total water right or potential water supply.) Please use the following formula: Estimated Amount of Water Better Managed / Average Annual Water Supply

This project will improve water management through headgate automation, measurement and SCADA by replacing the existing, 50+ year-old failing hardwire relay control system with a completely new PLC based system for automated headgate control (sluiceway gate) as well as remote monitoring and SCADA / alarming.

DESCRIPTION OF THE WATER TO BE BETTER MANAGED: The M&D and Ironstone Canals are the main canal systems delivering irrigation water to the west side of the UP area. Together, the M&D and Ironstone serve approximately 38,872 irrigated acres and provide approximately 309,704 ac-ft/yr of average annual diversion.

M&D CANAL: The M&D Canal serves approximately 20,932 irrigated acres with a 10 year average annual diversion of 202,457 ac-ft. Over the past 8 years, the canal system has been experiencing frequent failure resulting in either the loss of adequate water supply and / or pressure for on-farm deliveries, canal bank overflow, or over-delivery of water to the west side of the UP. The estimated amount of water that can be better managed is 202,457 ac-ft or 100%.

<u>Estimated Amount of Water Better Managed</u>	=	<u>202,457 ac-ft</u> or 100%
Average Annual Water Supply		202,457 ac-ft

IRONSTONE CANAL: The Ironstone Canal serves approximately 17,940 irrigated with a 10 year average annual diversion of 107,247 ac-ft. Over the past 5 years, the existing canal automation system has been experiencing frequent failure resulting in either the loss of adequate water supply and / or pressure for on-farm deliveries, canal bank overflow, or over-delivery of water to the west side of the UP. The estimated amount of water that can be better managed is 107,247 ac-ft or 100%.

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Annual Water Supply}} = \frac{107,247 \text{ ac-ft or } 100\%}{107,247 \text{ ac-ft}}$$

Together, a total of 309,704 ac-ft/yr or 100% of the water coming through the M&D and Ironstone Canals will be better managed through this project.

M&D AND IRONSTONE DELIVERY AS A PORTION OF THE ENTIRE UP: The estimated amount of water better managed as a portion of the total UP water supply is:

$$\frac{309,704 \text{ ac-ft}}{865,574 \text{ ac-ft}} = 36\%$$

Subcriterion No. A.2.—Percentage of Total Supply

Up to 4 additional points may be allocated based on the percentage of the applicant’s total average water supply (i.e., including all facilities managed by the applicant) that will be conserved directly as a result of the project.

Provide the percentage of total water supply conserved: State the applicant’s total average annual water supply in acre-feet. Please use the following formula:

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual Water Supply}}$$

Not applicable.

Subcriterion No. A.3.—Reasonableness of Costs

Up to 4 additional points may be awarded based on the reasonableness of the cost for the benefits gained. Please include information related to the total project cost, annual acre-feet conserved (or better managed), and the expected life of the improvement. Use the following calculation:

$$\text{Reasonableness of Cost} = \frac{\text{Total Project Cost}}{\text{Acre-Feet Better Managed x Improvement Life}}$$

Failure to include this required calculation will result in no score for this section.

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer’s guarantee,

industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.). Failure to provide this information may result in a reduced score for this section.

As recommended the following equation was used to determine reasonableness of costs. The improvement life for this project was calculated with assistance from Reclamation staff (Bob Norman, WCAO, personal communication). The improvement life is calculated as 11.4 years.

According to Mr. Norman, in order to get some idea of the improvement life of the project the life-expectancy of each project should take into account the individual components' present day values. He suggest the following equation for estimating this project's improvement life utilizing life expectancies or manufacturer's warranties: Solar panels last 20 years and cost \$2000, submersible sensors last 11 years and cost \$2500, PLC and gate controls last 11 years and cost \$39100, electrical components cost \$5000 and last 15 years, batteries cost \$300 and last 3 years, and hand-helds cost \$11730 and last 10 years, my formula would look like:

$$\frac{(20*2000 + 11*2500 + 11*39100 + 15*5000 + 3*300 + 10*11,730)}{(2000+2500+39100+5000+300+11,730)}$$

= 11.4 years.

$$\begin{aligned} \text{Reasonableness of Cost} &= \frac{\text{Total Project Cost}}{\text{Acre-Feet Conserved or Better Managed} \times \text{Improvement Life}} \\ &= \frac{\$86,128}{309,704 \text{ ac-ft / yr better managed} \times 11.4 \text{ years}} \\ &= \mathbf{\$0.024 / \text{ac-ft}} \end{aligned}$$

The following information regarding product life-expectancies was provided by Mountain Peak Control Systems of Golden, Colorado, and web research conducted for this project regarding industry accepted life-expectancies:

- The solar array system life-expectancy is 20 years
- The PLC, submersible sensors and control system electronics have a 10-12 year life expectancy
- The breakers, relays, push-buttons, canal submersible probes, etc., have a 15 year life-expectancy
- The batteries have a 3-year life-time after which they need to be replaced
- The handhelds have a 1 year manufacture's guaranty against defects. No product life-expectancy could be found for the handhelds, but according to website research, some models have had a 10 year life-expectancy before products are phased out in favor of new models (www.aceeca.com)

V.A.2. Evaluation Criterion B: Energy-Water Nexus (16 points)

Up to 16 points may be awarded based on the extent to which the project increases the use of renewable energy or otherwise results in increased energy efficiency.

For projects that include construction or installation of renewable energy components, please respond to Subcriterion No. B.1— Implementing Renewable Energy Projects Related to Water Management and Delivery. If the project does not implement a renewable energy project but will increase energy efficiency, please respond to Subcriterion No. B.2— Increasing Energy Efficiency in Water Management. If the project has separate components that will result in both implementing a renewable energy project and increasing energy efficiency, an applicant may respond to both. However, an applicant may receive no more than 16 points total under both Subcriteria No. B.1 and B.2.

Subcriterion No. B.1.—Implementing Renewable Energy Projects Related to Water Management and Delivery

Up to 16 points may be awarded for projects that include construction or installation of renewable energy components (e.g., hydroelectric units, solar-electric facilities, wind energy systems, or facilities that otherwise enable the use of renewable energy). Projects such as small-scale solar resulting in minimal energy savings or production will be considered under Subcriterion No. B.2 below.

Not applicable.

AND/OR

Subcriterion No. B.2.—Increasing Energy Efficiency in Water Management

If the project is not implementing a renewable energy component, as described in Subcriterion No. B.1 above, up to 4 points may be awarded for projects that address energy demands by retrofitting equipment to increase energy efficiency and/or through water conservation improvements that result in reduced pumping or diversions.

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping).

- Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

Not applicable – project not claiming water conservation benefit.

- Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?

Not applicable.

- Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.

Not applicable.

- Does the calculation include the energy required to treat the water?

Not applicable.

- Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations.

M&D CANAL:

Yes. According to UVWUA Water Masters, the M&D Canal has been experiencing frequent failures over the past 8 years which has required the ditch rider to physically monitor the canal headgate at least twice a day to regulate flow. From the UVWUA headquarters to the M&D Canal it is approximately 12 miles roundtrip. The irrigation season in the Uncompahgre Project runs from approximately April 1 to October 31 or 210 days. It is anticipated that following the implementation of this canal automation, remote monitoring and SCADA / alarming project, ditch riders may only have to check the canal at least 1.2 times per day over the irrigation season (more frequent visits in the beginning and less as they become more secure in the way the system is operating).

Current Vehicle Miles Driven

$(12 \text{ mi RT}) \times (2 \text{ visits/day}) \times (210 \text{ days/irrigation season}) = 5,040 \text{ miles per season}$

Future Projected Miles Driven

$(12 \text{ mi RT}) \times (1.2 \text{ visits / day}) \times (210 \text{ days/irrigation season}) = 3,024 \text{ miles per season}$

Reduced vehicle miles driven to M&D Canal per year: 2,016

IRONSTONE CANAL:

Yes. According to UVWUA Water Masters, the Ironstone Canal has been experiencing frequent failures over the past 5 years which has required the ditch rider to physically monitor the canal headgate at least four times to regulate flow. From the UVWUA headquarters to the Ironstone Canal it is approximately 7 miles roundtrip. The irrigation season in the Uncompahgre Project runs from approximately April 1 to October 31 or 210 days. It is anticipated that following the implementation of this canal automation, remote monitoring and SCADA / alarming project, ditch riders may have to monitor the canal 2 time per day over the irrigation season (i.e. a daily morning and evening run).

Current Vehicle Miles Driven

$(14 \text{ mi RT}) \times (4 \text{ visits/day}) \times (210 \text{ days/irrigation season}) = 11,760 \text{ miles per irrigation season}$

Future Projected Miles Driven

(14 mi RT) x (2 visits/day) x (210 days/irrigation season) = 5,880 miles per irrigation season

Reduced vehicle miles driven to Ironstone Canal per year: 5,880 miles

TOTAL REDUCED VEHICLE MILES DRIVEN TO M&D AND IRONSTONE PER IRRIGATION SEASON: 7,896

It is estimated that ditch rider vehicles consume on average approximately 1 gallon of gas for every 14 miles driven.

Utilizing the EPA Greenhouse Gas Equivalencies Calculator (<http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>), it is estimated that by driving 7,896 miles less per year, a reduction of **5.08 Metric Tons of CO₂** would be reduced.

$$\frac{7,896 \text{ miles}}{14 \text{ miles per gallon}} \times 0.009 \text{ Metric tons of CO}_2 \text{ per gallon of gas} = 5.08 \text{ Metric Tons}$$

•**Describe** any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).

The UVWUA will be installing a 20 watt small-scale solar panel as part of the project. According to utility usage records, the M&D Canal utilized on average about 2500 watts per day while the Ironstone utilized about 933 watts per day. A 20 watt solar panel would off-set existing energy demands 0.04 to 0.12 % per day at the M&D and Ironstone, respectively. Energy demands associated with the new components are likely to be higher due to their active level of control of headgate deliveries. Approximately 315 kilowatts will be saved per year by utilizing solar.

V.A.3. Evaluation Criterion C: Benefits to Endangered Species

(12 points) *Up to 12 points may be awarded for projects that will benefit federally-recognized candidate species or up to 12 points may be awarded for projects expected to accelerate the recovery of threatened or endangered species, or addressing designated critical habitat.*

For projects that will directly benefit *federally-recognized candidate species*, please include the following elements:

(1) What is the relationship of the species to water supply?

The federal Uncompahgre Project Area receives its water supply from the Gunnison River via the Gunnison Tunnel through the federal Aspinall Unit and from the Uncompahgre River. The lower Gunnison River, below the confluence of the Uncompahgre River, serves as critical habitat to four listed endangered fish species (razorback sucker, humpback chub, bonytail chub, and Colorado pikeminnow).

(2) What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?

This project will have benefits on accelerating the recovery of endangered fish species in the Lower Gunnison and Colorado Rivers because it is also serving as a pilot-project for canal headgate automation, remote monitoring, and SCADA that will eventually be employed throughout the east side of the UP. The east side of the UP is where significant efforts are being made to reduce selenium loading due to the high selenium content in the soils. Open canal and lateral delivery systems efficiency is being addressed through piping and lining which reduces seepage and resultant selenium loading. The UVWUA, Reclamation, and State of Colorado (with significant local stakeholder support) are currently in the process of completing an *Uncompahgre Integrated Assessment and System Optimization Analysis*. Among other things, the study will identify and document approaches and solutions for addressing water efficiency and management issues. One of the early critical tasks identified by study researcher, Dr. Charles Burt of the Irrigation Training and Research Center at California Polytechnical Institute and Reclamation staff, is the implementation and testing of a remote monitoring and SCADA / alarming system.

Documenting the benefit of accelerated recovery of endangered fish species will not be feasible during this project timeline. A large amount of selenium must be removed from the river system and from the aquatic food web in order to have a positive benefit on endangered river fish. In order to meet the 4.6 ppb chronic water-quality standard for selenium during an average hydrologic period similar to 2006-2010 where the 85th percentile dissolved selenium concentration is equal to approximately 5.58 ppb, it is estimated that approximately 2,800 pounds of selenium will need to be controlled. This is the current goal of the Selenium Task Force and the Selenium Management Program which may likely be accomplished in the next 10-15 years due to efforts such as those taking place in the UP. Current water-quality trends at the Gunnison River at Whitewater, Colorado showed a 29% decrease in selenium concentration during the 1986-2008 period due to man-induced activities (i.e. piping, lining, more efficient on-farm practices, Reclamation UP winter water program, etc.). It is hypothesized that decreasing trends in selenium concentration will continue as selenium reduction activities are accelerated within the basin.

For projects that will directly accelerate the recovery of *threatened or endangered species or address designated critical habitats*, please include the following elements:

(1) How is the species adversely affected by a Reclamation project?

In areas of the Lower Gunnison Basin like the federal UP, which have local geological sources of salts and selenium, application of water to the soil via irrigation water for urban landscaping or agricultural fields and leaking canals or laterals mobilizes selenium and salts and creates hydraulic gradients that can result in the discharge of non-point source polluted surface and groundwater into irrigation drains and local waterways. High selenium concentrations have been shown to cause reproductive failure and deformities in aquatic birds and fish. The lower Gunnison River, from the confluence of the Uncompahgre River, serves as critical habitat to four listed endangered fish species (razorback sucker, humpback chub, bonytail chub, and Colorado pikeminnow). The federal Uncompahgre Project Area and the Uncompahgre River Basin have been identified as the source of 60% of the selenium loading in the lower Gunnison River (Reclamation, 2006). The Uncompahgre River currently violates Clean Water Act (CWA) chronic water-quality standards of 4.6 ppb which are said to be protective of aquatic dependent life. Selenium concentrations in the Uncompahgre River above the confluence with the Gunnison are 14.8 ppb.

In 2009, an Environmental Impact Statement (EIS) was prepared for re-operation of the Aspinall Unit to mitigate for the effects of depletions in the Gunnison and Dolores River Basins on endangered river fish. A Biological Assessment (BA) found that there would be impacts to endangered fish as a result of the proposed re-operation. The FWS prepared a Programmatic Biological Opinion (PBO) which stated that on-going irrigation activities in the Lower Gunnison would continue to negatively impact selenium levels and that a Selenium Management Program would have to be developed as part of the conservation measures utilized to mitigate impacts from the flow medications and historical depletions. Employment of the canal headgate automation and remote monitoring project may make the operation of the Aspinall Unit easier for the benefit of endangered species because the UVWUA will have better control of water going through the UP.

(2) Is the species subject to a recovery plan or conservation plan under the Endangered Species Act?

Yes, the Colorado River Endangered Fish Recovery Program.

(3) What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?

Canal headgate automation, remote monitoring and SCADA / alarming are necessary components of the UP irrigation delivery system efficiency project for the east side where selenium mobilization potential is high. What the UVWUA learns from this project will greatly assist in addressing water management challenges presented with a more modernized and efficient irrigation delivery system. To date, over 64.15 miles of open, earthen canals and laterals have been piped or lined out of a total of 566 miles, with an additional 30.1 miles under contract.

The long-term future benefits of this project toward improving the status of endangered species are moderate because it provides necessary and critical education with regard water management via remote monitoring on the east side of the UP. The UVWUA plans to install

additional canal headgate automation, remote monitoring and SCADA on the east side at 3 identified locations within the next 2-3 years. The Uncompahgre Project is the source of approximately 60% of the selenium loading in the lower Gunnison River Basin. The estimated selenium reduction required to meet in stream water-quality standards is 1,680 pounds/year of selenium. The chronic water-quality standard for selenium is 4.6 ppb and the Uncompahgre River at Delta is 14.8 ppb.

V.A.4. Evaluation Criterion D: Water Marketing (12 points)

Up to 12 points may be awarded for projects that propose water marketing elements, with maximum points for projects that establish a new water market.

*Note: Water marketing does **not** include an entity selling conserved water to an existing customer. This criterion is intended for the situation where an entity that is conserving water uses water marketing to make the conserved water available to meet other existing water supply needs or uses.*

Not applicable.

V.A.5. Evaluation Criterion E: Other Contributions to Water Supply Sustainability (14 points)

*Up to 14 points may be awarded for projects expected to contribute to a more sustainable water supply. This criterion is intended to provide an opportunity for the applicant to explain how the project relates to a **WaterSMART Basin Study**, how the project could expedite future **on-farm improvements**, or how the project will provide **other benefits to water supply sustainability** within the basin. An applicant may receive the maximum 14 points under this criterion based on discussion of one or more of the numbered sections below.*

*(1) Points may be awarded for projects that address an adaptation strategy identified in a **WaterSMART Basin Study**. Proposals that thoroughly discuss how a project is addressing an adaptation strategy identified in a Basin Study (i.e., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:*

- Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project. Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe the water supply or water management issue that this adaptation strategy will address.

According to the *Colorado River Basin Water Supply and Demand Study* (Reclamation WaterSMART Basin Study, 2012) all portfolios developed to address water supply and demand imbalances involved adaptation strategies with “*significant* agricultural water conservation (emphasis added).....” (Executive Summary, pg. 19).

This project directly addresses the Conveyance System Efficiency Improvements adaptation strategy identified in Technical Report F (Appendix F10). According to the description, “Improvements in conveyance system efficiency through delivery canal lining, canal to pipe conversion, *improved canal control* and/or construction of regulation reservoirs to reduce canal operational spills, and implementation of system-wide drainwater or tailwater recovery systems *are included in this option*. Although these conservation methods *can yield significant reductions in total diversions in many cases, consumptive water use savings are far less and are attributed to evaporation, seepage, drainage, and operational spills to saline sumps, bodies of water, and phreatophyte evapotranspiration loss from irrigation and drainage canals* (emphasis added)” (<http://www.usbr.gov/lc/region/programs/crbstudy/finalreport/techrptF.html>).

The *Colorado River Water Supply and Demand Study* also found that, “The Study’s portfolio exploration demonstrated implementation of a broad range of options can reduce Basin resource vulnerability and improve the system’s resiliency to dry hydrologic conditions while meeting increasing demands in the Basin and adjacent areas receiving Colorado River water.” The study calls out several specific actions that must take place to implement solution to address imbalances including the fourth action says that, “...as projects, policies, and programs are developed, consideration should be given to those that provide a wide-range of benefits to water users and healthy rivers for all users” (Executive Summary, pg. 21).

- Provide a detailed explanation of how the proposed WaterSMART Grant project would help implement the adaptation strategy identified in the Basin Study.

The proposed WaterSMART grant project implements the *Conveyance System Efficiency Improvements* adaptation strategy by installing a canal remote monitoring and SCADA / alarming system on the M&D and Ironstone Canals which can improve delivery system efficiencies. This project addresses inefficiencies caused by a failing 50+ year old system while also serving as a pilot-project for the entire planned UP east side system optimization. This project addresses water management challenges associated with a modernized irrigation delivery system and helps address Colorado River Basin water resource vulnerabilities and improves the UVWUA’s resiliency to respond pressures associated with climate change and pressures under the Clean Water and Endangered Species Acts.

- Fully describe any other benefits to water supply sustainability that are not described elsewhere in your proposal that will result from this WaterSMART Grant project, for example, if the project will result in further collaboration among Basin Study partners, or demonstrate a new or innovative approach, among other benefits.

(2) Points may be awarded for projects that will help to expedite future on-farm irrigation improvements, including future on farm improvements that may be eligible for NRCS funding.

Not directly explored.

(3) Points may be awarded for projects that include **other benefits** to water supply sustainability. Projects that do not address a need/adaptation strategy identified in a Basin Study or do not help expedite future on-farm irrigation improvements, may receive maximum points under this criterion by thoroughly explaining additional project benefits. Please provide sufficient explanation of the additional expected project benefits and their significance. Additional project benefits may include, but are not limited to, the following:

- Will the project make water available to address a specific concern? For example:
 - i. Will the project address water supply shortages due to climate variability and/or heightened competition for finite water supplies (e.g., population growth or drought)? Is the river, aquifer or other source of supply over-allocated?

There is disagreement at this time as to whether the Gunnison Basin, a sub-basin of the Colorado River Basin, is over or under allocated at this time. The Colorado River Basin is over-allocated.

Yes, this project will help to address heightened competition for water supplies. Over the past 15 years, the Lower Gunnison Basin has experienced several intense droughts, the last occurring in 2012. The Uncompahgre River water right usually results in a call being placed on the Uncompahgre River 6 out of 10 years. During 2002 and 2003, the UVWUA was running at or below 80% of their allocation which resulted in calls being placed on junior water-right holders on the Gunnison River which has happened only twice in the past 38 years. During the drought of 2012 an agreement was made between the UVWUA and the Upper Gunnison River Basin with second fill storage credits out of Taylor Reservoir which diverted a call being placed on the Gunnison River. There was a shortage of water in the M&D Canal during the months of July and August and an extreme shortage of water in the Ironstone Canal during the months of May through October of 2012 which resulted in only 70% of water being delivered throughout the entire system for the majority of the growing season.

This canal automation and remote monitoring project directly responds to climate variability and competition for finite water supplies by improving the UVWUA's ability to accurately measure deliveries, keep steady water supplies in the system, prevent accidental canal overflow due to a malfunctioning relay control system at the canal headgates and improve the resiliency of the UVWUA to respond to potential endangered species issues (i.e. potential for U.S. Fish and Wildlife Service (FWS) to place a storage call on the Rivers for endangered species benefits under the ESA).

The UVWUA and other stakeholders within the basin are concerned about the potential for water resource, water-quality and endangered species conflicts that may arise as a result of projected population growth within areas served by the Colorado River in the Colorado River Basin, State of Colorado, and Delta and Montrose Counties, climate change and more frequent drought expected in the Colorado River Basin, and selenium loading associated with on-going irrigation in the Gunnison Basin.

ii. Will the project market water to other users? If so, what is the significance of this (e.g., does this help stretch water supplies in a water-short basin)?

No.

iii. Will the project make additional water available for Indian tribes?

No.

iv. Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved? (e.g., will the project benefit an endangered species by maintaining an adequate water supply)? Are there endangered species within the basin or other factors that may lead to heightened competition for available water supplies among multiple water uses?

Yes. With the existing failing canal automation system on the M&D and Ironstone Canals, landowners are already experiencing interruptions to water supply because the canals are either overflowing or empty when they shouldn't be.

In addition, there are endangered fish species which utilize critical habitat in the lower Gunnison River below the confluence with the Uncompahgre. During times of drought when there are limited water supplies and higher concentrations of selenium in the Uncompahgre River, it is very important for the UVWUA to effectively manage their water deliveries in order to prevent potential water-quality, water resource and endangered species conflicts. This project will help to improve the UVWUA's resiliency in responding to endangered species needs.

The canal automation and remote monitoring / alarming project also helps to address increased seepage and therefore higher selenium loading that results when the canal is fuller than it should be. In addition, the remote monitoring / alarming capabilities help to maintain adequate water supplies/levels for on-farm deliveries so that irrigation sets do not have to be re-started when there is a loss of water in the system. Doing additional irrigation sets results in additional on-farm selenium loading.

v. Will the project generally make more water available in the water basin where the proposed work is located?

No. The canal automation, remote monitoring and SCADA will allow the UVWUA to make better use of water that is already available.

• Does the project promote and encourage collaboration among parties?

i. Is there widespread support for the project?

Yes. Partners such as the Colorado River Water Conservation District, Colorado Division of Water Resources, Colorado Water Conservation Board, Gunnison Basin Selenium Management Program and Selenium Task Force stakeholders are all aware of and supportive of the project.

ii. What is the significance of the collaboration/support?

Stakeholders identified above understand the importance of furthering UP system efficiency because of the water-quality (e.g. selenium and salinity), water conservation and endangered species benefits it provides. Multiple stakeholders within the basin are working together on planning, research/studies, and implementation projects which are focused on selenium reduction with the above identified added environmental benefits. For example, the above stakeholders have worked together to do planning and to get funding to implement the UP East Side System Optimization Study and to provide political support for on-going piping and lining projects, etc.

iii. Will the project help to prevent a water-related crisis or conflict?

Yes. The project helps prevent potential future water-related conflicts because it addresses irrigation delivery system inefficiencies on both the west and east-sides of the UP where irrigation delivery system water seepage into Mancos shale soils are responsible for selenium loading. Addressing irrigation delivery system inefficiencies is a high priority action item in both the Gunnison Basin Selenium Management Program developed under the Gunnison Basin Programmatic Biological Opinion and the Selenium Watershed Management Plan developed under Section 319 of the CWA requirements.

iv. Is there frequently tension or litigation over water in the basin?

There has been tension during times of drought when there are limited water resources and when the UVWUA (which has senior water rights) has to place a “call” on junior water right holders in the Upper Gunnison and Upper Uncompahgre River basins.

v. Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

The UVWUA has been a leader in water-quality, water conservation, and endangered species planning and implementation efforts in the Lower Gunnison River Basin which is causing other watershed sub-basins, such as the North Fork of the Gunnison, to consider the development of comprehensive plans that address inefficiency.

• Will the project increase awareness of water and/or energy conservation and efficiency efforts?

To our knowledge, there is only one other water-provider (much smaller) in the Lower Gunnison Basin, the Fire Mountain Project in Paonia, utilizing canal automation, remote monitoring and SCADA/alarms, so it is possible that this project will increase awareness of water efficiency efforts and opportunities.

The UVWUA actively participates in local outreach and education to increase awareness about opportunities to address local water resource, water-quality and endangered species issues. Future outreach and education activities will highlight the benefits of the WaterSMART Program and this project.

i. Will the project serve as an example of water and/or energy conservation and efficiency within a community?

Yes. This project will serve as an example to other water providers/users considering system-wide optimization and efficiency projects by demonstrating the benefits of canal automation, remote monitoring, measuring, and SCADA / alarming.

ii. Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?

Through continuing efforts to increase irrigation delivery system efficiency and by demonstrating the benefits of canal automation, remote monitoring and SCADA in maintaining reliable water supplies, landowners may consider moving to more efficient irrigation systems such as sprinklers, gated pipe or drip.

iii. Does the project integrate water and energy components?

The UVWUA is currently exploring the possibility of a potential hydropower project on the M&D Canal. This project will have a direct benefit on the hydropower project by providing a regulated and reliable water supply for energy production. It is anticipated that the SCADA system will tie into the hydropower project to provide data and information on water flows and power production.

V.A.6. Evaluation Criterion F: Implementation and Results (10 points)

Up to 10 points may be awarded for the following:

Subcriterion No. F.1.—Project Planning

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place.

Yes, a Water Conservation Plan (WCP) and System Optimization Review (ROW) exist for the UP.

Provide the following information regarding project planning:

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, or other planning efforts done to determine the priority of this project in relation to other potential projects.

- A) UP WATER CONSERVATION PLAN (UP WCP)
- B) UP EAST SIDE SYSTEM OPTIMIZATION REVIEW (SOR)
- C) SELENIUM MANAGEMENT PROGRAM FORMULATION DOCUMENT (SMP)
- D) GUNNISON BASIN & GRAND VALLEY SELENIUM WATERSHED MANAGEMENT PLAN (SeWMP)

UP WATER CONSERVATION PLAN: The UVWUA certifies that it has an up-to-date water management plan. The Plan has been submitted to Ms. Sandra Caskey of the Western Colorado Area Office in Grand Junction. Ms. Caskey can be contacted directly if verification is needed (Phone: 970-248-0616 or Email: scaskey@usbr.gov).

UP EAST SIDE SYSTEM OPTIMIZATION REVIEW (SOR): The UVWUA certifies that the UP is currently undergoing an *Integrated Assessment and System Optimization Analysis*. The study is being conducted by the Irrigation Training and Research Center at California Polytechnical State University. Financial support for the study was provided by Colorado Species Conservation Trust Funds administered by the Colorado Water Conservation Board. Study expected to be complete in 2014.

SELENIUM MANAGEMENT PROGRAM FORMULATION DOCUMENT (SMP): A SMP was completed for the Gunnison Basin December 2011. The SMP can be accessed through Reclamation's website at: <http://www.usbr.gov/uc/wcao/progact/smp/docs/Final-SMP-ProgForm.pdf>

GUNNISON BASIN & GRAND VALLEY SELENIUM WATERSHED MANAGEMENT PLAN (SeWMP): The SeWMP was completed by the Selenium Task Force in December 2012. The SeWMP can be access via the Selenium Task Force website at: <http://www.seleniumtaskforce.org>

(2) Identify and describe any engineering or design work performed specifically in support of the proposed project.

No design or engineering work is necessary for this project.

(3) Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).

UP WATER CONSERVATION PLAN (UP WCP): The UP WCP identifies goals which include computerizing the headgates on the M&D and Ironstone Canals, converting to computerized hand-helds for ditch rider delivery data, and installing SCADA / alarming systems to improve water delivery efficiency and management, and on-going piping and lining to improve delivery system efficiency.

UP EAST SIDE SYSTEM OPTIMIZATION REVIEW (SOR): The SOR is being conducted for the purpose of: 1) performing a comprehensive analysis and review of efficiency improvement opportunities with regard to optimizing the network of open water delivery canals and laterals, 2) developing a systematic plan for improving the efficiency of the UVWUA water delivery system and minimizing water losses to deep percolation to reduce salt and selenium transport, and 3) developing a plan to best integrate the off-farm delivery systems with on- and near-farm water application efficiency improvements.

SELENIUM MANAGEMENT PROGRAM FORMULATION DOCUMENT (SMP): The UVWUA certifies that action plan components of the Gunnison Basin SMP include the need to continue to address irrigation improvement activities including “improving irrigation water management” and “continuing to pipe and line east side laterals” (SMP, pg. 40). These activities necessitate canal headgate automation, remote monitoring and SCADA for efficient operation of the UP. The SMP can be accessed through Reclamation’s website at: <http://www.usbr.gov/uc/wcao/progact/smp/docs/Final-SMP-ProgForm.pdf>

GUNNISON BASIN & GRAND VALLEY SELENIUM WATERSHED MANAGEMENT PLAN (SeWMP): The UVWUA certifies that action plan components of the SeWMP include the need to continue to address irrigation improvements activities which reduce selenium loading and include “improving irrigation water management” and “piping or lining open canals and laterals” (SeWMP, pg. 66). These activities necessitate canal headgate automation, remote monitoring and SCADA for efficient operation of the UP. The SeWMP can be access via the Selenium Task Force website at: <http://www.seleniumtaskforce.org>

Subcriterion No. F.2.—Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement.

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. ***(Please note, under no circumstances may an applicant begin any ground-disturbing activities—including grading, clearing, and other preliminary activities—on a project before environmental compliance is complete and Reclamation explicitly authorizes work to proceed).***

Please explain any permits that will be required, along with the process for obtaining such permits.

PERMITS: The UVWUA has consulted with Reclamation and confirmed that the project as described does not appear to necessitate NEPA or Cultural Resource compliance. Reclamation staff from the Western Colorado Area Office in Grand

Junction will do a Categorical Exclusion Checklist (CEC) for the project and doesn't foresee any expenses associated with providing the CEC.



IMPLEMENTATION PLAN: The implementation plan for the project is as follows. Prior to pre-award the UVWUA researched the headgate automation, remote monitoring, and SCADA / alarming project with Reclamation input and support. A scope of work was developed and preliminary bids for the project were obtained and a contract was been executed with a subcontractor and 40% down payment made. The UVWUA is ready to proceed with the remaining tasks upon implementation of a funding agreement with Reclamation as follows.

Existing hardwiring in the control box will be removed and new equipment will be purchased and installed (including hand-held devices, computer for the Olathe satellite office, barcode printer, solar panels and network server to manage data and networking requirements of this project). The submersible pumps will be installed in the canals prior to water being put back into the system. The PLC and Red Lion operator interface will be installed, wiring diagrams will be developed, and copies of software will be provided to UVWUA staff. Hand-helds will be programmed, computer applications will be developed for storing and integrating data, and training will be initiated.






















Grant program reporting will be done on a semi-annual basis with 2 progress and financial reports being submitted along with a final report.

A project schedule showing stages, duration of work, major tasks, milestones, and dates has been provided below.

Timeline and Milestone Table: Uncompahgre Project Headgate Automation, Remote Monitoring & SCADA System

Blue Arrow () = M&D Canal
 Red Arrow () = Ironstone Canal

Anticipate Water Smart Agreement

PROJECT TASK	Pre-Award				Post Award								Milestone	Date
	2012		2013		2013		2014		2014					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Task 1 Research project and obtain bids													SOW developed and bids received	Nov - 12
Task 2 - Execute contract w/Mountain Peaks													Contract in place	Dec - 12
Task 3 - Remove existing hardware and purchase PLC and other system components													Hardware removed & PLC, etc. purchased	Apr - 13 & Feb 14
Task 4 - Purchase computer and network server													Computer and server received	June - 13 & Mar - 13
Task 5 - Install submersible level sensors in canals before water arrives													Sensors in canal	Mar - 13 & Feb - 14
Task 6 - Install PLC and Red Lion operator interface systems for monitoring and controlling the headgates; develop wiring diagrams and provide software copies													PLC and Red Lion installed; diagrams developed; software copies in office	Aug - 13 & Apr - 14
Task 7 - Install solar panels													Solar panels mounted	Sept - 13 & May 14
Task 8 - Purchase hand-held devices and software													Hand-helds and software received	May - 13
Task 9 - Program hand-helds, create necessary applications for storing data, develop procedures for integrating data, initiate training													Hand-helds programmed; application complete; procedures documented, training	Dec - 13
Task 10 - Semi annual reports (2)and final report (1)													2 semi-annuals submitted; final report submitted; project closed	Oct - 13, Apr - 14, & Dec - 14

V.A.7. Evaluation Criterion G: Additional Non-Federal Funding (4 points)

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided.

$$\frac{\text{Non-Federal Funding}}{\text{Total Project Cost}} = \frac{\$47,370}{\$86,128} = 55\%$$

V.A.8. Evaluation Criterion H: Connection to Reclamation Project Activities (4 points)

Up to 4 points may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.

(1) How is the proposed project connected to Reclamation project activities?

UP system efficiency is an important component of the Gunnison Basin Selenium Management Program (SMP). The SMP is a conservation measure identified in the Gunnison Basin Programmatic Biological Opinion and required to be implemented by Reclamation.

The Uncompahgre Project is an identified salinity control area in the Colorado River Basin Salinity Control Program.

(2) Does the applicant receive Reclamation project water?

Yes, from the Gunnison River via the Gunnison Tunnel and federal Aspinall Unit.

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

Yes, the project is located on Reclamation project lands involves Reclamation facilities.

(4) Is the project in the same basin as a Reclamation project or activity?

Yes.

(5) Will the proposed work contribute water to a basin where a Reclamation project is located?

Yes. The project contributes water to the Lower Gunnison Basin where the federal Uncompahgre Project is located.

Subcriterion No. F.3.—Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved, marketed, or better managed, or energy saved). For more information calculating performance measure, see Section VIII.A.1.

“FY2013 WaterSMART Water and Energy Efficiency Grants: Performance Measures”. Note: All WaterSMART Grant applicants are required to propose a “performance measure” (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with WaterSMART Grant recipients describing the performance measure, and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted. Quantification of project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

IMPROVED WATER MANAGEMENT PERFORMANCE MEASURE: The UVWUA proposes to compare data from existing, old manual canal flow recorders located at the M&D and Ironstone Canal sites and data from remote delivery records after the submersible level sensors which regulate flow through the canal headgates are installed. The old manual recorders are used to manually calculate average daily flows from peaks and valleys recorded on a graph. The new sensors will respond constantly to changes in canal flows to maintain identified delivery amounts with less variability in daily flow and are therefore more accurate. A comparison of the two canal flow delivery recording methods should provide an accurate measure of the effect/benefit of the project on water management.

ENDANGERED SPECIES PERFORMANCE MEASURES: Water-quality benefits of this project on endangered species recovery are much more difficult to quantify as a performance measure during this project timeframe and at this project scale. The UVWUA has stated in this application that this canal automation, remote monitoring and SCADA project will serve as a pilot-test for upcoming canal headgate automation that will take place over the next 2-3 years on soils high in selenium on the east side of the UP. The UVWUA proposes that the final SOR report for the UP be provided to Reclamation in order to provide evidence of proposed activities that support selenium reduction and endangered species recovery including: 1) additional canal lining and lateral piping to reduce deep percolation and selenium loading, 2) re-alignment or elimination of laterals which reduces delivery system water losses due to canal or lateral seepage, and 3) identifies locations for additional canal headgate automation. In addition, information may be available from selenium water-quality monitoring sites in the UP which may allow for documentation of selenium concentration and / or load reduction which ultimately benefits the endangered fish species.

Environmental and Cultural Resources Compliance (FOA Section IV.D.1, pg. 25) To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on the NEPA, ESA, and NHPA requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why. Additional information about environmental compliance is provided

in Section IV.D.4. “Project Budget,” under the discussion of “Environmental and Regulatory Compliance Costs,” and in Section VIII.B., “Overview of Environmental and Cultural Resources Compliance Requirements.”

Note: applicants proposing a Funding Group II project must address the environmental and cultural resources compliance questions for their entire project, not just the first one-year phase. If you have any questions, please contact your regional or area Reclamation office (see <www.usbr.gov/main/regions.html>) with questions regarding ESA compliance issues. You may also contact Mr. Dean Marrone, WaterSMART Program Coordinator, at 303-445-3577, for further information.

(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.

The work involved in replacing the existing canal relay control system and hardwiring does not involve any earth-disturbing activities other than utilizing the existing utility easement to install the DSL line. A single individual walking on-foot in an un-vegetated area will remove old wiring and install new wiring and equipment onto a new backpanel in an existing utility cabinet. A submersible level sensor will be installed into an existing well within the canal and an additional ultrasound sensor will be attached to and located in-front of the canal headgate.

A 1.5 MB DSL line will have to be run from the control box which sits by the edge of a gravel road either to the ditch rider home or along the gravel road to an existing utility control box. The DSL line will be placed within the existing utility easement. The utility company will be notified and will be responsible for putting in the DSL line and will obtain any necessary permits. There is no vegetation around the control boxes or in the gravel roads.

(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?

Colorado hookless-cactus has been found on the west side of the UP. There would be no impacts to hookless cactus associated with this project as there are no earth disturbing activities proposed in vegetated areas. There is no existing vegetation around the canal control box or along the utility easement in the gravel road where the DSL line will be installed.

There are no activities associated with the project which would negatively impact endangered fish species. Endangered fish species habitat is found further downstream in the Lower Gunnison River.

(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.

No.

(4) When was the water delivery system constructed?

It is uncertain what the exact date of construction was for the M&D, but it is likely to be prior to the 1890 adjudication date. The M&D Canal was the first canal purchased (sometime between 1908 and 1909) for the Uncompahgre Valley Project and upon acquisition was upgraded and extended.

(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.

No. There will be no modification to the existing canal headgates or flumes. Modifications will only be done to the controls/wiring and equipment within the control box.

(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.

Yes.

(7) Are there any known archeological sites in the proposed project area?

No.

(8) Will the project have a disproportionately high and adverse effect on low income or minority populations?

No.

(9) Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No.

(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?

No.

REQUIRED PERMITS AND APPROVALS: The UVWUA has consulted with Reclamation and confirmed that the project as described does not appear to necessitate NEPA or Cultural Resource compliance. Reclamation staff from the Western Colorado Area Office in Grand Junction will do a Categorical Exclusion Checklist (CEC) for the project and doesn't foresee any expenses associated with providing the CEC.

LETTERS OF PROJECT SUPPORT: No letters of support for the project are provided at this time.

OFFICIAL RESOLUTION

George Etchart moved the adoption of the following resolution:

RESOLUTION

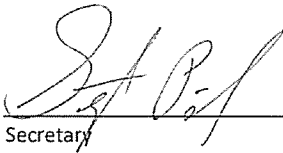
"Be it resolved, that for the purpose of its continued effort to upgrade and improve the efficiency and water delivery throughout the system, the Uncompahgre Valley Water Users Association (UVWUA) does approve, ratify and confirm that:

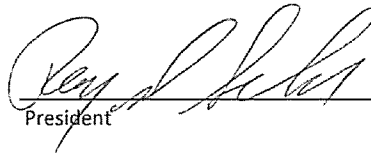
- 1) Steve Fletcher, Manager, and Ed Suppes, Assistance Manager have the legal authority to enter into an agreement with the Bureau of Reclamation for financial assistance provided under the WaterSMART Grant Program;
- 2) Mr. Fletcher and/or Mr. Suppes have reviewed and fully support the WaterSMART grant application submitted;
- 3) The UVWUA has the capability to provide the amount of funding and/or in-kind contributions specified in the funding plan; and
- 4) The UVWUA will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

"Be it further resolved that the Board of Directors affirms that this resolution is adopted with knowledge of the written request.

The Motion was seconded by Todd Steward and approved by a vote of 7 to 0. Done this 17th day of December, 2012.

Attest:


Secretary


President

IV.D.4. Project Budget

The project budget includes: (1) Funding Plan and Letters of Commitment, (2) Budget Proposal, (3) Budget Narrative and (4) Budget Form.

I. Funding Plan and Letters of Commitment

Describe how the non-Reclamation share of project costs will be obtained. Reclamation will use this information in making a determination of financial capability.

FUNDING PLAN:

(1) How you will make your contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

The UVWUA will contribute cost-share to the project via in-kind services associated with the different tasks and via cash match. In-kind services will be related to project research, development, management, and staff time related to training on the operation of the headgate structures, hand-helds, remote monitoring system, SCADA / alarming and all associated software applications. UVWUA cash match will be provided from assessments.

(2) Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs. Include:

(a) What project expenses have been incurred.

The UVWUA will seek reimbursement for pre-award expenses including research the project, developing a scope of work and initiating a contract with Mountain Peak Controls. The contract agreement between UVWUA and Mountain Peaks required that the UVWUA provide a down-payment of 40% of the project value.

There is a timing urgency related to implementing the M&D Canal project. Components that must be installed in the canal itself require that the work be done before water is put back into the system in late March or early April. The headgate automation must be installed this spring because the old system is no longer functioning.

In addition, PLC and other system components may need to be purchased in advance of the WaterSMART funding agreement in preparation of the project (depending on anticipated delivery dates for equipment) so that tasks may proceed on schedule.

(b) How they benefitted the project.

The contract that was initiated with Mountain Peaks via the preliminary down-payment will benefit the project by ensuring that UVWUA is ready to proceed as soon as an agreement can be made with Reclamation under WaterSMART.

(c) The amount of the expense.

At this time \$1,597 dollars of in-kind has been contributed toward the project by UVWUA staff for researching the feasibility of the project, developing a scope of work, and requesting and reviewing bids from potential contractors.

Cash expenditures in the amount of \$9,494 were made to initiate the contract with Mountain Peaks.

(d) The date of cost incurrence.

In – Kind: August thru December of 2012

Cash: December 12, 2012

(3) Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

The UVWUA will provide in-kind services in the amount of \$14,713 to the project and cash match in the amount of \$32,658. Please see letter of commitment below from Steve Fletcher, UVWUA Manager.

(4) Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards your 50 percent cost share unless otherwise allowed by statute.

Not applicable. No other federal funding sources have been acquired or applied to this project.

(5) Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.

Not applicable.

Please include the following chart (table 1) to summarize your non-Federal and other Federal funding sources. Denote in-kind contributions with an asterisk (*). Please ensure that the total Federal funding (Reclamation and all other Federal sources) does not exceed 50 percent of the total estimated project cost.

Table 1. Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
UVWUA	\$14,712*
UVWUA	\$32,658
<i>Non-federal Subtotal:</i>	\$47,370
Other Federal Entities	
Not applicable	-
<i>Other Federal Subtotal:</i>	\$0
Requested Reclamation Funding:	\$38,758
TOTAL PROJEC FUNDING:	\$86,128

BUDGET PROPOSAL NARRATIVE: Narrative description of all items included in the project budget, including value of in-kind contributions of goods and services provided to complete the project.

The UVWUA is providing \$9,809 of in-kind match related to base wages for staff training on the headgate automation, remote monitoring, hand-held devices, and software applications. Three thousand, two-hundred fifty four dollars (\$3,254) of in-kind is provided through UVWUA fringe benefits for all full-time employees identified in the plan that will be trained to operate the system, \$305 for staff support for calculating performance measures and \$1,345 of in-kind is claimed pre-award for research, development of a scope of work, and obtaining contractor bids. Total in-kind from UVWUA is **\$14,712**.

Cash will be provided by the UVWUA in the amount of **\$32,658** which can go toward the purchase of equipment (computer, network server, handhelds, barcode printer, submersible level sensor, solar power systems), and DSL Link, and DSL service for 19 months and a small portion of the PLC and Redlion interface control system (\$342).

WaterSMART funds in the amount of **\$38,758** and UVWUA funds (\$342) will be utilized for the PLC and Redlion gate interface control system.

Total project cost is equal to **\$85,128**.

Table 3. Funding Sources

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient/UVWUA Funding	55%	\$47,370
Reclamation Funding	45%	\$38,758
Other Federal Funding	0%	\$0
Totals	100%	\$86,128

Table 4. Budget Proposal Form

Budget Item Description	Computation			No. of Individ.	Quantity Type (hours)	Training	Total Cost
	\$/Unit	Base Rate	Fringe				
UVWUA Salaries and Wages (Training)*							
Water Master - Aaron English		\$27.45	\$7.46	1	12	Headgate	\$329
Water Master - Dennis Veo		\$27.45	\$7.46	1	12	Headgate	\$329
Water Master - Aaron English		\$27.45	\$7.46	1	8	Remotes	\$220
Water Master - Dennis Veo		\$27.45	\$7.46	1	8	Remotes	\$220
Ditch Riders (Remotes) -w/o house		\$21.20	\$6.68	2	8	Remotes	\$339
Ditch Riders (Remotes) - with house		\$19.20	\$6.44	14	8	Remotes	\$2,150
Ditch Riders (Headgates) - w/o house		\$21.20	\$6.68	2	12	Headgate	\$509
Ditch Riders (Headgates) - with house		\$19.20	\$6.44	14	12	Headgate	\$3,226
Manager - Steve Fletcher		\$38.50	\$7.09	1	12	Headgate	\$462
Assist Mgr- Ed Suppes		\$35.10	\$6.81	1	12	Headgate	\$421
Manager - Steve Fletcher		\$38.50	\$7.09	1	8	Remotes	\$308
Assist Mgr- Ed Suppes		\$35.10	\$6.81	1	8	Remotes	\$281
Bonie Glover		\$19.55	\$5.59	1	8	Remotes	\$156
Michelle Decker		\$21.75	\$5.76	1	8	Remotes	\$174
Don Kennedy		\$21.20	\$5.72	1	8	Remotes	\$170
Michelle Decker		\$21.75	\$5.76	1	12	Headgate	\$261
Don Kennedy		\$21.20	\$5.72	1	12	Headgate	\$254
<i>Subtotal Training:</i>							\$9,809
UVWUA Salary and Wages (Other Tasks)*							
Manager - Project research and development		\$38.50	\$7.09	1	24		\$924
Assistant Manager - Project research and development		\$35.10	\$6.81	1	12		\$421
<i>Subtotal (Other In-kind):</i>							\$1,345
Fringe Benefits*							
Full-time employees							\$3,254
<i>Subtotal Fringe Benefits</i>							\$3,254

Budget Item Description	Computation				Quantity Type (hours)	Training	Total Cost
	\$/Unit	Base Rate	Fringe	No. of Individ.			
Equipment							
Computer Olathe Satellite Office	\$1,200			1			\$1,200
Network Server - Headquarters	\$2,300			1			\$2,300
Hand-helds	\$690			17			\$11,730
Barcode Printer	\$900			1			\$900
Submersible Level Sensor	\$1,247			2			\$2,494
Solar Power System (20 Watt)	\$1,800			2			\$3,600
DSL Link	\$1,135			2			\$2,270
<i>Subtotal Equipment:</i>							\$24,494
Supplies/Materials							
DSL Service	75			19			\$1,425
<i>Subtotal Supplies/Materials</i>							\$1,425
Contractual/Construction							
Grant Reporting	\$44			9			\$396
Gate Control System	\$19,550			2			\$39,100
Computing Services, Software Development, Training	\$60			100			\$6,000
<i>Subtotal Contractual:</i>							\$45,496
Environmental Compliance							
NEPA & Cultural Resources							\$0
<i>Subtotal Environmental Compliance</i>							\$0
Other Reporting*							
Michelle Decker (Performance Measures)		\$21.75	\$5.76	14			\$305
<i>Subtotal Reporting:</i>							\$305
TOTAL DIRECT COSTS:							\$86,128
Indirect Costs: 0%							\$0
TOTAL PROJECT COSTS:							\$86,128

Notes: All UVWUA salaries and wages are fixed rates of compensation.

No costs are included for NEPA and Cultural Resources. The UVWUA consulted with Reclamation staff, Terry Stroh of the Western Colorado Area Office in Grand Junction and indicated there would be no environmental or cultural resource impacts with the project and that a CEC would simply be issued.

Letter of Commitment: UVWUA

THE GUNNISON TUNNEL PROJECT

The Uncompahgre Valley Water Users Association
601 North Park Ave. * P.O. Box 69 * Montrose, CO 81402-0069
Phone: 970-249-3813 Fax: 970-249-6830

January 15, 2013

To whom it may Concern:

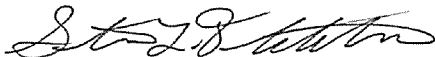
Uncompahgre Valley Water Users Association (UVWUA) is committed to the continued effort of modernization and upgrading of our irrigation system.

The UVWUA plans to utilize WaterSMART funds to completely replace the existing control system on the M & D and Ironstone Canals with a new Programmable Controller (PLC) based system for automatic gate control, as well as, SCADA remote monitoring/alarms capability. UVWUA's intention is to provide hand-held devices and software to ditchriders for the recording of water delivery.

The proposed project will accomplish multiple goals such as, increasing on-farm water use, improving water efficiency, preventing water-related conflicts due to canal control failure, addressing water resource challenges due to climate change, more accurate recording of water delivery, and serving as a pilot-test for canal automation which UVWUA will employ as a continuing effort for upgrading five additional headgates in the Uncompahgre River.

The UVWUA will contribute cost-share in the amount of \$14,713 to the project via in-kind services and cash match in the amount of \$32,658. UVWUA cash match will be provided from assessments. Funds are available as of January 1, 2013 with no time constraints and no other contingencies associated with the funding commitment.

Sincerely,



Steve Fletcher
Manager
Uncompahgre Valley Water Users Association

/md

SF 424C – Budget Form

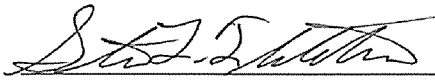
OMB Number: 4040-0008
Expiration Date: 06/30/2014

BUDGET INFORMATION - Construction Programs			
<i>NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.</i>			
COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	\$ 14,713.00	\$	\$ 14,713.00
2. Land, structures, rights-of-way, appraisals, etc.	\$ 0.00	\$	\$ 0.00
3. Relocation expenses and payments	\$ 0.00	\$	\$ 0.00
4. Architectural and engineering fees	\$ 0.00	\$	\$ 0.00
5. Other architectural and engineering fees	\$ 0.00	\$	\$ 0.00
6. Project inspection fees	\$ 0.00	\$	\$ 0.00
7. Site work	\$ 0.00	\$	\$ 0.00
8. Demolition and removal	\$ 0.00	\$	\$ 0.00
9. Construction	\$ 45,496.00	\$	\$ 45,496.00
10. Equipment	\$ 24,494.00	\$	\$ 24,494.00
11. Miscellaneous	\$ 1,425.00	\$	\$ 1,425.00
12. SUBTOTAL (sum of lines 1-11)	\$ 86,128.00	\$ 0.00	\$ 86,128.00
13. Contingencies	\$ 0.00	\$	\$ 0.00
14. SUBTOTAL	\$ 86,128.00	\$ 0.00	\$ 86,128.00
15. Project (program) income	\$ 0.00	\$	\$ 0.00
16. TOTAL PROJECT COSTS (subtract #15 from #14)	\$ 86,128.00	\$ 0.00	\$ 86,128.00
FEDERAL FUNDING			
17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter eligible costs from line 16c Multiply X <input type="text" value="45"/> % Enter the resulting Federal share.			\$ 38,757.60

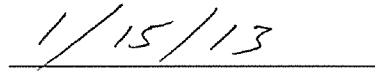
Statement of Agreement with Requirements for Agricultural Operations

In accordance with Section 9504(a)(3)(B) of Public Law 111-11, the Uncompahgre Valley Water Users Association agrees to both of the following conditions related to entering into a cooperative agreement for an improvement to conserve irrigation water in the Uncompahgre Project Area located in Montrose and Delta counties, Colorado:

- a) Not to use any associated water savings to increase the total irrigated acreage of the eligible applicant; and
- b) Not to otherwise increase the consumptive use of water in the operation of the eligible applicant, as determined pursuant to the Colorado water law.



Steve Fletcher, Manager



Date