# Submittal by El Paso Water Utilities
# In Response to:

## Funding Opportunity Announcement No. R14AS00001

# WaterSMART:
## "Water and Energy Efficiency Grants for FY 2014; Funding Group I"

**Dated January 16, 2014**

# SF-424 Application Cover Page

The following sections are the fully completed SF-424 forms, signed by a person legally authorized to commit the applicant to performance of the project. In addition, Appendix Number 1 included in this proposal is the application approval letter from the Rio Grande Council of Governments as required by the relevant Executive Order.

# Title Page

**Applicant: El Paso Water Utilities Public Service Board (EPWU-PSB)**

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## Proposed Project Title

**"Potable Water and Energy Conservation and Savings from Secondary Membrane Treatment of Reverse Osmosis (RO) Concentrate at Existing Wellhead RO Units"**

**Project Proposed for Funding Group I under U. S. Bureau of Reclamation (USBR) Funding Opportunity Announcement No. R14AS00001 referred to as "WaterSMART; for Water and Energy Efficiency Projects**

## Project Summary Description:

EPWU operates eleven Reverse Osmosis (RO) membrane units at Lower Valley (LV) wells to treat brackish groundwater to potable standards. The LV wellhead RO units discharge up to 25% of their water production to the sanitary sewer as membrane concentrate, thus reducing the effective volume of potable water available to the public, and increasing treatment costs at EPWU's wastewater plants. EPWU has worked for several years with Dr. Anthony Tarquin of the University of Texas at El Paso's (UTEP's) Civil Engineering Department to research secondary RO techniques, including Seawater RO (SWRO) systems, to reduce overall volumes of concentrate requiring disposal, thus providing additional potable water. Dr. Tarquin's research has shown that SWRO can reduce the final, total volume of concentrate requiring disposal to approx. 3% of the initial raw, feed water volume. This project proposes to join EPWU and USBR-WaterSMART Grant funds to design/ install Seawater Reverse Osmosis (SWRO) units at Three Lower Valley Wellhead RO Units to provide an additional 300 AFY of potable water to the customer, and reduce operations expenses at the Wastewater Plants. EPWU is an eligible applicant under this program, and the proposed project, with a total cost estimate of $1,655,000.00 over two years, is consistent with USBR's purpose and scope. The 24 -month proposed schedule and grant request of $300,000.00 are within USBR's schedule requirements and funding allocation limit of $300,000.00 under Group I of this program. If proven successful at this proposed level of operation, the concept could be expanded to

increase the potable water productive capacity of all eleven LV wellhead units as well as EPWU's Kay Bailey Hutchison (KBH) Desalination Plant.

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## Executive Summary

**Date: January 16, 2014**

**Applicant Name: El Paso Water Utilities Public Service Board**

**City: El Paso**

**County: El Paso**

**State: Texas**

**Project Summary:**

Join EPWU and USBR-WaterSMART funds to design, install, operate and monitor Seawater Reverse Osmosis (SWRO) units located at Three Lower Valley Wellhead RO Units to perform secondary membrane treatment of the concentrate from the existing wellhead RO units and provide an additional 300 AFY of potable water to the customer and reduce operations expenses at EPWU's Wastewater Plants. The proposed project, with a total cost estimate of $1,655,000.00 is anticipated to be completed within 24 –months.

The project is expected to provide EPWU with an additional 300 acre-feet per year (AFY) of potable water at a unit cost of approximately $280.00 per AF, based on original construction costs only and a 20-year project life. The estimated, long-term amortized cost of the water produced using this proposed project is approximately $2.00 per thousand gallons (Tarquin, March 2010), or $652.00 per AF. The process will also provide an additional cost savings of approximately $ 857.00/AF, or $257,000.00 per year, due to the avoided cost of processing the discharged concentrate at the wastewater plants. In effect, the proposed project will essentially generate a net cost advantage of approximately $205.00/AF for each acre-foot of potable water produced compared to discharging the concentrate to the sewer. In addition, this 300 AFY of potable water produced will be available to sell to the customer at the prevailing water rate.

If proven successful at this proposed level of operation, the concept could be expanded to increase the potable water productive capacity at all eleven LV Wellhead RO units and possibly at EPWU's Kay Bailey Hutchison (KBH) Desalination Plant, thus providing additional cost benefits and water and energy (conservation/sustainability )savings to the public and to EPWU.

**Means by which the Project Contributes to the Goals of the USBR Funding Opportunity Announcement:**

1) **Water Conservation**: ***300 Acre-Feet per Year (AFY) of additional potable water***

   **Provide 300 AFY of additional potable water for public use, or approx. *a 0.30% increase* in EPWU's annual supply.**

   **If expanded to include all of EPWU's Wellhead RO Facilities, plus the KBH Desalination Plant, the concept could provide an additional 3,000 AFY of potable water, or increase the supply by 2.5%.**

2) **Energy-Water Nexus**: ***New potable water at a cost of $280.00/AF based on original construction costs only, or a long-term amortized cost of $652.00/AF.***

***Total "avoided" cost savings of $257,000.00 per year for water not treated at Wastewater Plants.***

**Provides an additional 300 AFY of potable water at a total, long-term amortized cost of $652.00/AF, which is competitive with the cost of EPWU's alternate sources of treated water.**

**The above referenced value of $280.00/AF is based on the capital cost estimate only and is not a true amortized cost including operations and maintenance (O&M). Previous cost analyses prepared by Dr. Anthony Tarquin of UTEP (Tarquin, March 2010; see List of References) yields a true amortized cost of approximately $652.00/AF, which can be considered as the cost of new water made available using this process, and would be competitive with the cost of EPWU's other available sources of potable water.**

**Also provides a total "avoided" cost savings of $257,000.00 per year (or $857.00/AF) in terms of the equivalent volume of water that will not have to be treated at the Wastewater Treatment plants.**

**Using EPWU's average electrical rate of $0.11 per thousand gallons of raw wastewater processed at the Haskell Street Plant and at the Bustamante Wastewater Plant yields a total electricity cost savings of approximately $11,000.00 per year for the three wells combined if retrofitted with this process. This equates to an approximate energy savings of $37.00 per AF equivalent for the new water generated.**

*3)* **Benefits to Endangered Species**: ***150 AFY of water left either in Elephant Butte or Caballo Reservoirs, or potentially available for "in-stream" flows***

**The 300 AFY of water generated by this project translates into an equal volume of water per year that will not have to be diverted from either surface water from the Rio Grande Project or from other groundwater sources. Assuming that EPWU's raw, source water averages 50% of the average annual supply, this will equate to 150 AFY in terms of water left either in Elephant Butte or Caballo Reservoirs, or available within the river or canal system as "in-stream" flows. This water is potentially available for benefits to the environment and potentially endangered species.**

4) **Water Marketing**: ***150 AFY of water potentially available for agricultural and municipal communities***

**The 300 AFY of water generated by this project translates into an equal volume of water per year that will not have to be diverted from either surface water from the Rio Grande Project or from other groundwater sources. Assuming that EPWU operates the RO Wellhead Units in the summer when surface water is available, this will equate to 150 AFY in terms of water left in storage in either the Elephant Butte or in Caballo Reservoir.**

**This 150 AFY of water is potentially available for marketing among the agricultural and municipal communities. Under the current Operating Agreement among the Bureau of Reclamation, El Paso County Water Improvement District No.1, and Elephant Butte Irrigation District, this 150 AFY will be classified as carry-over storage and will either be carried over proportionally according to the users' water rights into the following year, or be available for purchase by a willing buyer according to the wishes of a willing seller.**

***5)*** **Water Supply Sustainability/WaterSmart Basin Studies**:

***EPWU annually purchases raw surface water from the USBR-Rio Grande Project, and the Rio Grande Project is located in a "WaterSmart Basin Study. The concept is also transferrable to other areas with brackish ground water."***

**Bert Cortez and Mike Landis at the El Paso office of USBR have informed EPWU that the USBR-Rio Grande Project is located within one of the "WaterSmart Basin Studies". The proposed project is within EPWU's service area, and EPWU annually purchase raw surface water from the Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1. In addition, Joshua German of the Denver Office of USBR has informed EPWU that the Upper Rio Grande Basin Study is now complete.**

**Due to the simplicity and transportability of this technology, it is eminently transferrable to any location exhibiting brackish source water that is not currently useable for potable purposes without TDS reduction. This is true for either ground or surface water.**

6) **Implementation and Results**:

***The proposed project has been extensively researched and tested, and will essentially pay for itself in approx. 6.5 years based solely on the construction costs vs. "avoided" cost of wastewater treatment. EPWU has both Water Conservation and Drought Contingency Plans***

**The project will essentially pay for itself in approx. 6.5 years considering the "avoided" cost of wastewater treatment alone, and the original construction costs.**

**In addition, as described in the Technical Project Description Section of this proposal, EPWU and UTEP have been researching and testing this or similar technologies for at least six years, and are extremely confident in its effectiveness and reliability. Finally, EPWU has active and operational Water Conservation and Drought Contingency Plans that are included in the Appendices of this proposal.**

**Finally, on an amortized basis, the proposed project will essentially generate a net cost advantage of approximately $205.00/AF for each acre-foot of potable water produced, compared to discharging the concentrate to the sewer.**

7) **Additional Non-Federal Funding**: ***EPWU is proposing to pay for 82% of the Project***

**On a Total Project Cost Basis, EPWU is proposing to pay for 82% of the project expenses in terms of both cash and in-kind services. On a cash-only basis, EPWU is proposing to pay for 81% of the total project.**

8) **Connection to an Existing U. S. Bureau of Reclamation (USBR) Project:** ***EPWU annually purchases raw surface water from the USBR-Rio Grande Project***

**The proposed project is within EPWU's service area, and EPWU annually purchase raw surface water from the Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1.**

**Project's Proposed Duration: Two years**

**Estimated Completion Date: August 1, 2016**

## Background Data

El Paso Water Uti**lities (EPWU) / Public Service Board operates the Water, Wastewater, Reclaimed Water and** Stormwater utilities in El Paso, Texas. The entire service territory is located within the El Paso County, and primarily operates within the boundaries of the City of El Paso.

EPWU is nationally recognized as a leader in the implementation of water management programs, including water conservation, reclaimed water and water desalination.

The Public Service Board (El Paso Water Utilities) was established in 1952, by City Ordinance No. 752 to completely manage and operate the water and wastewater system for the City of El Paso. The seven-member board of trustees which make up the Public Service Board consists of the Mayor of the City of El Paso and six residents of El Paso County, Texas, who are appointed by the City Council.

EPWU serves the city of El Paso, located in El Paso County, Texas. Figure 1 below shows the geographical location. Interstate 10 crosses the city of El Paso from West to East.


**Figure 1 – Location of EPWU (El Paso, Texas)**

The sources of water for EPWU are

- Ground water from the Hueco Bolson (25% of demand)
- Ground water from the Mesilla Bolson (19% of demand)
- Surface water from the Rio Grande (49% of demand)
- Reclaimed water used for non-potable uses (7% of demand)

The Utility's potable water capacity is approximately 220 million gallons per day (MGD), including groundwater, desalinated brackish groundwater and surface water treatment capacity of 100 MGD. The treatment plants currently process an average of 60,000 acre-feet per year of surface water, or about 20 billion gallons in a normal year. The utility owns land in the County of El Paso for the purposes of water rights, and currently leases additional acres for water rights. Furthermore, the Utility has third party agreements with El Paso County Water Improvement District #1 and the Bureau of Reclamation that allows for the purchase of additional surface water to supply the Jonathan Rogers WTP. In addition, the Utility built a desalination plant in east El Paso. This plant can produce 27.5 MGD of potable water. The water sources for the desalination plant are large brackish water areas in the Hueco Bolson estimated to hold 20 million acre-feet of water. Figure 2 below shows the location for the sources of water for EPWU.


**Figure 2 - Sources of Water For EPWU**

The primary water uses for EPWU customers are municipal, residential, commercial and industrial. The Bureau of Reclamation and Irrigation districts in the area are responsible for the supply and distribution of surface water for irrigation purposes.

**Table 1 - Relevant Statistics for EPWU System**

| Item | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| Maximum water supply capacity in acre-feet per day | 675 | 675 | 675 | 675 | 675 |
| Maximum daily water demand in acre-feet | 443 | 468 | 486 | 502 | 501 |
| Daily average consumption in peak week in acre-feet | 461 | 426 | 453 | 468 | 467 |
| Water customers, retail and wholesale | 198,390 | 202,150 | 207,593 | 210,987 | 214,254 |
| Water pumped in acre-feet | 108,390 | 113,754 | 116,419 | 120,900 | 120,890 |
| Water metered, retail and wholesale in acre-feet | 98,416 | 104,793 | 105,734 | 113,942 | 111,417 |
| Percent of water billed to water pumped | 90.80% | 92.1% | 90.8% | 94.2% | 94.0% |
| Miles of water mains in place | 2,467 | 2,488 | 2,505 | 2,544 | 2,561 |

Appendix Number 2 of this report contains a map showing the basic service area of EPWU and also points out the general area proposed for this project. The subject area is referred to as the El Paso Lower Valley area and contains several wells drilled into the Hueco Bolson Aquifer. Approximately 11 of the existing wells are completed in an area of the aquifer now containing brackish ground water, and are now consequently equipped with Wellhead RO Units in order to improve the water quality of the raw, untreated water and meet state and federal drinking water standards. The RO units located at these 11 wells now discharge their RO-process concentrate into the adjacent wastewater collection (drain) system for delivery to one of two nearby wastewater plants for blending with raw wastewater prior to treatment and discharge. In other words, the current method of concentrate disposal requires that the concentrate from the existing wellhead RO units be processed, or treated, along with the current raw wastewater

flows. This current, water resource methodology treats undesirable brackish groundwater to benefit the public, but also adds a new, additional treatment load to the wastewater plants.

## Technical Project Description

As previously mentioned, approximately 11 of the existing wells LV wells are completed in an area of the aquifer now containing brackish ground water, and are now equipped with Wellhead RO Units to improve the water quality of the raw, untreated water and meet state and federal drinking water standards. The RO units located at these 11 wells now discharge their RO-process concentrate into the adjacent wastewater collection (drain) system for delivery to one of two nearby wastewater plants for blending with raw wastewater prior to treatment and discharge. This water resource methodology treats undesirable brackish groundwater to benefit the public, but also adds a new, additional treatment load to the wastewater plants.

This project is an outgrowth of previous projects that were funded by the Bureau of Reclamation and El Paso Water Utilities (See Reports DWPR Report No. 108, Feb 2005, DWPR Report No. 125, Mar 2006, and pending DWPR report submitted in Sept 2012), the Texas Water Development Board (*High Tech Methods to Reduce RO Concentrate Volume Prior to Disposal* – Final report 2009), and the Texas Water Development Board with the WateReuse Foundation (*Continuous Flow Seawater RO System for Recovery of Silica-Saturated RO Concentrate*, Final Report, WateReuse Foundation, May 2012). These projects showed that up to *90% of the concentrate* from the Kay Bailey Hutchison (KBH) Desalting plant could be recovered using the Concentrate Enhanced Recovery Reverse Osmosis (CERRO) process, a batch-treatment Seawater RO process. The process was also successfully pilot tested in 2011 at the U. S. Bureau of Reclamation's BGNDRF test facility, achieving over 76% recovery of the high-TDS, high-calcium sulfate water from Well 2 (see submitted BOR 2012 final report). The list of **References** contained at the end of this application package shows a full bibliography of those final reports that describe the prior research performed utilizing several relevant membrane processes, including the one proposed for this production-level project.

Figure 3 below is a schematic diagram of the small-scale pilot- batch treatment CERRO process as extensively tested at the KBH and BGNDRF test sites. The 5-gpm pilot-scale system that is described in the 2009 final report to the Texas Water Development Board was fully automated, requiring no human intervention after the start-up.

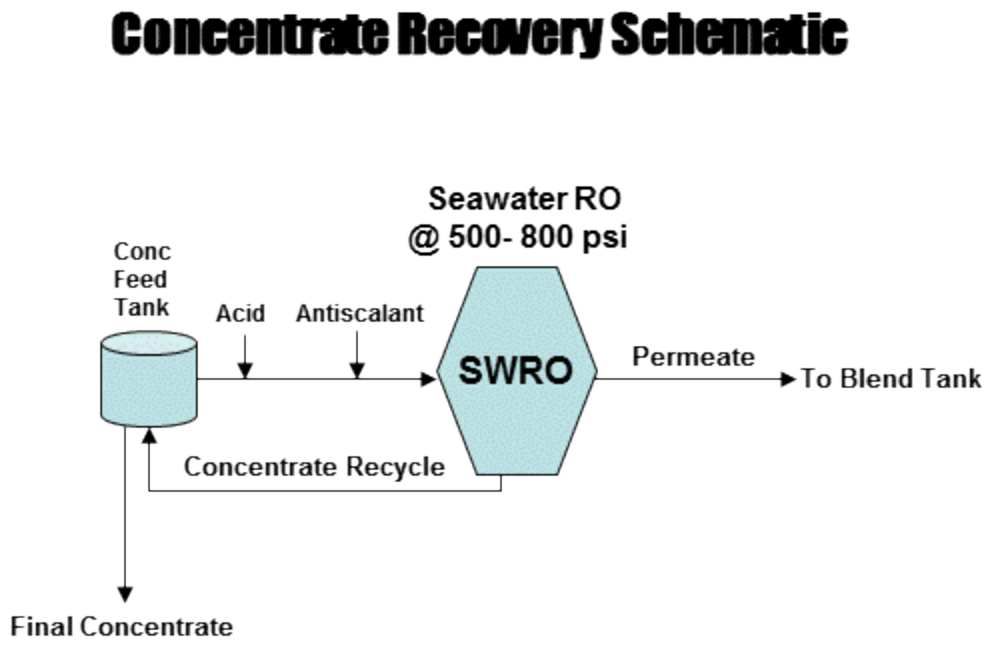


**Figure 3**- **Schematic Diagram of Tested, Small-Scale Pilot CERRO Batch-Treatment Process;**

Additional pilot-scale testing is planned between now and when the full-scale system design is initiated. It is likely that the additional testing will result in a system that is even more energy efficient and optimized for total water recovery.

The activities that will be accomplished as a result of this project will include the following:

(1) Design and integration of the CERRO batch-treatment process (for 80% recovery of water from RO concentrate) into the existing RO systems at three different EPWU brackish water well sites that provide potable water for the City of El Paso and surrounding communities.

(2) Monthly sampling and chemical analysis of the feed water (i.e. RO concentrate), permeate, and super-concentrate from the CERRO process for monitoring and evaluating the performance of the system from a process-effectiveness point of view. The physical and chemical analyses to be conducted will include pH and determination of the concentration of various inorganic ions (including arsenic) and silica in the respective process streams.

(3) Measurement of energy consumption and flow rates (including blend water) at each well site for determining the efficiency of the system and unit cost of the finished water before and after blending.

(4) Determination of the energy and other cost savings associated with reduced wastewater flows resulting from recovery of water that was previously discharged into the sewer system.

Overall, this project will demonstrate that a significant amount of water can be cost-effectively recovered from RO concentrate that is currently disposed of through procedures that are oftentimes environmentally unfriendly and/or costly and unsustainable on a long term basis.

# System for Award Management

All applicants must be registered in the System for Awards Management (SAM) prior to award under this FOA. All applicants must maintain an active SAM registration with current information at all times while they have an active Federal award or an application under consideration.

EPWU is now registered on the System for Awards Management (SAM) and a copy of this registration notice is attached as Appendix Number 3 of this Proposal.

# Evaluation Criteria

# V.A.1. Evaluation Criterion A: Water Conservation (28 points)

*Up to **28 points** may be awarded for a proposal that will conserve water and improve efficiency. Points will be allocated to give consideration to projects that are expected to result in significant water savings.*

**V.A.1 Evaluation Criterion A-Water Conservation**

***Subcriterion No. A.1.-Water Conservation***

Subcriterion No. A.1(a)-Quantifiable Water Savings:

**"300 Acre-Feet per Year for this Project"**

**Other Project Water Conservation Evaluation Criteria Allowed:**

The water savings associated with this project will be derived by recovering water from RO concentrate that is currently being thrown away via disposal into the municipal sewer system. EPWU has a total of 11 wells that have capacities averaging approximately1 MGD. Those wells are used continuously during the 6-month non-irrigation season that normally extends from

October through March of each year. However, during the current drought in the Southwest, EPWU has the capability of running these wells nearly year-round, as customer-water demand dictates. Each of these wells currently disposes of their RO concentrate into the sanitary sewer system. This project will retrofit three of the wells with the CERRO water recovery system previously described in the Technical Project Description section of this proposal. It is expected that a minimum of 80% of the water in the RO concentrate will be recovered using the SWRO system. At a recovery rate of 75 gpm for approximately 10-months per year, the total amount of water saved will be approximately 100 acre-ft. per well per year (AFY), or 300 ac-ft. per year (AFY) combined for all three wells retrofitted as part of this project. Routine maintenance should provide for a useful equipment life of 20 years.

**Improved Water Management:**

***Subcriterion No. A.1.- Improved Water Management:***

***"Potentially 2.5% of Average Annual Water Supply"***

***(Equates to 3,000 AFY, when fully expanded across EPWU)***

**Estimated Amount of Water Better Managed/Average Annual Water Supply**

**If the Concept is expanded for all LV Wells plus KBH Plant:**

**3,000 AFY/120,500 AFY = 2.5% of average annual water Supply**

***Subcriterion No. A.2.- Percentage of Total Water Supply, this Project:***

***"0.25% of Average Annual Water Supply"***

***(Equates to 300 AFY for this immediate project)***

**Estimated Amount of Water Conserved /Average Annual Water Supply**

**For this immediate Project:**

**300 AFY/120,500 AFY = 0.25% of average annual water Supply**

***Subcriterion No. A.3.-Reasonableness of Costs:***

***"$280.00/AF based on Capital Cost Estimate"***

**Costs for Benefits Gained (based on capital cost) = Total Project Cost/Acre-Feet-Year Conserved x Project Life**

**= $1,655,000 / (300 AFY x 20 Years)**

**= $280.00 per acre-ft. (equivalent cost for water produced)**

**This cost is based on capital expenditure only and does not represent a true, amortized cost including capital plus operations and maintenance. Below is a calculated estimate of the true, long-term amortized cost of the water produced using the proposed process, based on cost evaluations by Dr. Anthony Tarquin at UTEP (See Tarquin, March 2010, in List of References). Either way, this cost is competitive with EPWU's alternate public water supply options. Please refer to the Section on "Performance Measures" for a more complete explanation of this concept.**

***"$652.00/AF based on Estimated Total Amortized Cost"***

***$2.00/ thousand gallons of water processed (Tarquin, March 2010) x 326,000 gallons/AF =***

***$652.00/AF***

# 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**.*

**Subcriterion No. B.2.-Increasing Energy Efficiency in Water Management: (for this immediate project)**

***"Total Avoided Cost Savings of $257,100.00/year"***

***"Estimated Avoided Electrical Cost Savings of $11,000.00/year, or $37.00/AF equivalent of New Water"***

**Avoided Total Cost for Wastewater Treatment = $857.00/AF equivalent (in terms of raw wastewater)**

**Per Year: 300 AF/year x $857.00/AF (total amortized cost) = $257,100.00 (on the basis of total process costs)**

**In terms of Electrical Savings only:**

**$0.11 electrical power cost /thousand gallons wastewater treated X 300 AF/year x 326,000 gallons/ AF; yields $11,000 saved per year (for this project).**

# 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.

***"150 AFY of water left either in Elephant Butte or Caballo Reservoirs, or potentially available for "in-stream" flows"***

**The 300 AFY of water generated by this project translates into an equal volume of water per year that will not have to be diverted from either surface water from the Rio Grande Project or from other groundwater sources. Assuming that EPWU's raw, source water averages 50% of the average annual supply, this will equate to 150 AFY in terms of water left either in Elephant Butte or Caballo Reservoirs, or available within the river or canal system as "in-stream" flows. This water is potentially available for benefits to the environment and potentially endangered species.**

# 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.*

***"150 AFY of water potentially available for marketing among agricultural and municipal communities"***

**The 300 AFY of water generated by this project translates into an equal volume of water per year that will not have to be diverted from either surface water from the Rio Grande Project or from other groundwater sources. Assuming that EPWU operates these RO Wellhead Units in the summer, this will equate to 150 AFY in terms of water left in storage in either the Elephant Butte or in Caballo Reservoir. This 150 AFY of water is potentially available for benefits for marketing among the agricultural and municipal communities.**

**Under the current Operating Agreement among the Bureau of Reclamation, El Paso County Water Improvement District No.1 (EPCWID), and Elephant Butte Irrigation District (EBID), this 150 AFY will be classified as carry-over storage and will either be carried**

**over proportionally according to the users' water rights into the following year, or be available for purchase by a willing buyer according to the wishes of a willing seller. EPCWID and EBID already have the mechanisms in place for the sale and distribution of these "carryover" waters and transfers among willing buyers and willing sellers.**

# V.A.5. Evaluation Criterion E: Other Contributions to Water Supply Sustainability (14 points) "WaterSmart Basin Studies"

***"Addresses Water Sustainability and Climate Change, is transferrable to other geographic locations, and EPWU Annually purchases surface water from the USBR-Rio Grande Project located in a recently completed "WaterSmart Basin Study"***

**"WaterSmart Basin Studies"**

**Bert Cortez and Mike Landis at the El Paso office of USBR have informed EPWU that the USBR-Rio Grande Project is considered to be located within one of the "WaterSmart Basin Studies". The proposed project is within EPWU's service area, and EPWU annually purchase raw surface water from the Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1. In addition, Joshua German of the Denver Office of USBR has informed EPWU that the Upper Rio Grande Basin Study is now completed.**

**Benefits to Water Supply Sustainability (Potentially Addressing Drought and/or Climate Change):**

This project addresses water supply shortages due to climate variability in the upper Rio Grande Basin, and in particular in the area of the USBR-Rio Grande Project. El Paso gets up to 50% of its water supply from the Rio Grande when water is available in Elephant Butte Dam from runoff in southern Colorado and northern New Mexico. When the water supply from the Rio Grande is limited (as has been the case in recent years), El Paso must rely on groundwater to make up for the shortage. The wells that are involved in this project are normally used only during the non-irrigation months of October through March, but during severe drought conditions (as currently exist), they are used *year round* to make up for some of the shortage of Rio Grande water. The

extra water that would be available through implementation of this project will be critical during periods of high demand. Use of these wells may preclude the requirement for invoking Stage 2 water restrictions at various times during the high-demand periods of May through September.

**Applicability of the Project to Other Areas:**

This technology can be applied to water treatment at other locations where the raw, source water is brackish and requires TDS removal. Vast areas of the Western U.S. contain brackish ground and surface waters that require RO for potable and agricultural use. The ability to generate approximately up to an additional 22% worth of useable, treated water from the original brackish supply source makes this concept very attractive compared to having to dispose of up to nearly 25% of the volume of the original, raw source water, if secondary membrane treatment was **not** utilized. In other words, there are definite economic and resource benefits available by increasing the recovery of an RO system from approximately 75% to nearly 97%.

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

*Up to **10 points** may be awarded for the following:*

***"The proposed project has been extensively researched and tested and will pay for itself in approx. 6.5 years. EPWU has Water Conservation and Drought Contingency Plans"***

**"EPWU has both Water Conservation and Drought Contingency Plans"**

**The project will essentially pay for itself in approx. 6.5 years due to the "avoided" cost of wastewater treatment alone. In addition, as described in the Technical Project Description Section of this proposal, EPWU and UTEP have been researching and testing this or similar technologies for at least six years, as indicated by the publications in the List of References included at the end of this proposal. EPWU is extremely confident in the effectiveness and reliability of this technology.**

**Finally, EPWU has active and operational Water Conservation and Drought Contingency Plans that are included in Appendix Number 4 of this proposal.**

**EPWU and UTEP have been researching and testing this or similar technologies for at least six years, and are extremely confident in its effectiveness and reliability. This is substantiated by the number of research project reports documented and listed in the List of References contained in this proposal.**

**In addition, EPWU keeps extensive records of operations at each of its Well sites, including those that are equipped with RO desalting systems. Each site has extensive data-logging capability, so all flows are continuously electronically recorded. In addition to the electronic records, daily readings of many analog gauges are manually recorded each day. Therefore, the amount of RO concentrate that is discharged into the sewer system at each well site is known with a high degree of accuracy. After the SWRO systems are installed at each Well site, a very simple calculation will determine the amount of water that has actually been recovered from the RO super-concentrate before it is discharged into the sewer system.**

### *Subcriterion No. F.1.-Project Planning*

*(1) Identify planning that provides support for the proposed project:*
For the past 24 months, EPWU has been engaged in an extensive brackish Well rehabilitation/replacement program in preparation for river (Rio Grande) drought conditions that will limit water supplies available from the Rio Grande.

*(2) Identify engineering or design work performed in support of the proposed project*
EPWU personnel have identified the Well sites with the highest priority for implementation of this project. In addition, EPWU has provided more than $140,000.00 for prior research projects related to development of the continuous flow and batch-treatment Seawater RO process that will be used in recovering water through this project. These projects were performed in conjunction with matching cash funds associated with the Texas Water Development Board (TWDB), U. S Bureau of Reclamation, the WateReuse Research and other foundation Studies, and these summary reports are listed at the end of this application and are available for review on request.

*(3) Identify any aspect of the project that implements a feature of an existing water plan*
As mentioned in (1) above, EPWU been engaged in rehabilitating and/or re-drilling many of the Wells that supply water for the 11 reverse osmosis plants that are currently in place. This project will increase the amount of water available by up to 20% (after blending) at each of the sites where it is implemented.

### *Subcriterion No. F.2.-Readiness to Proceed*

EPWU has active and operational Water Conservation and Drought Contingency Plans included in Appendix Number 4 of this proposal. EPWU and UTEP have been researching and testing this or similar technologies for at least six years, and are extremely confident in its effectiveness and reliability. This is evidenced by the number of completed research and project summary reports shown in the List of References included in this proposal. EPWU personnel have identified the Well sites with the highest priority for implementation of this project.

EPWU keeps extensive records of operations at each of its Well sites, including those that are equipped with RO desalting systems. Each site has extensive data-logging capability, so all flows are continuously electronically recorded. In addition to the electronic records, daily readings of many analog gauges are manually recorded each day.

***Subcriterion No. F.3.-Performance Measures***

***The ultimate performance measure that EPWU will use will be a comparison of the final, total process costs vs. the cost of water produced for public consumption using the other water sources and their respective treatment processes. This will also be covered in Section VIII-A of this application.***

The core principle for this Performance Measure Evaluation is the Net-Present Worth (NPW), or amortized valuation of the Secondary RO Membrane Treatment of Concentrate vs. the Net Present Worth, or amortized value of the alternative sources of water. The estimated NPW for this proposed project has been mentioned several times and is equal to approximately $652.00/AF of new, potable water. Contrasted to this value is the NPW of the other available supplies. These NPW values are as follows; Groundwater=$163.00/AF, Surface Water =$300.00/AF, Desalination at the KBH Plant=$534.00/AF, and Imported Ground water at approximately $3,962.00/AF, and are shown for reference on Appendix 5 of this proposal. EPWU's estimated cost of reclaimed water, primarily for Turf Irrigation is $706.00/AF, but this source of supply does not represent potable water.

Unfortunately the total NPW for Secondary RO of Concentrate does not reflect the actual cost savings experienced by avoiding those costs that are NOT incurred if this process were not in place and the equivalent 300 AFY of concentrate were sent to the wastewater plant. These "avoided" total costs in a NPW basis are equal to approximately $857.00/AF for the equivalent volume of water not sent to the wastewater plant. The avoided electrical costs alone are equal to $37.00/AF in terms of equivalent wastewater volume.

Considering the fact that there are imbedded capital costs in the NPW value of $857.00/AF, and the fact that EPWU cannot easily or practically reduce the capital component of the $857.00 NPW, EPWU has chosen to not use this entire value to recalculate the effective net value of the NPW for this secondary RO Process. However, EPWU does have viable records for the Year 2013 for the total Operation and Maintenance (O&M) costs incurred, and total volume of wastewater processed, at the Roberto Bustamante Wastewater Treatment Plant. These records show that the unit O&M costs (only) at the Bustamante Plant were equivalent to $0.39 per thousand gallons of raw wastewater, or $127.00 per AF. Therefore, for Performance Measure and

other purposes, EPWU proposes to use a value of $525.00 per AF for the real, comparable value of the water provided by this secondary RO process compared to the other water sources and treatment processes available to EPWU.

The value of $525.00/AF of processed water for Secondary RO was derived by subtracting the calculated, historical raw wastewater O&M value of $127.00/AF from the estimated NPW of $652.00/AF for Secondary RO previously explained. For a visual comparison, Appendix 5 attached shows the NPW's for the full range of water sources and treatments available to EPWU. As the reader can observe, the comparable cost of Secondary Membrane Treatment of RO Concentrate falls between that of surface water from the Rio Grande and Desalination at the KBH Plant, after adjustment for the avoided O&M costs of the equivalent volume of concentrate that would NOT have to be processed at the wastewater plant.

EPWU proposes that if this project is selected and ultimately constructed, then real, measurable costs for construction and operations/maintenance will be available to check and compare against the values proposed in this application. To calculate the true operating cost of the water produced from RO concentrate, all costs associated with operating the SWRO system will be summed and then divided by the total volume of water produced (including blend water) in the SWRO system. Power consumption will be recorded electronically and chemical consumption (i.e. antiscalant and acid), will be recorded manually. Labor costs will be determined by having all maintenance personnel and operators record their time spent (daily) for servicing the SWRO system (as is already done for all other systems). EPWU can then truly determine whether the anticipated costs are in the vicinity of those proposed in this application.

As previously mentioned, this project would generate quantifiable water savings by recovering a portion of water that is currently being thrown away (disposed of via the sanitary sewer), so its performance measure would fall under the broad category of **Projects with Quantifiable Water and Energy Savings, along with Automation (to intercept unused, impaired waters), and Increasing Energy Efficiency in Water Management.**

The main objective of this project is to *recover water* (from RO concentrate that is currently being thrown away, or discharged, via the sewer system) *in a cost-effective manner*.

Finally, EPWU keeps extensive records of operations at each of its Well sites, including those that are equipped with RO desalting systems. Each site has extensive data-logging capability, so all flows are continuously electronically recorded. In addition to the electronic records, daily readings of many analog gauges are manually recorded each day. Therefore, the amount of RO concentrate that is discharged into the sewer system at each well site is known with a high degree of accuracy. After the SWRO systems are installed at each Well site, a very simple calculation will determine the amount of water

that has actually been recovered from the RO super-concentrate before it is discharged into the sewer system.

# 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:* ***"82%"***

**On a Total Project Cost Basis, EPWU is proposing to pay for 82% of the project expenses in terms of both cash and in-kind services. On a cash-only basis, EPWU is proposing to pay for 81% of the total project.**

**Total of EPWU Cash Plus In-Kind = $1,355,000 Equals 82%**

**Estimated Project Cost $1,655,000**

# 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:*

***"Proposed Project is within the Bureau of Reclamation Rio Grande Project in NM and TX, and EPWU purchases raw surface water from USBR".***

**The proposed project is within EPWU's service area, and EPWU annually purchase raw surface water from the U. S. Bureau of Reclamation's Rio Grande Project through several water rights and administrative contracts with USBR and El Paso County Water Improvement District No. 1.**

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

**EPWU purchases approximately 50% of its average annual water production volume in an average year from the USBR through various contracts involving both USBR and El Paso County Water Improvement District No. 1. EPWU's surface water treatment plants currently process an average of 60,000 acre-feet per year of surface water, or about 20 billion gallons in a normal year. The utility owns land in the County**

**of El Paso for the purposes of water rights, and currently leases additional acres for water rights. Furthermore, the Utility has third party agreements with El Paso County Water Improvement District #1 and the Bureau of Reclamation that allows for the purchase of additional surface water to supply the Jonathan Rogers WTP.**

(2) Does the recipient receive Reclamation project water? **Yes, from the USBR Rio Grande Project. EPWU purchases approximately 50% of its average annual water production volume in an average year from USBR through various contracts involving both USBR and El Paso County Water Improvement District No. 1.**

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

**Yes. EPWU purchases approximately 50% of its average annual water production volume in an average year from USBR through various contracts involving both USBR and the El Paso County Water Improvement District No. 1. EPWU's Surface Water Treatment plants currently process an average of 60,000 acre-feet per year of surface water, or about 20 billion gallons in a normal year.**

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

**Yes. The Project is located within the City of El Paso. Please refer to Answers 1 through 3 above.**

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

**Yes. EPWU purchases approximately 50% of its average annual water production volume in an average year from USBR through various contracts involving both USBR and El Paso County Water Improvement District No. 1. In addition, EPWU has been informed that the Rio Grande Project is considered to be within a WaterSmart Basin Study Area.**

# Sections VIII-A and B

# Performance Measures:

## Performance Measures that apply directly to this proposal include Quantifiable Water Savings (A), Quantifiable Energy Savings(B), Increasing Energy Efficiency in Water Management (B-2), and finally, Automation (A-4) for the interception and beneficial use of previously-impaired waters.

The core principles for this Performance Measure Evaluation are the Net-Present Worth (NPW), or amortized valuation of the Secondary RO Membrane Treatment of Concentrate vs. the Net Present Worth, or amortized value of the alternative sources of water. The estimated NPW for this proposed project has been mentioned several times and is equal to approximately $652.00/AF of new, potable water. Contrasted to this value is the NPW of the other available supplies. These NPW values are as follows; Groundwater=$163.00/AF, Surface Water =$300.00/AF, Desalination at the KBH Plant=$534.00/AF, and Imported Ground water at approximately $3,962.00/AF, and are shown for reference on Appendix 5 of this proposal. EPWU's estimated cost of reclaimed water, primarily for Turf Irrigation is $706.00/AF, but this source of supply does not represent potable water. Also, EPWU is not yet employing importation.

Unfortunately the total NPW for Secondary RO of Concentrate does not reflect the actual cost savings experienced by avoiding those costs that are NOT incurred if this process were not in place and the equivalent 300 AFY of concentrate were sent to the wastewater plant. These "avoided" total costs in a NPW basis are equal to approximately $857.00/AF for the equivalent volume of water not sent to the wastewater plant. The avoided electrical costs alone are equal to $37.00/AF in terms of equivalent wastewater volume.

Considering the fact that there are imbedded capital costs in the NPW value of $857.00/AF, and the fact that EPWU cannot easily or practically reduce the capital component of the $857.00 NPW, EPWU has chosen to not use this entire value to recalculate the effective net value of the NPW for this secondary RO Process. However, EPWU does have viable records for the Year 2013 for the total Operation and Maintenance (O&M) costs incurred, and total volume of wastewater processed, at the Roberto Bustamante Wastewater Treatment Plant. These records show that the unit O&M costs (only) at the Bustamante Plant were equivalent to $0.39 per thousand gallons of raw wastewater, or $127.00 per AF. Therefore, for Performance Measure and other purposes, EPWU proposes to use a value of $525.00 per AF for the real, comparable value of the water provided by this secondary RO process compared to the other water sources and treatment processes available to EPWU.

The value of $525.00/AF of processed water for Secondary RO was derived by subtracting the calculated, historical raw wastewater O&M value of $127.00/AF from the estimated NPW of $652.00/AF for Secondary RO previously explained. For a visual comparison, Appendix 5 attached shows the NPW's for the full range of water sources and treatments available to EPWU. As the reader can observe, the comparable cost of Secondary Membrane Treatment of RO Concentrate falls between that of surface water from the Rio Grande and Desalination at the KBH Plant, after adjustment for the avoided O&M costs of the equivalent volume of concentrate that would NOT have to be processed at the wastewater plant.

EPWU proposes that if this project is selected and ultimately constructed, then real and quantifiable costs for construction and operations/maintenance will be available to check and compare against the values proposed in this application. To calculate the true operating cost of the water produced from RO concentrate, all costs associated with operating the SWRO system will be summed and then divided by the total volume of water produced (including blend water) in the SWRO system. Power consumption will be recorded electronically and chemical consumption (i.e. antiscalant and acid), will be recorded manually. Labor costs will be determined by having all maintenance personnel and operators record their time spent (daily) for servicing the SWRO system (as is already done for all other systems). EPWU can then truly determine whether the anticipated costs are in the vicinity of those proposed in this application.

As previously mentioned, this project would generate quantifiable water savings by recovering a portion of water that is currently being thrown away (disposed of via the sanitary sewer), so its performance measure would fall under the broad category of **Projects with Quantifiable Water and Energy Savings, along with Automation (to intercept unused, impaired waters), and Increasing Energy Efficiency in Water Management.**

The main objective of this project is to *recover water* (from RO concentrate that is currently being thrown away, or discharged, via the sewer system) *in a cost-effective manner*.

Finally, EPWU keeps extensive records of operations at each of its Well sites, including those that are equipped with RO desalting systems. Each site has extensive data-logging capability, so all flows are continuously electronically recorded. In addition to the electronic records, daily readings of many analog gauges are manually recorded each day. Therefore, the amount of RO concentrate that is discharged into the sewer system at each well site is known with a high degree of accuracy. After the SWRO systems are installed at each Well site, a very simple calculation will determine the amount of water

that has actually been recovered from the RO super-concentrate before it is discharged into the sewer system.

# IV.D.1. Environmental and Cultural Resources Compliance

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.

All of the Proposed Project Sites were developed in the 1970's or earlier, have been previously disturbed, and EPWU anticipates that a **Categorical Exclusion or Finding of No Significant Impact** will be sufficient to meet NEPA and other Environmental and Cultural/Historical Requirements.

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.

   **All construction will take place on property that EPWU already owns and sites that have been previously developed for municipal production of potable water. There is no existing animal habitat and all construction will be performed to EPWU standards that are designed to minimize impacts in terms of ground, air and water disturbance. Dust control will be minimized by water application and noise pollution will be controlled using the proper construction practices. Runoff from the project area will be controlled using berms or similar techniques, where applicable.**

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 construction sites are all existing well sites that were constructed more than thirty years ago, they are within the City limits and have all been previously developed and disturbed. There is no known habitat for threatened or endangered species.**

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, there are no known wetlands or surface waters located inside the project boundaries.**

4) When was the water delivery system constructed?

   **The well and pipeline system in the project area was originally constructed between 1975 and 1984.**

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 effects or modifications to any features of the existing irrigation system.**

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.

   **No, there are no buildings, structures, or irrigation features located in the area of the proposed project that are eligible for listing on the National Register of Historic Places.**

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

   **No, there are no known archaeological sites in the proposed project area.**

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

   **No, the proposed project will not adversely or disproportionally affect any low income or minority populations. In fact, it will benefit the largely minority population in this part of El Paso by producing low-cost water.**

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

   **No, the project will not limit access to, or ceremonial use, of any tribal lands, sacred sites, or areas used for Indian ceremonial purposes.**

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, the project will not contribute to the introduction, continuation or spread of noxious weeds nor non-native invasive plant species. The RO equipment will be contained within small storage-shed type structures and will not be open to the environment.**

## Required Permits or Approvals

EPWU currently operates the existing wells and wastewater treatment plants under the applicable permits for water delivery to the public and wastewater effluent discharges issued by the Texas Commission for Environmental Quality (TCEQ) under the pertinent standards of the Environmental Protection Agency (EPA). None of these permits will require alteration because the water delivered to the public will still meet all drinking water requirements, and there will be sufficient blend water volume overall delivered to the Wastewater Plants through the current collection system to mix with and dilute the Seawater RO process concentrate prior to treatment and discharge at the present locations. The volume and composition of the final wastewater effluent release will remain within the limits of the existing discharge permits.

## Letters of Project Support

Since there are no third-party participants proposed for this project, there is no need for additional letters of support. EPWU and USBR will be the only primary parties involved in this project. The attached official EPWU Resolution (referenced as follows) will serve as EPWU's letter of support or participation.

## Official Resolution

Attached as Appendix Number 6 is EPWU's official Resolution signed by the appropriate Members of the Board of Directors signifying the commitment of EPWU to the cost, expenses and terms and conditions cited in this proposal.

# 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.**

## *"Appendix Number 7 of this Proposal is the Proposed Project Budget in the Recommended USBR Format"*

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). **EPWU's cash and in-kind contributions will be provided from revenues either currently approved in the current year budget, or to be approved by the Board of Directors in the FY 2014-2015 budget within the Capital and O&M budgets.**

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: **$1,500.00 for testing equipment since July 2013**

   b) How they benefitted the project: **Tests to date have revealed a process recovery of approx. 85 to 90%.**

   **c)** The amount of the expense: **$1,500.00**

   d) The date of cost incurrence: **July 2013 through Dec. 2013.**

3) Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment: **EPWU is the only funding partner.**

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: **None.**

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.**

Table 2 below summarizes the respective proposed non-Federal and Federal (USBR) funding source components. "In-kind" contributions are designated with an asterisk (*). Review of this table reveals that the total Federal funding component (Reclamation) does not exceed 50 percent of the total estimated project cost. On a Total Project Cost Basis, EPWU is proposing to pay for 82% of the project expenses in terms of both cash and in-kind services. On a cash-only basis, EPWU is proposing to pay for 81% of the total project.

**Table 2. Summary of non-Federal and Federal funding sources.**

| **Funding Sources** | **Funding Amount** |
|---|---|
| Non-Federal Entities | |
| 1. El Paso Water Utilities (EPWU) | $1,300,000.00 |
| 2. El Paso Water Utilities (EPWU) | $55,000.00* |
| 3. | |
| Non-Federal Subtotal: | $1,355,000.00 |
| | |
| Other Federal Entities | |
| 1. NA | |
| 2. | |
| 3. | |
| Other Federal Subtotal: | -0- |
| | |
| Requested Reclamation Funding: | $300,000.00 |
| | |
| Total Project Funding: | $1,655,000.00 |

*In-Kind Contributions ($55,000.00)

Since this application is being submitted in accordance with the requirements of Funding Group I, Table 3 is offered to summarize the funding requested by year from USBR.

**Table 3. Funding Group I Funding Request.**

| Funding Group I Request | | | |
|---|---|---|---|
| | **Year 1 (FY 2014)** | **Year 2 (FY 2015)** | **Year 3 (FY 2015)** |
| Funding Requested from USBR | $300,000.00 | $0.00 | -0- |

## Funding Plan and Letter of Commitment (Resolution):

**The EPWU Board of Directors approved by Resolution a total of $1,300,000.00 in cash over two years to fund this project's local match, plus $55,000.00 in terms of In-Kind Contributions as shown in the Appendix Number 7, Budget Form. Of this cash amount from EPWU, $ 300,000.00 is available now from EPWU budget revenues. Then one year from now, EPWU's Board will approve an additional $ 1,000,000.00 in cash for expenditure between March 1, 2015 and August 1, 2016, if the project is funded by USBR. This funding disbursement scheme is represented on Table 3 above; EPWU will match the requested USBR funds one- for-one in the first year, and apply $ 1,000,000.00 towards the project in the second year (based on EPWU's fiscal year). The in-kind services, worth $55,000.00 are available on an as-needed basis without restrictions, if the project proceeds. Therefore, there are essentially no time-constraints on the availability of EPWU's funds. The only contingency applied to the use of the EPWU funds is the requirement that USBR select the project for funding.**

## Budget Narrative:

Please refer to the attached Budget Form, Appendix Number 7:

Salaries and Wages (in-kind)

The following EPWU personnel will be involved in this project. The respective roles and value of their in-kind services is described as follows:

John Balliew is the President and CEO of EPWU and will function as the official Lead Manager for this proposed Project. He will be responsible for overall project oversight and has the authority to advance the objectives of the study and assure its completion within budget and on schedule. Hector Gonzalez works directly under the supervision of John Balliew and will function as the Assistant Project Manager. Mr. Gonzalez's official title at EPWU is Government Affairs Manager. For all practical purposes Mr. Gonzalez will be the day-to-day staff member responsible for daily and routine activities. Mike Fahy, as the Grant Manager, will be

responsible for adherence to project budgets and all necessary routine reporting to USBR. Mr. Fahy will be the initial point of contact with USBR for regular, routine questions about project scheduling and reporting. Mr. Balliew, Mr. Gonzalez, and Mr. Fahy all work together in close proximity at EPWU's Headquarters building and are all accessible, as needed, for USBR representatives. It is estimated that Mr. Fahy will spend approximately 10% of his time overall on the project over the two year duration. Manpower commitments by Mr. Balliew and Mr. Gonzalez will be considerably smaller, less than 2%.

Paul Rivas is the Director of EPWU's Chemical Testing Laboratory (International Water Quality Laboratory) and will be responsible for assuring that all water quality testing required for the project is performed properly and according to all ASTM, EPA, TCEQ and other applicable standards. Mr. Rivas has several, qualified technicians that work directly for him and will keep him updated on all water quality tests and any problems that ensue, and will make sure that all tests are conducted properly. EPWU estimates that Mr. Rivas will invest approximately 2% of his time overall on this project.

Irma Finlay will be the staff accountant responsible for oversight of all funds and cash reimbursements required for the proposed project. She will maintain the project spreadsheet recording all expenses incurred, both cash and in-kind, and assure that all contracted invoices are paid. Ms. Finlay will also compile EPWU's reimbursement requests after expenses are paid and submit them to USBR for back payment to EPWU. Her manpower requirement was estimated at 3% of her total available time over the two-year project. Margarita Munoz is Ms. Finlay's immediate supervisor and will check and verify all invoice payments and reimbursement requests. Her labor commitment was stated at approximately 1% of her time over two years.

In terms of EPWU's on-site, operations staff, Victor Guzman is an Operations supervisor and will provide oversight during project reviews, pre-and post-bid meetings, bid specifications preparation, field inspections and project start-up when the construction is completed. His two technicians, Raul Najera and Robert Martinez, will assist him and during the project so that all on-site activities are conducted properly and the details are followed for proper construction of the facilities, according to the manufacturers' requirements. EPWU estimates that each of these three individuals will spend approximately 3% of their time on this project over the two year period.

## Fringe Benefits (in-kind)

The in-kind fringe benefits for EPWU personnel involved in this project were computed on a "Fringe" basis and were derived by subtracting the hourly salary rate cost for EPWU manpower (person-by-person) from the loaded value per hour (also person-by-person).

## Travel (in-kind)

The travel costs included in this project are for mileage by EPWU field personnel for travelling between the three well sites. The total mileage is expected to be 2000 miles, and at a cost of $0.50/mi, the total project cost is estimated at $1000.00.

## Equipment

According to Figure 4 in the aforementioned Technical Project Description, each of the three proposed wellsite facilities will utilize approximately 14 membranes in a combination of parallel and in-series arrangements. Each facility will also use at least two pressure vessels and two storage tanks. Based on equipment cost estimates from Dr. Tarquin, with the help of El Paso's Industrial Water Supply Corporation (IWSC), EPWU anticipates that the cost of equipment (hardware) will equal $350,000.00 for each of the four locations proposed. This will then equate to a total project equipment cost of approximately $1,050,000.00.

These equipment costs can be further broken down using the following basic proportionality formula provided by Paul Diaz at IWSC; Membranes- 40%; Piping, Valves and Pressure Vessels – 25%; Electrical Controls and Monitoring/Measuring – 20%; and finally 15% of system equipment costs for Pumps. Using this formulation yields the following breakdown per well for equipment costs by Type of Equipment:

| **Equipment Type** | **Cost Estimate/Well** |
|---|---|
| Membranes…….. | $140,000.00 |
| Piping, Valves, Pressure Vessels…… | $ 87,500.00 |
| Electrical Controls and Monitoring …….. | $ 70,000.00 |
| Pumps…… | $ 52,500.00 |
| **Total per Well:** | **$350,000.00** |

## Materials, Supplies, and Services (in-kind)

Water samples will be collected from the feed water (i.e. RO concentrate), permeate, and super-concentrate at each well on a monthly basis and analyzed at EPWU's International Water Quality Laboratory. The analyses will include anions/cations, pH, conductivity, silica, TDS, arsenic and other parameters deemed necessary as the project progresses. At a cost of $300.00 per sample for 45 samples, the cost of this service is $13,500.00.

## Contractual

Dr. Tarquin will be employed under a standard EPWU consultant services contract and will be the primary membrane processes consultant overseeing the technical processes functions of the proposed project. Dr. Tarquin has been a faculty member of the University of Texas at El Paso (UTEP) for more than 44 years and, as the list of References attached indicates, has worked jointly with EPWU to complete many membrane research and water treatment projects. Dr. Tarquin will report directly to Mr. Fahy on a daily basis, and jointly with Mr. Gonzalez for weekly progress reporting. Dr. Tarquin will report to Mr. Balliew as necessary or for special meetings. Dr. Tarquin will be the engineer ultimately responsible for determining the number of membranes, pumps, valves, pipes, and so for the, and their constructed orientation, method of

assembly, and location for final construction. This information will be passed on to the Technical-Engineering consultant, through EPWU's Engineering Department, for inclusion in the design specifications for competitive bidding. The project budget includes 333 hours over two years for Dr. Tarquin's manpower, which equates to approximately 10% of his time over the two year duration.

EPWU will use the Qualifications-based method for selection of a qualified and experienced consulting engineering firm to assemble the bid specifications for the project and provide technical oversight (resident engineering) services during construction. There are several qualified engineering firms located in El Paso to choose from and all are very familiar with basic membrane processes for water treatment, and EPWU's requirements and procedures for competitive bidding of construction and equipment installations. These firms would include CH2M Hill, Parkhill, Smith and Cooper, CDM, and others. The budget estimate of $120,000.00 for the Engineering Consultant was derived using approximately 7% of the total estimated project cost, including all cash plus in-kind components. This value is within the generally accepted industry standard of 5 to 10% of total project costs, and is also considered reasonable in light of the fact that Dr. Tarquin will provide the basic system design.

The purchase of the membrane equipment and related hardware, along with the assembly on-site will be conducted using EPWU's standard policies and procedures for competitive bidding. EPWU employs an industry-accepted manual for this process that is very effective at procuring such materials and construction services for a competitive price. The technical process bid specifications will clearly identify the approved types of membranes, pumps, valves and so forth (by both manufacturer and model number), and the correct methods of assembly on-site. EPWU's standard procurement procedures will be used to assure that the low bidder has adequate resources, qualified personnel, and financial stability to complete the project once started. The per well construction/installation cost estimate of approximately $130,000.00 was derived by assuming that each well facility would require 1,530 man-hours for construction at an average hourly, total (loaded) labor rate of $85.00 per hour. Construction will require plumbers, electricians, equipment operators, technicians, routine laborers and supervisors. Oversight of the construction contractor during installation will be provided by a combination of EPWU, Dr. Tarquin, and the Engineering Consulting firm jointly.

## Environmental and Regulatory Compliance Costs

The Lump Sum estimate of $15,000.00 was applied for this task, and is based on the cost from a prior USBR Challenge Grant in which USBR performed the work and concluded that there would be no significant environmental impacts.

## Reporting (in-kind)

A lump sum amount of $3,000.00 is included for report preparation (for printing, binding, distribution, etc.).

## Other Expenses

No other expenses are shown.

## Indirect Costs

There are no indirect costs shown. The in-kind services for EPWU labor were calculated on a "loaded", fringe basis.

## Total Costs:

The total cost of the project is $1,655,000.00. The Bureau of Reclamation share is $300,000. El Paso Water Utilities' contribution will be $1,300,000.00 in cash and $55,000.00 for in-kind services.

## Reference List


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