MEMORANDUM

Date: January 27, 2017

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Regional Wastewater Reclamation Energy Management Program Update**

One of the major expense categories in operating a regional wastewater system is energy cost. The annual energy cost to operate our regional wastewater system is $6,050,000; $5,140,000 to Tucson Electric Power (TEP); $430,000 to TRICO Electric; $390,000 for Solar Electricity; and $90,000 for natural gas.

Recent rate increases at TEP, approved by the Arizona Corporation Commission, have resulted in cost increases of approximately 15 percent over the past five years. However, wastewater rates have not increased in the last four years. The Regional Wastewater Reclamation Department (RWRD) has been able to offset these increases through their own efforts and efficiencies as outlined in the attached report. Thus, have been able to hold their own energy costs relatively consistent for this same timeframe.

The significant energy cost associated with operating a wastewater system relates to the energy intensive equipment necessary to maintain the appropriate biological conditions as well as the movement of water. The attached Energy Management Program Update report from RWRD discusses all of the various energy management programs that are underway or implemented.

In addition, the County has actively pursued an energy recovery program through the beneficial use of methane gas generated in the treatment process.

Negotiations are currently underway to contract with a Third-party vendor to clean, compress, and inject the methane gas produced at the Tres Rios WRF into the Southwest Natural Gas pipeline.

CHH/anc

Attachment

c: Carmine DeBonis, Jr., Interim Deputy County Administrator for Public Works
Jackson Jenkins, Director, Regional Wastewater Reclamation Department

PIMA COUNTY
WASTEWATER RECLAMATION
201 NORTH STONE AVENUE
TUCSON, ARIZONA 85701-1207

JACKSON JENKINS
DIRECTOR

PH: (520) 724-3400
FAX: (520) 724-9635

January 6, 2017

TO: C.H. Huckelberry, County Administrator

THRU: Carmine DeBonis, Jr., Interim Deputy County Administrator – Public Works

FROM: Jackson Jenkins, Director – RWRD

SUBJECT: **Energy Management Program Update**

Attached please find the Energy Management Program Update that describes many of the previous and current Department efforts towards energy optimization and related process efficiency.

With the upcoming User Fee rate increase request going before the Board of Supervisors on January 17th, this document is intended to provide some general information to the BOS in an area that has frequently generated significant interest and questions.

Please let me know if you have any questions or require additional information.

Attached

c: John Sherlock, Deputy Director - RWRD
Eric Nelson, Program Manager - RWRD
Marla Berry, Program Manager, Sr. - RWRD
Jeff Prevatt, Program Manager - RWRD
John Warner, Deputy Director - RWRD
Eric Wieduwilt, Deputy Director - RWRD
Jaime Rivera, Program Manager - RWRD
Lisa Josker, Director – Facilities Management
Linda Salcido, Program Coordinator

ENERGY MANAGEMENT PROGRAM UPDATE
PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT

The Pima County Regional Wastewater Reclamation Department (RWRD) is actively dedicated to operational energy efficiency and sustainable practices.

RWRD treats approximately 60 million gallons of water and safely returns it to the environment each day. It takes a significant amount of energy to transform raw domestic wastewater into the high quality effluent that the modernized treatment plants produce. For example, at the Tres Rios Water Reclamation Facility (WRF), roughly 5,400 horsepower worth of equipment is required to operate 24 hours a day 365 days a year in order to meet stringent regulatory permits and protect the public health.

Energy Efficiency and Cost Containment in the Post-ROMP Era

- During the design and construction phase of the Regional Optimization Master Plan project energy efficient equipment was specified and installed with the long term goal of lower operating costs and more sustainable operations. Because of these forward thinking strategies, RWRD was able to participate in Tucson Electric Power's "Commercial Energy Solutions" program. Tucson Electric Power sent out a team of independent 3rd party auditors to document that the energy efficient equipment was operating as required and verified that the effect of installing this equipment was equivalent to reducing energy usage by 3,500,000 kWh per year. The Department thereby was awarded an energy efficiency rebate check from Tucson Electric Power in the amount of $351,996.99. (TEP letter Exhibit A)
- RWRD became a partner in the U.S. Department of Energy's "Better Plants" Program in January 2015. This national program has set an overarching goal to "significantly improve energy efficiency of commercial, residential, and industrial buildings". Each partner that joins the program makes a commitment to reduce source energy intensity by 25% over a 10-year period. In the first year of participation, RWRD achieved an 8% reduction in source energy intensity. The largest contributor to the 8% reduction in 2015 was the cessation of operations at Randolph Park WRF. The influent that used to be treated at Randolph Park now flows to either Tres Rios or Agua Nueva where it can be treated to a higher grade effluent with less energy consumption. (DOE letter Exhibit B)
- Under the Design-Build-Operate Agreement with CH2M, the Agua Nueva facility must meet an energy efficient standard of 1,516 kWh per million gallons treated. This is a very aggressive target. If the operation of the plant exceeds this kilowatt standard, CH2M must reimburse the County for the excess use of energy. If CH2M's energy intensity measure is less than 1,516 kWh per million gallons, then they share in the cost savings with RWRD. The agreement is in place to incentivize CH2 to operate the Agua Nueva WRF under optimal energy efficiency.
- In 2015, RWRD commissioned HDR Inc. to conduct an energy audit on the four Sub-Regional treatment facilities – Green Valley, Avra Valley, Corona de Tucson and Mt. Lemmon. At the end of the audit, HDR made a series of recommendations to staff of potential energy conservation measures that could conserve energy and/or lower energy costs. The majority of the low cost/no cost energy conservation measures have been implemented and the single greatest cost

saving (changing Green Valley WRF to rate LGS-13) was already being implemented before the report was finalized. (HDR Executive Summary Exhibit C)

- In order to maximize "economies-of-scale" that became available with the substantial completion of the Tres Rios WRF, the Department entered into contract discussions with TEP to purchase power at the most cost effect rate available. In February 2013 the Department requested permission from the Pima County Board of Supervisors to enter into the contract with TEP and be billed under the LLP-14 industrial rate. Based on detailed data collected during the first year of the upgraded facilities operation, further analysis of TEP rates showed that Tres Rios would further benefit by switching to the LLP-90 time-of-use rate. The Pima County Board of Supervisors were presented with the recommendation conservatively estimating that $168,000 per year could be saved by going to the new rate. The BOS approved this recommendation at the August 5, 2014 Board meeting. (BOS Agenda Item Summary Exhibit D). The actual savings during Year One on the LLP-90 rate was $278,000.

Solar Projects

RWRD supports the County's Sustainability Program and has taken steps to reduce the carbon footprint of the Department. RWRD was an early adopter of large scale solar.

- RWRD's first 1 mega-watt solar facility went operational in August of 2010 and has since produced 13,250,000 kWh of renewable electricity through the end of calendar year 2016.
- RWRD's second 1 mega-watt solar facility went operational in April 2011. As of January 2017 this facility has produced 10,650,000 kWh of renewable electricity.
- Combined, these two power sources have reduced the carbon footprint on the environment in the equivalent of 40 million automobile miles or 37.8 million pounds of CO_2 emissions avoided. (SunEdison summary pictures, Exhibit E)
- RWRD's next solar project, to be constructed at the Corona de Tucson WRF, was approved by the Board of Supervisors in November 2016. The 20-year projected cost savings in electricity costs is over $550K with the solar production. The project should be completed by September 2017 (Oakleaf Summary Table, Exhibit F)
- Not all of the solar projects that have been proposed have been accepted by the Department. Each proposed project is evaluated as to whether the proposed return will be favorable or not. One of the recent proposed solar projects for covered solar parking at the Water Campus was not accepted as it was determined not to be cost effective over the proposed 20-year contract period.

Renewable Biogas Energy Created and Beneficially Used

- The biogas that is produced in our anaerobic digesters is used in specially designed boilers that burn the raw biogas to produce heat. This capability allows RWRD to avoid purchasing large amounts of natural gas. Last year, the Department beneficially reused 220,000 cubic feet of biogas with an associated savings of approximately $190,000.
- RWRD is currently in negotiations to provide our raw biogas to a third party vendor who will clean, compress, and inject it into the local natural gas pipeline. Under this agreement RWRD will share in the revenue generated by the sale of this renewable resource. RWRD is expected to receive approximately $150,000 per year through this venture.

On-Going Steps to Optimize Energy Usage

- RWRD will continue to participate in the Better Plants program and to make use of the resources provided by the Department of Energy and other industry associations. Continuous improvement is a core value in all of RWRD's operations and appropriate attention will continue to be paid to optimize processes and reduce costs.

Keeping Staff Informed of Peak Power Demand/Power Usage

- One example of how energy efficiency goals are communicated to staff is the Tres Rios Daily Energy Report. This report is automatically generated and emailed to managers and team leads each morning so that yesterday's performance can be monitored and usage patterns compared with expected performance. The overall goal for the facility is stated in the body of the email. In 2017 the goal is to reduce electrical usage by 4% at the Tres Rios WRF. Other reports and dashboards are currently in the works to improve understanding of our goals and the strategy for achieving these goals. (Tres Rios Daily Energy Report, Exhibit G)

New Projects: Anammox Trails

- Research into processes improvements or technological advances related to our industry are ongoing at RWRD. For example, at the Tres Rios WRF, the cost for the operation of the air blowers is approximately $1.6 million annually. The blowers provide air to the biological nutrient removal process and are key to achieving regulatory permit compliance. RWRD is planning a bench scale pilot program, to begin in February 2017, for an innovative process in treating side stream ammonia flows for improved performance and reducing energy costs. Anaerobic ammonia oxidation, or anammox, is a relatively new concept that drastically reduces aeration costs up to 30%. If successful, this new process could reduce our energy costs by up to $400,000 per year.

Projects Under Evaluation: Hydro Power at the Outflow

- At the request of the Regional Wastewater Reclamation Advisory Committee, RWRD pursued an updated feasibility review of commercially available, in-conduit turbines to produce power from the stored potential energy of the TRWRF effluent flows to the Santa Cruz and other large diameter pipelines within the conveyance system. Based on conversions and calculations with a leading vendor in this area the present level of technology does not allow for a cost effective installation of an in-conduit energy recovery system. However, it is recommended that a feasibility review be completed in 5 years to study improvements in technology that may make the implementation of an energy recovery system cost effective.

Water and Energy Sustainability Center

- Another accomplishment of ROMP was the design and construction of the Water and Energy Sustainability Center. The complex was designated a Silver LEED building. LEED stands for Leadership in Energy and Environmental Design; a system that rates building and facilities according to their green features.

On-Going Steps with TEP and Rate Structure

- An attorney from the Pima County Attorney's office is actively involved in the current rate case increase study with TEP and attends meetings to give input on behalf of the County. This pro-active approach to proposed rate increases should have a positive impact on the Department and allow staff to plan for future budget impacts with the proposed rate increases.

EXHIBIT A

88 E. Broadway Blvd.
Mail Stop HQW 505
Tucson, AZ 85701

December 15, 2014

Eric Nelson
PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPT
130 W Congress St, 7th Floor
Tucson, AZ 85701

RE: TEP Commercial Energy Solutions Project ID#: TEP-13-01692
Application Type: LB Custom Retrofit
Project Name: Tres Rios (Ina Rd) & Agua Nueva Waste Treatment

Dear Eric Nelson,

Thank you for participating in the TEP Commercial Energy Solutions program. Enclosed is the rebate check issued to PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPT in the amount of $351,996.99.

We appreciate your interest in the TEP Commercial Energy Solutions program and your efforts to help conserve energy in Arizona. If you have questions or are interested in pursuing other energy efficiency projects at your facility, contact the program team at (866) 324-5506 or send an email to ces@tep.com.

Sincerely,

David Couture
Manager, Key Account Services & Economic Development
Tucson Electric Power Company

EXHIBIT A

TEP EasySave Plus

Custom Incentive Worksheet

Project Name:	Tres Rios and Agua Nueva WW improvements	TEP Account No:	

Please attach supporting documents as described in the specifications. Do not use this form for projects where a custom worksheet is available (custom lighting, heat exchangers, packaged dx energy management systems, etc). Applications using this form where specific worksheets exist will require a resubmittal using the applicable worksheet.

Item 1	Description	Rebate: $0.10 /kWh	
	Retrofit and replacement of interconnected Pima County Water Reclamation Facilities (Tres Rios and Agua Nueva). Project resulted in increased capacity and reduced energy use intensity per Million Gallons treated while improving treatment quality of wastewater to exceed currently mandated guidelines.	**Annual kWh Savings**	**Rebate Subtotal**
		3,519,970	
		kW Savings	
		401.8	$351,996.99
		Annual Oper. Hrs	
		8,760	
		Measure Cost	
		$2,648,529.06	

Enter Operating Schedule and Days Closed Below

Day of Week	Start Time	End Time	Total Hours
Monday	12:00 AM	12:00 AM	24.00
Tuesday	12:00 AM	12:00 AM	24.00
Wednesday	12:00 AM	12:00 AM	24.00
Thursday	12:00 AM	12:00 AM	24.00
Friday	12:00 AM	12:00 AM	24.00
Saturday	12:00 AM	12:00 AM	24.00
Sunday	12:00 AM	12:00 AM	24.00

	Days Closed per Year	
0.00	Weeks Closed per Year	
	Weeks/Year	**52.14**
	Hours/Week	**168.00**
	Calculated Hours/Year	**8760.02**

Item 2	Description	Rebate: $0.10 /kWh	
		Annual kWh Savings	**Rebate Subtotal**
		kW Savings	
		#DIV/0!	
		Annual Oper. Hrs	
		0	
		Measure Cost	

Enter Operating Schedule and Days Closed Below

Day of Week	Start Time	End Time	Total Hours
Monday			0.00
Tuesday			0.00
Wednesday			0.00
Thursday			0.00
Friday			0.00
Saturday			0.00
Sunday			0.00

	Days Closed per Year	
0.00	Weeks Closed per Year	
	Weeks/Year	**0.00**
	Hours/Week	**0.00**
	Calculated Hours/Year	**0.00**

Project Completion Date

Page 1 Custom Rebate SubTotal	$351,996.99
Custom Rebate Total	$351,996.99

EXHIBIT B

Department of Energy
Washington, DC 20585

Mr. Jackson Jenkins
Director
Pima County Wastewater Reclamation Department
201 N. Stone Avenue, 8th Floor
Tucson, AZ 85701

Dear Mr. Jenkins,

I am writing to commend Pima County Wastewater Reclamation Department on the impressive energy savings it has achieved as a partner in the U.S. Department of Energy's Better Buildings, Better Plants program. In 2015, your agency improved its energy intensity by 8.1% against a 2014 baseline. This puts your agency well on track to meet its long-term target of a 25% improvement over 10 years. Congratulations on such a strong start!

To help Pima County make further progress toward its energy efficiency goals, I invite you to explore other DOE technical assistance offerings, including energy audits through our Industrial Assessment Centers, combined heat and power (CHP) support through our CHP Technical Assistance Partnerships, and energy management tools and training through the online Guide for Energy Management and Superior Energy Performance Program. Your TAM will discuss these opportunities with you in the near future.

We also recently highlighted Better Plants partners' collective accomplishments by releasing our 2016 annual report at this year's World Energy Engineering Congress. I've included a copy, which showcases the impressive achievements of partners like you, including $3.1 billion in cumulative cost savings reported to date. Thank you for helping make 2016 a great year for our partnership.

Pima County Wastewater Reclamation Department is leading the way on industrial energy efficiency. Together with other Better Plants partners, your efforts are helping to cut energy waste, grow jobs, and improve the competitiveness of the U.S. manufacturing sector. I extend my congratulations on your achievement to date of an 8.1% cumulative improvement in energy intensity and look forward to continuing our partnership.

Great Job,

Mark Johnson
Director of Advanced Manufacturing Office
Office of Energy Efficiency & Renewable Energy
U.S. Department of Energy

cc: Ms. Marla Berry, Mr. Eric Nelson

Printed with soy ink on recycled paper

EXHIBIT C

OVERALL EXECUTIVE SUMMARY

The reports provided herein discuss the findings of the Energy Audits of Sub-Regional Wastewater Reclamations Facilities (WRF) project completed by HDR on behalf of PCRWRD in 2015. A detailed energy audit analysis of four Sub-Regional WRF's was completed; Corona de Tucson WRF, Avra Valley WRF, Green Valley WRF, and the Mount Lemmon WRF. HDR also provided a cursory review the Arivaca Junction and Pima County Fairgrounds Lagoons.

The purpose of these energy audits is to evaluate the current energy consumption at each plant and develop potential energy conservation measures (ECMs) that could be carried out to conserve energy and/or lower energy costs. The detailed energy audits included the following:

- Review of utility bills, process flow diagrams, equipment data, and rate schedules
- Kick-off meeting with PCRWRD plant personnel to discuss preliminary energy concerns
- Field investigation and review of process operation, equipment, and approach
- Identification and assessment of ECMs
- Report that summarize the findings and recommendations

The existing conditions for the fiscal year 2013-2014 are shown below in Table 1.

Table 1: Energy Snapshot for FY 2013-2014

	Units	Corona de Tucson	Avra Valley	Green Valley	Mt. Lemmon
Average Flow	MGD	0.28	1.26	1.74	2,639
Electrical Energy	kWh/yr	732,120	2,135,440	2,479,400	65,440
Average Monthly Energy Intensity (MG Treated)	kWh/MG	7,221	4,648	3,947	70,442
Average Monthly Energy Intensity (BOD Removed)	kWh/lb BOD Removed	3.98	2.10	1.95	N/A
Electrical Energy Cost	$/yr	$98,731	$264,714	$273,524	$9,924
Average Rate (loaded)	$/kWh	$0.14	$0.12	$0.11	$0.152
Billing Demand	kW	142-182	323-590	N/A	15-20
Average Demand	kW	159	409	331	18

ECMs were identified for each of the facilities shown in Table 1. The ECMs identified along with estimated electrical energy savings, costs savings, capital costs, and simple payback periods are shown in Table 2. The estimates in this document use equipment and construction cost estimates consistent with a level of accuracy corresponding to Class 5 according to the Association for the Advancement of Cost Engineering (AACE) International Recommended Practices and Standards, No 18R-97.

EXHIBIT C

Table 2: Energy Conservation Measures and Calculations

ECM #	Description	Savings kW	Savings kWh/yr	Savings $/yr	Capital Cost	Simple Payback (yrs)	Comments
Corona De Tucson							
1	Monitor and set an alarm on real-time electrical demand	15.9	0	$3,177	$10,000	3.1	Bring the pulses from the electric utility meter in to SCADA, set targets for maximum demand, and provide alarms when approaching or exceeding target value. Consider automatic load shedding to bring demand below target value while investigating the cause for the demand spike.
2	Turn off two motive pumps during anoxic cycle	14.9	52,280	$7,319	$0	0	Operate two motive pumps instead of four pumps during the anoxic cycle. Anoxic cycle is 40% of the time and will provide 6 kW/day (40% 15 kW) savings.
3	Replace motive pumps usage with two banana blade mixers during anoxic cycle	3.6	31,368	$4,391	$25,000	5.7	Turn off all motive pumps during anoxic cycle and install two 4 HP banana mixers (similar to Avra Valley Oxidation Ditches).
4	Install high efficiency screw-type composite blowers	7.8	68,617	$9,606	$150,000	15.6	Install four (4) high efficiency screw-type composite blowers, saving up to 20% energy usage.
5	Replace the jet aerators in the reactors with fine bubble diffusers.	7.8	68,617	$9,606	$125,000	13	Fine bubble diffusers can require up to 25% less aeration to achieve the same dissolved oxygen content.
6A	Consider changing sheaves in sludge tank blowers to optimize energy usage	3.7	32,675	$4,574	$1,000	0.2	Reducing sludge tank blower speed by 50% by changing sheaves.
6B	Install VFD's on the sludge tank aerators	3.7	32,675	$4,574	$10,000	2.2	Installation of a VFD on the blower motor will provide more flexibility for aeration rate – assume a 50% reduction.
	Total for Recommended ECMs 1 – 6A			**$38,675**	**$311,000**	**8**	**Percent Electrical Cost Savings = 39.2%**
Additional Saving Methods (will require additional investigations to implement)							
1	RAS pump optimization. Current RAS flow rate is 50%; decreasing flow rate to a lower % will help to save energy.						
Avra Valley							
1	Aggregate the two electric meters with Trico	41.4	0	$8,272	$0	0	The two electric meters onsite each have monthly demand charges associated with them. Since this is the same facility, PCRWRD could request that Trico combine these two meters into one bill, with one 15 minute demand charge. A single demand charge for the whole facility would likely result in a 10% cost reduction.
2	Monitor and set an alarm on real-time electrical demand	41.4	0	$8,272	$10,000	1.2	Bring the pulses from the electric utility meter in to SCADA, set targets for maximum demand, and provide alarms when approaching or exceeding target value. Consider automatic load shedding to bring demand below target value while investigating the cause for the demand spike.
3	Reduce non potable water (NPW) usage	1.7	15,136	$1,816	$0	0	Reduce NPW usage from 130,000 gpd to 80,000 gpd by optimizing use throughout the plant, especially sprays.
4	Reduce operating pressure of NPW system	0.5	4,541	$545	$0	0	Reduce operating pressure of the NPW system from 80 psi to 65 psi.
5	Optimize UV Disinfection system	6	52,560	$6,307	$5,000	0.8	Reduce the dose set point of the Trojan 3000 Plus UV system by 20% from an average usage of 300 mJ to 240 mJ.
6	Operate sludge holding tank recirculation (chopper) pumps 50% of the time	11.2	98,024	$11,763	$5,000	0.4	Always run pumps prior to solids load out. Also use these pumps for temporary load shedding for demand management.
	Total for Recommended ECMs 1 - 6			**$36,975**	**$20,000**	**0.5**	**Percent Electrical Cost Savings = 14.0%**
Additional Potential Saving Methods (will require additional investigations to implement)							
1	RAS pump optimization.						
2	Sand filter optimization by running the compressors at lower operating pressure.						

Table 2: Energy Conservation Measures and Calculations (Continued)

ECM #	Description	Savings kW	Savings kWh/yr	Savings $/yr	Capital Cost	Simple Payback (yrs)	Comments
Green Valley							
1	Reclassify the GRVWRF as LGS-13 from GS-10 for TEP billing	NA	NA	$24,000	$0	0	LGS-13 rate schedule offers a lower energy charge than GS-10. However, a demand charge is associated with LGS-13 ($15.25/kW) and the demand needs to be managed to avoid high electric bills. Savings assumes a load factor of 0.65.
2	Monitor and set an alarm on real-time electrical demand	38	NA	$6,954	$10,000	1.4	Bring the pulses from the electric utility meter in to SCADA, and set targets for maximum demand, and provide alarms when approaching or exceeding target value. Consider automatic load shedding to bring demand below target value while investigating the cause for the demand spike.
3	Operate the grit pumps as needed, and not all the time in the winter	3.73	21,783	$2,178	$500	0.2	The grit pump runs 24/7 during the winter time and runs for 20 mins after every 40 mins (33% of the time) during the summer time. The grit pump could be optimized for the winter period and run similar to summer time. Assume a 50% reduction of overall pump run time, which will lead to an average of 33% of grit pump running time throughout the year.
4	Optimize sludge/air volume in the sludge holding tanks	2.2	19,605	$1,960	$0	0	Provide optimum level of air to keep the sludge in aerobic condition.
5	Divert more flow to the lagoons	20	175,200	$17,520	$0	0	Current operation practice sends 0.4 MGD of flow to the lagoons. The lagoons are low cost treatment and can treat up to 2.1 MGD. Sending more flows to the lagoons will help to minimize energy consumption.
	Total for Recommended ECMs 1 - 5			**$52,613**	**$10,500**	**0.2**	**Percent Electrical Cost Savings = 19.2%**
Additional Saving Methods (will require additional investigations to implement)							
1	RAS pump optimization. Current RAS flow rate is 40% and by decreasing it to 35% will help to save energy.						
Mount Lemmon							
1A	Avoid use of supplemental aspirating aerator by narrowing the band of on/off liquid levels of the influent pump station (IPS), increasing the frequency of pump operation	4	5,446	$817	$0	0	Simple control changes. Assume aspirating aerator operates 4 hrs/day
1B	Avoid use of supplemental aspirating aerator by installing VFDs on IPS to reduce the peak flow rate slug loading	4	5,446	$817	$10,000	12.2	Try ECM 1A first
2	Place the brush aerator on a timer in the evenings.	4	6,807	$1,021	$500	0.5	Interlock aerator and IPS to run aerator briefly upon pump operation. Timer is operational 10 hrs per day and aerator runs 50% of the time
3	Manage demand so that there is no simultaneous operation of IPS pumps, aspirating aerator, and effluent pumps	5	0	$1,016	$0	0	Reducing the slug load to the plant will help to reduce demand in kW (demand charge is $16.65/kW/month)
4	Reduce dissolved oxygen (DO) set point to 3.0 mg/L from 4.3 mg/L	1	8,760	$1,314	$0	0	Consider only if ECM 1A is implemented
	Total for Recommended ECMs 1A, 2 – 4			**$4,168**	**$500**	**0.1**	**Percent Electrical Cost Savings = 42%**
Additional Saving Methods							
1	Change the pressure in the high pressure compressor from 100 psi to 20 psi.						
Combined Recommended ECMs				**$132,431**	**$342,000**	**2.6**	**Percent Electrical Cost Savings (Combined) = 20.5%**

EXHIBIT D

BOARD OF SUPERVISORS AGENDA ITEM SUMMARY

Requested Board Meeting Date: August 5, 2014

ITEM SUMMARY, JUSTIFICATION &/or SPECIAL CONSIDERATIONS:

In February 2013, the Tres Rios Wastewater Reclamation Facility (WRF) entered into an agreement with Tucson Electric Power Company (TEP) to be charged for electricity services at the LLP-14 rate schedule. On-going utility analysis, while the upgraded facility has come on-line, shows that even further savings in electricity costs can be realized under the LLP-90 rate schedule. The attached graph (Attachment A), shows that an estimated $14,000 per month ($168,000 annually) savings can be realized under the LLP-90 schedule.

This contract amendment would place the Tres Rios WRF under the LLP-90 rate schedule.

*CONTRACT NUMBER (If applicable): CT # 13*359*

STAFF RECOMMENDATION(S):

Staff recommends that the Board approve the contract amendment that will allow electricity charges for the Tres Rios Wastewater Reclamation facility to be billed at the LLP-90 rate schedule.

CORPORATE HEADQUARTERS: _____

EXHIBIT D

CLERK OF BOARD USE ONLY: BOS MTG. _____

ITEM NO. _____

PIMA COUNTY COST: *approximately $2.9 million per year for electricity costs at Tres Rios WRF*

FUNDING SOURCE Enterprise Fund
(i.e. General Fund, State Grant Fund, Federal Fund, Stadium D. Fund, etc.)

Advertised Public Hearing:

		YES	***X***	***NO***

Board of Supervisors District:

1		*2*		*3*		*4*		*5*		*All*	*X*

IMPACT:

IF APPROVED:
The Tres Rios WRF electricity costs through TEP will be charged under the LLP-90 rate schedule, resulting in an estimated monthly savings of $14,000.00

IF DENIED:
The Tres Rios WRF will continue to be charged under the LLP-14 rate schedule with TEP; no additional savings in electrical costs will be realized.

DEPARTMENT NAME: Regional Wastewater Reclamation Department (RWRD)

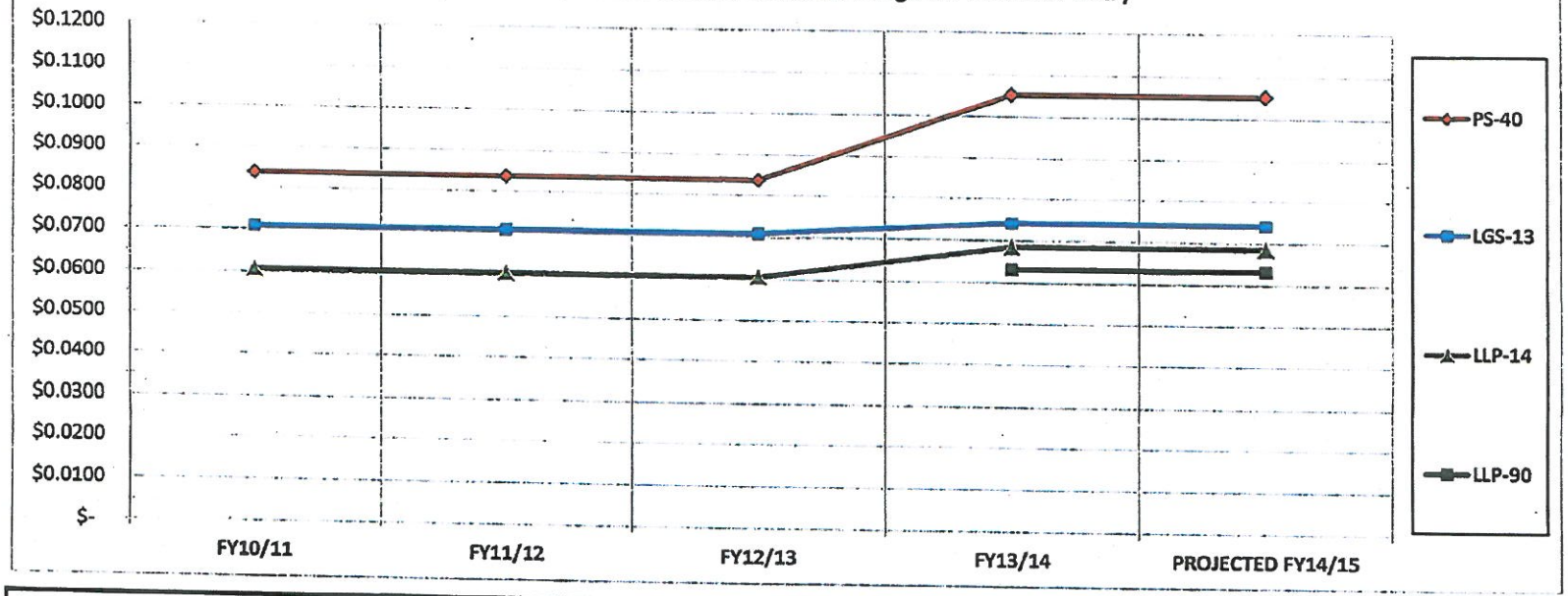
CONTACT PERSON: Marla Berry TELEPHONE NO.: 724-6181

EXHIBIT D

Attachment A

TEP BASE RATE COST PER KWH

(Based on June 2014 Actual Electrical Usage for Tres Rios WRF)



	COST PER KWH				
	FY10/11	FY11/12	FY12/13	FY13/14	PROJECTED FY14/15
PS-40	$ 0.0838	$ 0.0838	$ 0.0838	$ 0.1054	$ 0.1054
LGS-13	$ 0.0707	$ 0.0707	$ 0.0707	$ 0.0740	$ 0.0740
LLP-14	$ 0.0608	$ 0.0608	$ 0.0608	$ 0.0687	$ 0.0687
LLP-90				$ 0.0634	$ 0.0634

	AVERAGE MONTHLY BASE RATE COST (Peak Demand = 4,500 KW, Usage = 2,720,000 kWh)				
RATE	FY10/11	FY11/12	FY12/13	FY13/14	PROJECTED FY14/15
PS-40	$ 227,936	$ 227,936	$ 227,936	$ 286,688	$ 286,688
LGS-13	$ 192,376	$ 192,376	$ 192,376	$ 201,361	$ 201,361
LLP-14	$ 165,304	$ 165,304	$ 165,304	$ 186,766	$ 186,766
LLP-90				$ 172,361	$ 172,361

Peak Demand 4,500 KW Peak Demand (Actual June 2014)

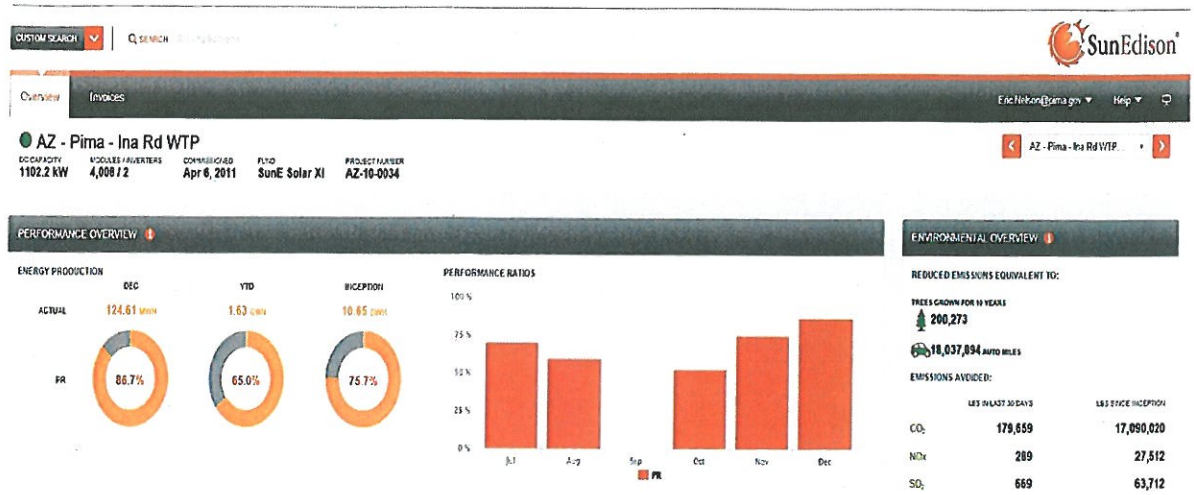
Usage 2,720,000 kWh per Month (Actual June 2014)

By changing from LLP-14 to LLP-90 we anticipate saving an average of $14,000 per month, or approximately $168,000 per year.

NOTE: Base rate does not include DSM, PPFAC, REST charges or Taxes which typically add approximately 20% to the base rate charges

DSM = Demand Side Management surcharge, PPFAC = Purchased Power Fuel Adjustment Clause, REST = Renewable Energy Standard Tariff.

EXHIBIT E


CUSTOM SEARCH
SEARCH
SunEdison
Overview
Invoices
Eric.Nelson@pima.gov
Help
AZ - Pima - Ina Rd WTP
DC CAPACITY 1102.2 kW
MODULES / INVERTERS 4,008 / 2
COMMISSIONED Apr 6, 2011
FUND SunE Solar XI
PROJECT NUMBER AZ-10-0034
AZ - Pima - Ina Rd WTP...
PERFORMANCE OVERVIEW
ENERGY PRODUCTION
DEC
YTD
INCEPTION
ACTUAL
124.61 MWH
1.63 GWH
10.65 GWH
PR
86.7%
65.0%
75.7%
PERFORMANCE RATIOS
100 %
75 %
50 %
25 %
0 %
Jul
Aug
Sep
Oct
Nov
Dec
PR
ENVIRONMENTAL OVERVIEW
REDUCED EMISSIONS EQUIVALENT TO:
TREES GROWN FOR 10 YEARS
200,273
18,037,894 AUTO MILES
EMISSIONS AVOIDED:
LBS IN LAST 30 DAYS
LBS SINCE INCEPTION
CO2 179,659 17,090,020
NOx 289 27,512
SO2 669 63,712

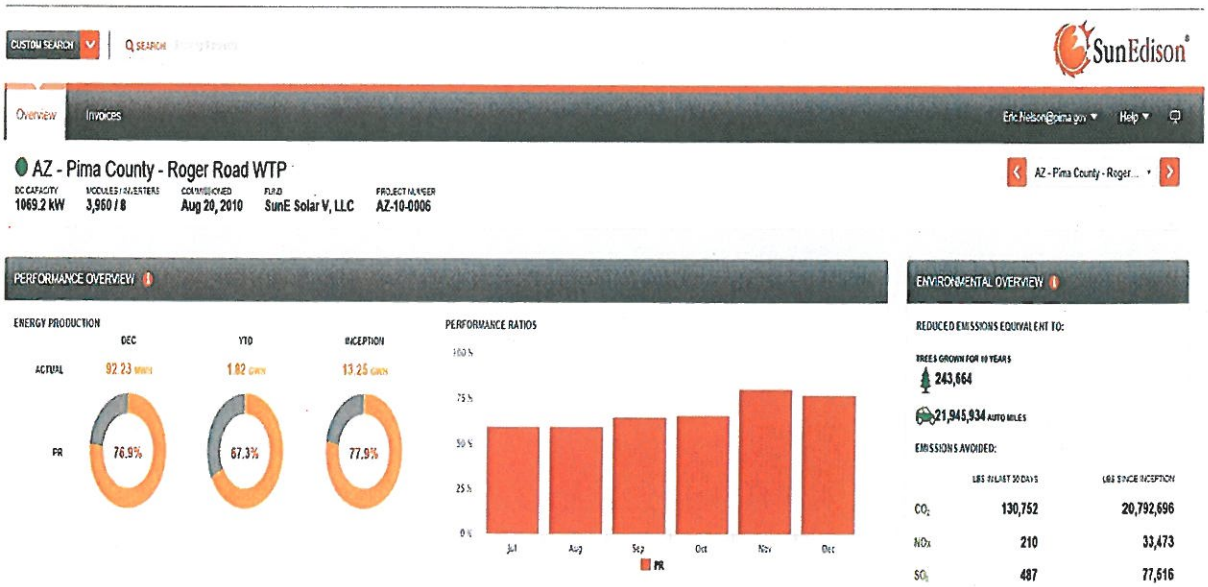

CUSTOM SEARCH
SEARCH
SunEdison
Overview
Invoices
Eric.Nelson@pima.gov
Help
AZ - Pima County - Roger Road WTP
DC CAPACITY 1069.2 kW
MODULES / INVERTERS 3,960 / 8
COMMISSIONED Aug 20, 2010
FUND SunE Solar V, LLC
PROJECT NUMBER AZ-10-0006
AZ - Pima County - Roger...
PERFORMANCE OVERVIEW
ENERGY PRODUCTION
DEC
YTD
INCEPTION
ACTUAL
92.23 MWH
1.82 GWH
13.25 GWH
PR
76.9%
67.3%
77.9%
PERFORMANCE RATIOS
100 %
75 %
50 %
25 %
0 %
Jul
Aug
Sep
Oct
Nov
Dec
PR
ENVIRONMENTAL OVERVIEW
REDUCED EMISSIONS EQUIVALENT TO:
TREES GROWN FOR 10 YEARS
243,664
21,945,934 AUTO MILES
EMISSIONS AVOIDED:
LBS IN LAST 30 DAYS
LBS SINCE INCEPTION
CO2 130,752 20,792,696
NOx 210 33,473
SO2 487 77,516

Exhibit 1.2 - Expected & Guaranteed Performance Output for the Corona de Tucson project.

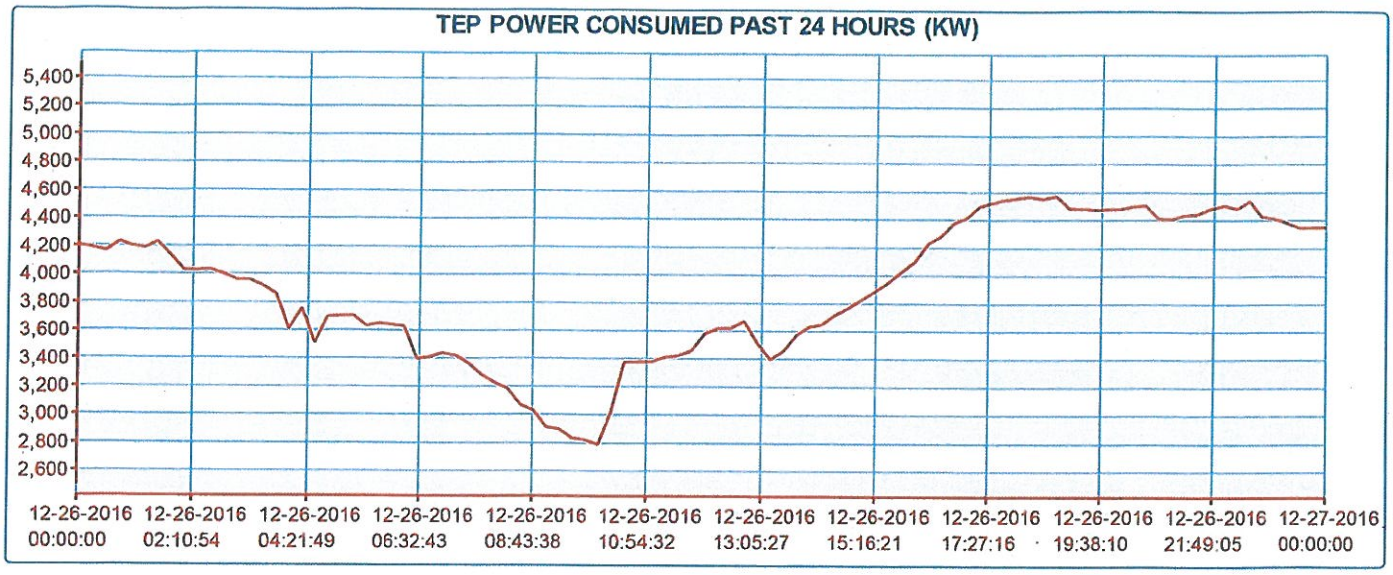
a. The actual Expected Performance Output (kWh) (Column A) shall not exceed in any given year 610,130 kWh.
b. The Guaranteed Minimum Output (kWh) (Column B) shall be calculated at a minimum of 85% of Expected Performance Output (Column A); a grea
c. First year Expected Performance Output will be calculated for the 12 month period that commences on the Commercial Operation Date defined by
d. The actual cost of electricity purchased from the utility during the calendar year 2013 for the Green Valley WRF was approximately $.14/kWh.
e. The Total for Column C (Average weighted SSA price of Guaranteed Minimum Output) shall be calculated as the Total of Column E divided by the T
The Total for Column F (Average weighted TEP price of Guaranteed Minimum Output) shall be calculated as the Total of Column G divided by the Tot

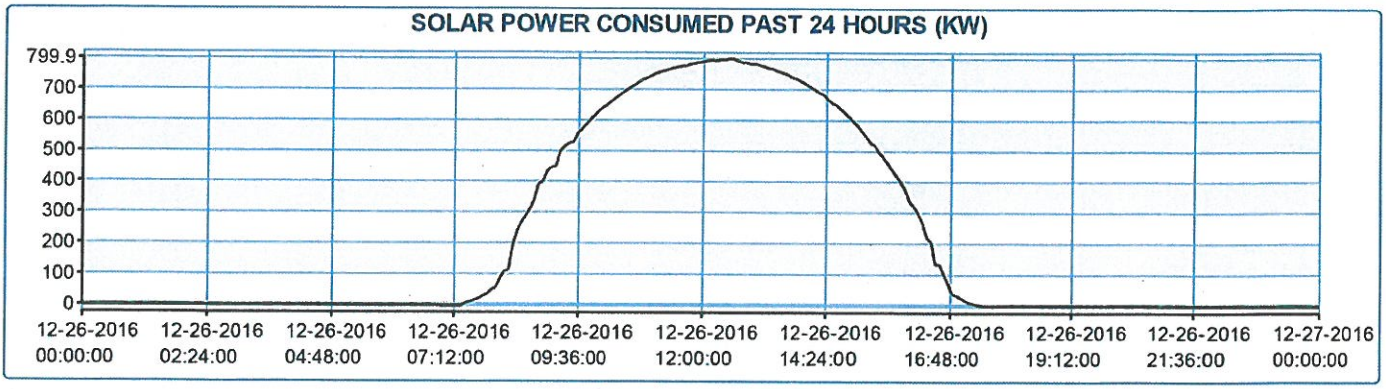
Column	A	B	C	D	E	F	G	H
YEAR	Expected Performance Output (kWh)	Guaranteed Minimum Output (kWh)	Supplier Price ($/kWh)	Total Annual Cost for Expected Perf. Output Electricity ($) from Supplier Columns (A X C)	Total Annual Cost For Guaranteed Electricity ($) From Supplier Columns (B X C)	Est. TRICO Cost $/kWh	Est. Total Annual Cost For Guaranteed Electricity ($) From TRICO Columns (B X F)	Pima County Savings per year Columns (G-E)
1	608,580	547,722	$ 0.1050	$ 63,901	$ 57,511	$ 0.118	$ 64,631	$ 7,120
2	605,537	544,983	$ 0.1050	$ 63,581	$ 57,223	$ 0.122	$ 66,237	$ 9,014
3	602,509	542,258	$ 0.1050	$ 63,263	$ 56,937	$ 0.125	$ 67,883	$ 10,946
4	599,497	539,547	$ 0.1050	$ 62,947	$ 56,652	$ 0.129	$ 69,570	$ 12,918
5	596,499	536,849	$ 0.1050	$ 62,632	$ 56,369	$ 0.133	$ 71,299	$ 14,930
6	593,517	534,165	$ 0.1050	$ 62,319	$ 56,087	$ 0.137	$ 73,071	$ 16,983
7	590,549	531,494	$ 0.1050	$ 62,008	$ 55,807	$ 0.141	$ 74,887	$ 19,080
8	587,597	528,837	$ 0.1050	$ 61,698	$ 55,528	$ 0.145	$ 76,748	$ 21,220
9	584,659	526,193	$ 0.1050	$ 61,389	$ 55,250	$ 0.149	$ 78,655	$ 23,404
10	581,735	523,562	$ 0.1050	$ 61,082	$ 54,974	$ 0.154	$ 80,609	$ 25,635
11	578,827	520,944	$ 0.1050	$ 60,777	$ 54,699	$ 0.159	$ 82,612	$ 27,913
12	575,932	518,339	$ 0.1050	$ 60,473	$ 54,426	$ 0.163	$ 84,665	$ 30,240
13	573,053	515,748	$ 0.1050	$ 60,171	$ 54,153	$ 0.168	$ 86,769	$ 32,616
14	570,188	513,169	$ 0.1050	$ 59,870	$ 53,883	$ 0.173	$ 88,925	$ 35,043
15	567,337	510,603	$ 0.1050	$ 59,570	$ 53,613	$ 0.178	$ 91,135	$ 37,522
16	564,500	508,050	$ 0.1050	$ 59,272	$ 53,345	$ 0.184	$ 93,400	$ 40,055
17	561,677	505,510	$ 0.1050	$ 58,976	$ 53,079	$ 0.189	$ 95,721	$ 42,642
18	558,869	502,982	$ 0.1050	$ 58,681	$ 52,813	$ 0.195	$ 98,100	$ 45,287
19	556,075	500,467	$ 0.1050	$ 58,388	$ 52,549	$ 0.201	$ 100,537	$ 47,988
20	553,294	497,965	$ 0.1050	$ 58,096	$ 52,286	$ 0.207	$ 103,036	$ 50,749
Total	11,610,431	10,449,388	$ 0.1050	$ 1,219,095	$ 1,097,186	$ 0.158	$ 1,648,491	$ 551,306

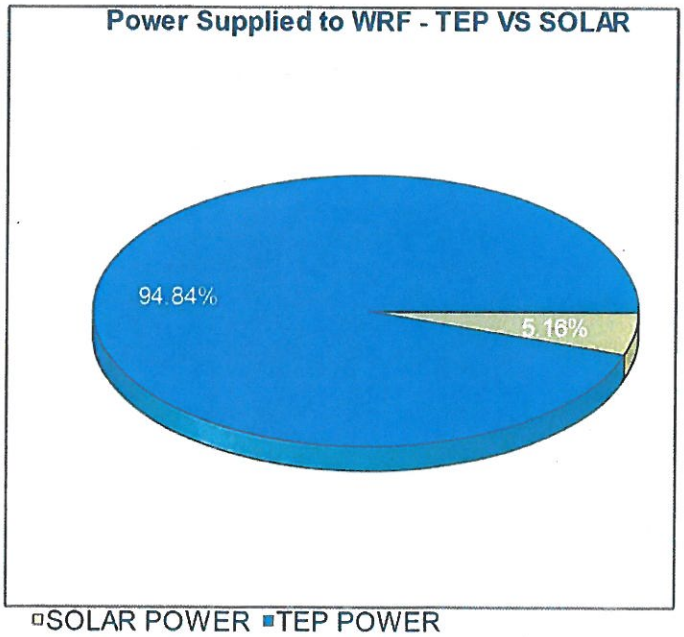
EXHIBIT F

EXHIBIT G

Tres Rios Daily Energy Report 12/26/2016







TEP Peak Demand:	4,570 KW
TEP Peak Demand Time:	12-26-2016 18:55:00
TEP Average Demand:	3,889 KW
TEP Daily Load Factor:	0.85
TEP Energy Consumed:	**93,337 KWH**
12/26/2016 TEP Cost:	**7,747 $**
2016 TEP Avg Demand YTD:	**3,898 KW**
TEP Est. Yearly Cost:	**2,834,120 $**

12/27/16 01:00:00