Drinking Water Board Packet

August 27, 2014

Agenda

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

DRINKING WATER BOARD MEETING

August 27, 2014
2:00 pm
Davis Conference Center
Zephyr Room
1651 North 700 West
Layton, Utah 84041

Ken Bousfield's Cell Phone #: (801) 674-2557

1. Call to Order – Chairman Hansen
2. Roll Call – Ken Bousfield
3. Introductions – Chairman Hansen
4. Approval of the Minutes:
   A. July 18, 2014 Board Meeting
5. Financial Assistance Committee Report
   A. Status Report – Michael Grange
6. Drinking Water Energy Efficiency
   A. Documents and Presentations - Ken Bousfield
      i. Cost Saving Opportunities Through Implementing Energy Efficiency Strategies
      ii. Conserving Energy and Power in a Water System
      iii. Rural Water Association of Utah Energy Efficiency Presentation
      iv. Water Energy Summit
   B. Drinking Water Boards Direction on Interest Rate Reductions for Energy Efficient Applicants – Michael Grange

7. Operator Certification Commission Member Appointment – Ken Bousfield

8. Rural Water Association Report – Dale Pierson

9. Chairman's Report

10. Directors Report

11. Next Board Meeting:

Date:	November 7, 2014
Time:	1:00 pm
Place:	Multi Agency State Office Building Room 1015 195 North 1950 West Salt Lake City, Utah 84116

12. Other

13. Adjourn

In compliance with the American Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Dana Powers, Office of Human Resources, at: (801) 499-2117, TDD (801) 536-4414, at least five working days prior to the scheduled meeting.

Agenda Item 4(A)

State of Utah
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Department of
Environmental Quality

Amanda Smith
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DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
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DRINKING WATER BOARD MEETING
Friday, July 18, 2014 - 1:00 pm
Multi Agency State Office Building; Room 1015
195 North 1950 West
Salt Lake City, Utah 84116

DRAFT MINUTES

- **A Board Member training and a tour of the Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant were conducted prior to the Board meeting. Neither discussion of any agenda item nor any Board actions were conducted during the tour.**

Board Members present for the training and the tour: Betty Naylor, Brad Johnson, Roger Fridal, David Stevens, and David Sakrison

Division Staff present: Ken Bousfield, Michael Grange, Heather Bobb, and Marianne Booth

Board Member Tage Flint joined the group for the tour of the Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant.

1. **Call to Order – Betty Naylor**

Betty Naylor, Board Vice Chairman, called the meeting to order at 1:00 pm.

2. **Roll Call – Ken Bousfield**

Board Member present: Betty Naylor, Roger Fridal, Brad Johnson, David Sakrison and David Stevens. Tage Flint arrived at 1:47 pm, being absent for all actions taken by the Board that involved a vote

Attending Telephonically: Mark Stevens

Board Members excused: Paul Hansen and Brett Chynoweth

Division Staff present: Ken Bousfield, Michael Grange, Heather Bobb, Marianne Booth,

Tammy North, Bob Hart, Brad Holdaway, and John Oakeson.

3. **Introductions – Betty Naylor**

Betty Naylor, Board Vice-Chairman welcomed everyone and requested that the Board Members introduce themselves and state what position they represent on the Board.

They are (in no particular order):

- Brad Johnson, Deputy Director for the Department of Environmental Quality (DEQ), representing Amanda Smith, Executive Director of DEQ
- David Stevens, Utah State University and Utah Water Research Lab, representing higher education.
- Betty Naylor, Vice-Chairman, representing non-governmental organizations.
- Ken Bousfield, Director of the Division of Drinking Water (DDW, the Division), Executive Secretary of the Board
- David Sakrison, Mayor of Moab City
- Roger Fridal, Mayor of Tremonton
- Mark Stevens, Medical Doctor and Trauma Surgeon at Primary Children's Hospital and Intermountain Medical Center, representing the medical field.

Betty then expressed appreciation to the two new Board members, David Sakrison and Roger Fridal, and gave them the opportunity to give some background information about themselves.

- David Sakrison is currently in his 4th term as Mayor of Moab and has been in local politics for 30 years. He is married and has lived in Moab for 40 years.
- Roger Fridal is currently in his 2nd term as Mayor of Tremonton. Prior to being Mayor, he was a dairy farmer for 35 years.

Betty then requested that those in the audience introduce themselves.

Those in attendance were:

- Dale Pierson, Brian Pattee, Terry Smith and Curtis Ludvigson, representing the Rural Water Association of Utah.
- Alane Boyd, representing the Intermountain Section of AWWA.
- Milt Shipp, President of White Hills Water Company, and Steve Jackson, Jackson Engineering, representing the White Hills Water Company
- Jeff Coombs, Tooele County Health Department, Mark Whitney, Mayor of Stockton, and John Iverson, Sunrise Engineering, representing the town of Stockton.
- Mary Darling, Joseph Elmworth, and Casey Cross, members of the public.

4. **Approval of the Minutes:**

A. May 9, 2014 Board Meeting
B. June 17, 2014 Board Meeting

- David Stevens moved to approve both sets of minutes. David Sakrison seconded. <u>The motion was carried unanimously by the Board.</u>

5. **Financial Assistance Committee Report**

A. Status Report – Michael Grange

Michael Grange, Construction Assistance Section Manager with the Division, reported that currently the State Loan Fund is almost $1 million in the red, however over the course of the next year the Division is expecting an additional $5.5 million to come into the fund, from tax revenues and repayments, therefore, through to July 1, 2015, the fund is projected to have $4.75 million available to fund drinking water projects.

Michael went on to report that the Federal Fund currently has just over $30 million, which includes the recent capitalization grant that the Division received as well as repayments, and over the course of the next year the Division is expecting another $15 million to come into the fund. By July 1, 2015 the fund is projected to have $45.5 million to fund drinking water projects.

He then went on to inform the Board, that since the May 9th Board meeting, Division staff has closed 5 loans for projects equaling roughly $19 million in value, and are currently under construction.

B. Project Priority List – Michael Grange

Michael Grange, Construction Assistance Section Manager with the Division, proposed to the Board that two new projects be added to the project priority list. The first is Marble Hills Water Company, with 100 points, and their project would consist of replacing the pump and their well. He went on to state that their well house was struck by lightning and is an emergency project. The second is the White Hills Water Company, with 25.4 points, and their project would consist of water line replacement, tank rehabilitation and a new pressure reducing valve. The Financial Assistance Committee (FAC) recommends the Board approve the updated Project Priority List.

- Betty Naylor moved to approve the updated project priority list. David Sakrison seconded. <u>The motion was carried unanimously by the Board.</u>

C. SRF Applications

i. STATE:

ii. FEDERAL:

a) White Hills Water Company – Michael Grange

Michael Grange, Construction Assistance Section Manager with DDW, stated that the White Hills Water Company (WHWC) is requesting $1,037,000 to replace approximately 4,000 linear feet of 10 inch steel pipe, install air/vac stations at high points in their system, install a pressure reducing valve station, install security fencing around both of their wellheads and well control buildings, and rehab two of their ground steel tanks interiors and exteriors, in an effort to improve service to the White Hills Country Estates area. He

then informed the Board that the WHWC has been annexed into Eagle Mountain City and there is a negotiated transfer agreement in place, one condition being that these improvements be fulfilled. WHWC has previously received financial assistance from the DWB and are currently making their annual payments. WHWC has a local MAGI is $47,386, which is approximately 120% of the State MAGI. Their current water bill is $56, which is 1.42% of the local MAGI. The proposed financial assistance would increase their water bill to $84.51, which is 2.14% of the local MAGI. The FAC recommends that the DWB authorize $1,037,000 to White Hills Water Company, with 1% interest or fee per annum, for 30 years, with $518,000 in principal forgiveness on the condition that WHWC resolve the issues on their compliance report.

In response to some questions from the Board, Steve Jackson, Jackson Engineering, informed the board that White Hills Water Company, located to the west of Eagle Mountain City, was originally part of a subdivision development built in the late 70's or early 80's and serviced approximately 120 lots from a single well, with two steel storage tanks and steel pipelines. He went on to state that the ground surrounding the subdivision was recently annexed into Eagle Mountain and there is a negotiated agreement, where upon completion of the improvements identified, including replacement of the steel pipe with PVC, Eagle Mountain will take over and operate the system. He then went onto inform the Board that another stipulation of the agreement is that the costs for these improvements will be borne by the customers utilizing this system and they will have a separate water rate from other residents, but would still be administered by Eagle Mountain City. He also let the Board know that the agreement in place is considered a conveyance through a transition agreement, or a conveyance of facilities.

- Roger Fridal moved to authorize a $1,037,000 loan to White Hills Water Company at 1.0% interest or fee per annum, for 30 years, with $518,000 in principal forgiveness with the condition that they resolve all issues on their compliance report. David Stevens seconded. <u>The motion was carried unanimously by the Board.</u>

b) Marble Hills Water Company – Michael Grange – 1:19:10

Michael Grange, Construction Assistance Section Manager with DDW, stated that the Marble Hills Water Company (MHWC), located 10 miles west of Tremonton, is requesting $28,167 to replace a well pump that was damaged by lightning strike in April, and has been determined to be an emergency project. He went on to state that due to the emergency nature, MHWC has already completed the repairs and is simply requesting this as a reimbursement of monies already spent. MHWC has a local MAGI of $41,806, which is approximately 105% of the State MAGI. Michael noted to the Board, that MHWC is not in agreement with this number and does not feel it accurately reflects the financial condition within the company's service area, however they have not had time to pursue a third party income survey as of now. MHWC's current water bill is $14 which is .46% of the local MAGI. The proposed financial assistance would increase their water bill to $58 which is 1.67% of the local MAGI. The FAC recommends that the DWB authorize a loan of $28,167, with $28,167 in principal forgiveness.

- David Stevens moved to authorize a $28,167 loan to Marble Hills Water Company at 2.98% interest, for 20 years, with $28,167 in principal forgiveness, making note that the Board does not want to set a precedent for future projects with this motion.

This motion is made due to the low amount of the loan requested, the cost of bonding the loan and the circumstances surrounding the project. Mark Stevens seconded. The motion was carried unanimously by the Board

iii. OTHER:

6. **Selection of Financial Assistance Committee Members**

Betty Naylor, Vice-Chairman of the Drinking Water Board, gave a quick overview of the responsibilities of the Financial Assistance Committee, which is reviewing proposals and making recommendations via teleconference, about 30 days prior them being presented at the Board meeting. She went on to state that this is an opportunity to ask questions, receive answers or request more information but that no formal decisions are made, just recommendations. Betty noted that Chairman Paul Hansen, David Stevens and herself would like to stay on the committee, leaving one open spot. Roger Fridal volunteered to fill the position.

- David Sakrison moved to appoint Roger Fridal to the position on the Financial Assistance Committee. Mark Stevens seconded. The motion was carried unanimously by the Board

7. **Authorization for a Change in Proposed Rule – Tammy North**

A. R309-545 Drinking Water Storage Tanks
B. R309-550 Transmission and Distribution Pipelines

Tammy North, Environmental Engineer with DDW, reminded the Board that at the May 9th meeting they had authorized the Division to go forward with a proposed rule changes for R309-545 Drinking Water Storage Tanks and R309-550 Transmission and Distribution Pipelines. She went on to state that since the authorization, the Division filed those changes with the Division of Administrative Rules (DAR) and a 30 day public comment period was opened and has now closed. Division staff has read through the comments and made some additional changes in response to those comments as well as some language and wording changes, therefore they are coming before the Board to again request authorization to go forward with the new proposed rule change for R309-545 and R309-550.

In response to questions from the Board, Bob Hart informed the Board, that the Division staff takes time to study and review the rules before they make rule revisions, however due to new insights and comments received, they are required go through them and decide if more revisions are needed, and if a new revision is made it is required to be authorized by the Board, then submitted to DAR and another additional 30 day public comment period opened. Ken Bousfield, Director of DDW, also added that during the first 30 day comment period, people who may have reviewed the rule changes, found nothing wrong, and made no comment, need the opportunity to review the new changes and make comment.

- Betty Naylor moved to authorize the Change in Proposed Rule for R309-545, Drinking Water Storage Tanks and R309-550, Transmission and Distribution Pipelines. David Sakrison seconded. The motion was carried unanimously by the Board

8. **Authorization to Initiate Rule Revision – John Oakeson**

A. R309-400 Water System Rating Criteria

John Oakeson, Environmental Scientist with DDW, reported to the Board that the changes requested to R309-400, Water System Rating Criteria, are necessary to incorporate the adoption of the Groundwater Rule, as well as to correct formatting, language, and outdated references. He went on to inform the Board that this rule is a tool for prioritizing the Division's enforcement and technical assistance resources. Division staff recommends that the Board authorize staff to proceed with the filing for substantive changes to R309-400, Water System Rating Criteria, with the DAR for adoption.

- David Sakrison moved to authorize Division staff to Initiate Rule Revision of R309-400 Water System Rating Criteria. Roger Fridal seconded. The motion was carried unanimously by the Board

9. **Rural Water Association Report – Dale Pierson**

Dale Pierson, Executive Director of the Rural Water Association of Utah (RWAU), explained that RWAU is an association made up of water systems whose primary purpose is to provide training to all water systems in the State of Utah, either in a classroom setting or onsite, and is made possible by federal and state funds. He went on to state that as part of the Board packet was a recent letter to Charles Jeffs of RWAU, that he felt showed the appreciation that systems have for RWAU and the work they do. Dale then stated that some of the RWAU employees were in attendance and would like them to take a minute to introduce themselves and explain what their roles are.

Curt Ludvigson informed the Board that his position with RWAU is to work with counties in assuring that development takes place in the outlying areas with the proper infrastructure. Curt then passed out to the Board a brochure entitled 'Developing Adequate Infrastructure' that he takes with him when meeting with building authority, planning and zoning, commissioners, and others who are involved in the processes. He then went onto explain that he and Michael Grange of the Division had identified the Six County area, which includes Sanpete, Sevier, Juab, Millard, Piute and Wayne, as a good place to start on this, and Curt is currently working with John Chartier, Central Utah District Engineer for the Division. They are working to put together a non-public drinking water system ordinance that hopefully will be adopted and implemented by the Central Utah Public Health Department and then throughout the State.

Ken Bousfield added that this is an important project for the Board because this will ensure that water systems infrastructure is adequate for future growth and the eventuality of becoming a compliant public water system.

Brian Pattee, Compliance Circuit Writer for RWAU, informed the Board that his responsibility is to work with systems that have high IPS points to resolve their compliance issues. He stated that often, it seems, their issues are sampling, or lack of it, and feels that may be due to the lack of a certified operator, communication between an operator and the cities officials, or simply the high cost of sampling.

Terry Smith, Management Technician for RWAU, explained to the Board that his job is to work with water systems in the area of capacity development, which means he helps them with ordinances, policies, procedures, evaluation of their water rates through rate studies, and to obtain funding for projects. Terry also let the Board know that his prior title was Compliance Circuit Writer for RWAU, and it was his experience that the operators in the smaller water systems have other responsibilities, such as being the town Sexton over the Cemetery or overseeing the town dump, and he feels that often operators are unable to keep up with the work load which, in turn, causes the non-compliance issues.

10. **Chairman's Report**

Betty Naylor, sitting in for Chairman Paul Hansen, stated that she didn't have anything to report.

11. **Directors Report**

Ken Bousfield, Director of DDW, started out by notifying the Board of a recent fire in the Town of Stockton (Tooele County) that destroyed the roof on their water storage tank, which then collapsed into the tank along with the applied fire retardant. He then stated that the Division and Jeff Coombs, Tooele County Health Department, have been working together on the issues. Ken thanked Jeff for his efforts in getting the MSDS and chemical makeup of the fire retardant. This information was helpful to then advise the analytical laboratories on what to look for. With that information, lab work was performed on samples from the tank and in various locations in the distribution system. The results of analysis showed that the retardant was isolated to the tank and was not in the distribution system. With these results Ken and Jeff both agreed that the town could proceed with normal water usage with the exception of human consumption, which includes drinking, teeth brushing, and cooking. Residents were advised that human consumption could resume if two satisfactory bacteriological samples on consecutive days showed no detects.

At Ken's request, Jeff Coombs informed the board that the first bacteriological sample had been taken and the results have come back looking good. He also stated that another round of samples was taken as of the morning of July 18 and they should have the results back by the next day, noting that if those come back good as well, he will consult with Ken and hopefully be able to remove the water restriction on the water in the distribution system.

John Iverson, Sunrise Engineering, also updated the Board on the tank for Stockton. John and an insurance adjustor had assessed the tank, and as of now, they are unsure if the tank can be salvaged, or if they will need a new tank. He then stated that currently they are unable to drain the tank to do a thorough inspection as the EPA will not allow them to drain the tank due to the ammonia polyphosphate fire retardant that is in the water, but they are also working with the State's Division of Water Quality to find a way to resolve that issue. He went onto state that the intent, if possible, would be to go with a new tank as the existing tank is 90 years old and was originally installed for use by the railroad as a reservoir to fill up locomotive boilers. John also informed the board that the roof of the tank was made up of redwood and they have had compliance issues with it in the past, but had just installed a new membrane coating on it.

In response to questions from the Board, Mayor Mark Whitney let them know that they have taken the burned tank out of service and are relying on their 250,000 gallon tank. He stated that the town also has an emergency well that may end up being used, but it has some antimony in it and will have to be blended before use. As for now the town will be on water restrictions until they can repair or rebuild the 500,000 gallon tank and get it operational.

Ken followed up by saying that Michael Grange has been working with the Towns' consultant and they are currently in the process of getting a packet together to bring before the Board.

A. The Division's proposed FY2016 fee schedule

Ken Bousfield explained that on June 30th, a letter was sent out to the water systems throughout the State notifying them of proposed changes to the Division's fiscal year 2016 fee schedule. He stated that the increases are based on projections that the SRF fund will be down roughly $2 million from the prior year and that a portion of the SRF grant is used for administrative purposes on a percentage basis. He then explained that the Division is proposing ¼ of 1% of the estimated construction costs with a minimum fee of $250 and a maximum fee of $5,000 and based on projections would keep the fund where it needs to be. He then notified the Board that the Department of Environmental Quality and all of its Divisions will have a fee hearing sometime in September, with a public comment period announcement being made in August.

B. EPA Audit Letter

Ken Bousfield also reminded the Board that the Division has been the subject of two audits recently, one is a financial audit of the SRF program and the other is a program audit on the implementation of the Federal Safe Drinking Water Act. He then referred them to the report in the Board's packet and pointed out that overall this is a positive report. He then discussed an issue in the report related to unliquidated obligations, which is grant money that has been awarded for projects but is not being utilized, and explained that this reflects poorly on the EPA and the program when more funding is requested from Congress.

12. **Next Board Meeting:**

Date: August 27, 2014
Time: 2:00 pm
Place: Davis Conference Center
Zephyr Room
1651 North 700 West
Layton, Utah 84041

Betty Naylor announced that the next Board meeting is being held in conjunction with the RWAU 2014 Fall Conference.

Dale Pierson, Executive Director of the Rural Water Association of Utah (RWAU), took a moment to inform the Board that they are welcome to attend the conference in entirety as

guests of RWAU, and that he feels it is a good opportunity for them to meet the water operators, managers, and council members from around the State.

13. **Other**

14. **Adjourn**

- Betty Naylor moved to adjourn the Drinking Water Board Meeting. David Sakrison seconded. The motion was carried unanimously by the Board.

Meeting adjourned at 2:11 pm.

In compliance with the American Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Dana Powers, Office of Human Resources, at: (801) 499-2117, TDD (801) 536-4414, at least five working days prior to the scheduled meeting.

Agenda Item 5(A)

DIVISION OF DRINKING WATER

STATE LOAN FUNDS

AS OF July 31, 2014

	SUMMARY		
	Total State Fund:	$3,016,106	
	Total State Hardship Fund:	$1,014,161	
	Subtotal:	$4,030,267	
LESS AUTHORIZED	Less:		
	Authorized Loans & Closed loans in construction:	$3,483,000	*(see Page 2 for details)*
	Authorized Hardship:	$344,875	
	Subtotal:	$3,827,875	
	Total available after Authorized deducted	**$202,392**	
PROPOSED	**Proposed Loan Project(s):**	**$0**	*(see Page 2 for details)*
	Proposed Hardship Project(s):	**$0**	
	Subtotal:	**$0**	
AS OF:			
July 31, 2014	**TOTAL REMAINING STATE LOAN FUNDS:**	**-$466,894**	
	TOTAL REMAINING STATE HARDSHIP FUNDS:	**$669,286**	

Total Balance of ALL Funds: **$202,392**

Projected Receipts Next Twelve Months:			
and Sales Tax Revenue			
Annual Maximum Sales Tax Projection	**$3,587,500**		
	$0		
Less State Match for 2015 Federal Grant	($1,560,000)		
Less Appropriation to DDW	($800,000)		
Less Administration Fees	($145,700)		
SUBTOTAL Sales Tax Revenue including adjustments:		$1,081,800	
Payment:			
Interest on Investments (Both Loan and Hardship Accounts)		$24,000	
Principal payments		$3,515,722	**Receive 80% in January**
Interest payments		$1,020,311	
Total Projections:		$5,641,833	

Total Estimated State SRF Funds Available through 8-01-2015	**$5,844,225**

DIVISION OF DRINKING WATER
STATE LOAN FUNDS
PROJECTS AUTHORIZED BUT NOT YET CLOSED
AS OF July 31, 2014

Community	Loan #	Cost Estimate	Date Authorized	Date Closed/Anticipated	Authorized Funding		
					Loan	Grant	Total
							0
							0
Trenton Town 1.5% int 30 yrs	3S196	422,139	May-14		145,000	145,075	290,075
							0
Subtotal Loans and Grants Authorized					145,000	145,075	290,075
PLANNING LOANS / GRANTS IN PROCESS							
Henrieville Town 0% int 5 yrs	3S189P	36,000	Jun-13	Sep-13	36,000		36,000
Tabiona	3S192P	32,000	Sep-13	??	32,000		32,000
Coalville pl loan 5 yrs 0% int	3S186P	32,000	Jul-13	Sep-13	32,000		32,000
Fairview	3S198P	38,000	Jun-14		38,000		38,000
Hildale pl grant	3S194P	40,000	Jan-14	Mar-14		40,000	40,000
West Erda Imp Dist - pl grnt	3S197P	39,800	Jun-14			39,800	39,800
Hanksville	3S199P	40,000	Jul-14	Jul-14		40,000	40,000
Glen Canyon-Big Water Town	3S200P	40,000	Jul-14	Jul-14		40,000	40,000
Cedarview Montwell SSD	3S201P	40,000	Jul-14			40,000	40,000
					138,000	199,800	337,800
CLOSED LOANS (partially disbursed)							
Payson, 3.46% int, 20 yrs	3S170	3,404,000	Nov-11	Apr-12	908,000		908,000
Woods Cross 0% int 20 yrs	3S195	3,275,000	Jul-13	Feb-13	2,292,000		2,292,000
							0
							0
Subtotal Planning Loans/Grants Auth					3,200,000	0	3,200,000
Total authorized or closed but not yet funded					$3,483,000	$344,875	$3,827,875
PROPOSED PROJECTS for Aug 2014							
	0	0			0	0	0
		0			0	0	0
		0			0	0	0
							0
Total Proposed Projects					0	0	0

DIVISION OF DRINKING WATER
STATE LOAN FUNDS
AS OF July 31, 2014

	5235 Loan Funds	5240 Interest (use for Grants)	Total
Cash:	$3,016,106	$1,014,161	$4,030,267
Less:			
Loans & Grants authorized but not yet closed (schedule attached)	(283,000)	(344,875)	(627,875)
Loans & Grants closed but not fully disbursed (schedule attached)	(3,200,000)	0	(3,200,000)
Proposed loans & grants	0	0	0
Administrative quarterly charge for entire year	(145,700)		(145,700)
Appropriation to DDW	(800,000)		(800,000)
	0		0
FY 2015 Federal SRF 20% match of $7,570,000	(1,560,000)		(1,560,000)
	(2,972,594)	**669,286**	**(2,303,308)**
Projected repayments during the next twelve months			
Thru 08-01-2015			
Principal	3,515,722		3,515,722
Interest		1,020,311	1,020,311
Projected annual investment earnings on invested cash balance		24,000	24,000
Sales Tax allocation thru Aug-01-2015	3,587,500		3,587,500
Total	**$4,130,628**	**$1,713,597**	**$5,844,225**
* All interest is added to the Hardship Fee account.			

DIVISION OF DRINKING WATER

FEDERAL SRF

AS OF July 31, 2014

FIRST ROUND FUND	
1997 thru 2014 SRF Grants	
Net Federal SRF Grants:	$144,595,581
Total State Matches:	$31,540,300
Closed Loans:	-$173,921,789
Total Grant Dollars:	**$2,214,092**

FEDERAL SECOND ROUND FUND	
Principal Repayments	
Principal (P):	$34,047,524
Interest (I):	$9,201,205
Total P & I:	**$43,248,729**

Earnings on Invested Cash Balance	
Total:	**$1,151,402**

Hardship Fund	
Total:	**$2,698,610**

SUMMARY	
Total Federal State Revolving Fund:	$46,614,223
Total Federal Hardship Fund:	$2,698,610
Subtotal:	$49,312,833

LESS AUTHORIZED & PARTIALLY DISBURSED		
Less:		
Authorized & Partially Disbursed Closed Loans:	$17,508,017	*(see Page 2 for details)*
Authorized Federal Hardship:	$576,360	
Subtotal:	$18,084,377	

PROPOSED		
Proposed Federal Project(s):	**$0**	*(see Page 2 for details)*
Proposed Federal Hardship Project(s):	**$0**	
Subtotal:	**$0**	

AS OF:	**July 31, 2014**		
	TOTAL REMAINING LOAN FUNDS:	**$29,106,206**	
	TOTAL REMAINING HARDSHIP FUNDS:	**$2,122,250**	

Total Balance of ALL Funds after deducting proposed actions: $31,228,456

Projected Receipts thru August 1, 2015		
2015 Fed SRF Grant	$6,056,000	
2015 State Match	$1,514,000	
Interest on Investments	$201,600	
Principal Payments	$5,774,246	**Receive 60% in January**
Interest	$1,426,487	
Hardship & Technical Assistance fees	$420,176	
Total:	$15,392,509	

Total Estimated Federal SRF Funds Available through: 8/1/2015 **$46,620,965**

DIVISION OF DRINKING WATER
FEDERAL STATE REVOVING FUND
PROJECTS AUTHORIZED BUT NOT YET CLOSED
AS OF July 31, 2014

COMMUNITY	Project			Authorized Date	Closing Date Scheduled	Authorized From Loan Funds (1st or 2nd Round)			Hardship Fund
	Total Project	Terms	Loan #			Loan	Forgiveness	Total	
Duchesne County	22,000,000	0% int 30 yrs 700K pf	3F142	Mar-10	Sep-14	3,300,000	700,000	4,000,000	
Herriman	8,375,000	2.25% hgf, 20 yrs	3F194	Mar-12	Sep-15	4,682,000		4,682,000	
Woodenshoe Water	201,000	1% int, 30 yr	3F197	Jul-12	Aug-14	201,000	121,850	322,850	
Greendale Water Co	1,385,000	3.92 int/hgf, 20 yrs	3F213	Jul-13	Mar-15	1,145,000		1,145,000	
Sheep Creek Cove HOA	90,000	4.82% int, 20 yr	3F218	Jan-14		90,000		90,000	
Pleasant View City	2,327,000	3.75% int, 20 yrs	3F219	Jan-14		1,977,000		1,977,000	
Forest Glen A	1,418,000	0% int, 30 yrs	3F222	Feb-14	Sep-14	986,000	432,000	1,418,000	
Big Plains - Cedar Point	83,000	100% PF	3F224P	May-14		41,000	42,000	83,000	
Boulder Farmstead	2,000,000	0% INT, 30 yrs	3F225	May-14		1,000,000	1,000,000	2,000,000	
White Hills	1,047,000	1% int, 30 yr	3F226	Jul-14		519,000	518,000	1,037,000	
								0	
					TOTAL CONSTRUCTION AUTHORIZED:	**$ 13,941,000**	**$ 2,813,850**	**$ 16,754,850**	**$ -**
COMMITTED PLANNING ADVANCES / AGREEMENTS or PARTIALLY DISBURSED CLOSED 2ND ROUND AGREEMENTS:									
					Date Closed				
								0	0
Kane Co-Zion View	1,400,000	4.71% int, 30 yrs	3F185	Mar-12	Jul-12	725,000		725,000	0
Rural Water Assn of Utah	124,758	5 yr contract for Development Specialist	Ongoing	Nov-12	Jan-13			0	463,054
Woodland Mutual Wtr Co.	37,000	Planning Loan 0% 5 yrs	3F206P	Nov-12	May-13			0	37,000
Boulder Farmstead	40,000	100% principal forgiveness	3F215P	Sep-13	Oct-13			0	18,000
Willow Creek Water Co	37,500	Planning Grant	3F221P	Jan-14	Mar-14			0	21,606
Rockville Pipeline Co	36,700	Planning Grant	3F220P	Feb-14	Mar-14			0	36,700
Marble Hills	28,167	100% Principal Forgiveness	3F227	Jul-14	Aug-14		28,167	28,167	
					TOTAL PLANNING AUTHORIZED:	**$725,000**	**$28,167**	**$753,167**	**$576,360**
				TOTAL CONSTRUCTION & PLANNING:				**$17,508,017**	**$576,360**
				AVAILABLE PROJECT FUNDS:					**$29,106,206**
				AVAILABLE HARDSHIP FUNDS:					**$2,122,250**
PROPOSED PROJECTS FOR AUGUST 2014:									
								0	
								0	
					TOTAL PROPOSED PROJECTS FOR THIS MEETING:	**$0**	**$0**	**$0**	**$0**
*RWAU hardship grant is being disbursed monthly									
				TOTAL FUNDS AFTER PROPOSED PROJECTS ARE FUNDED:					**$29,106,206**
				TOTAL FUNDS AFTER PROPOSED HS PROJECTS ARE FUNDED:					**$2,122,250**
NOTES OF LOAN CLOSINGS SINCE LAST BOARD MEETING:									
Total Recent Loan Closings						**$0**	**$0**	**$0**	**$0**

DIVISION OF DRINKING WATER
FEDERAL SRF LOAN FUNDS
AS OF July 31, 2014

	Loan Funds 1st Round	Loan Payments 2nd Round Principal	Loan Payments 2nd Round Interest	Loan Payments Hardship Fund	TOTAL
Federal Capitalization Grants and State 20% match thru 2013	$176,135,881				
Earnings on Invested 1st Round Funds			1,151,402		
Repayments (including interest earnings on 2nd round receipts)		34,047,524	9,201,205	2,698,610	223,234,622
Less:					
Closed loans and grants	-173,921,789				-173,921,789
SUBTOTAL of Funds Available	**$2,214,092**	**$34,047,524**	**$10,352,607**	**$2,698,610**	**$49,312,833**
Loans & Grants authorized but not yet closed or fully disbursed	-13,974,850	-3,505,000	-28,167	-576,360	-18,084,377
SUBTOTAL of Funds Available less Authorized	**-$11,760,758**	**$30,542,524**	**$10,324,440**	**$2,122,250**	**$31,228,456**
Future Estimates:					
Proposed Loans/Grants for current board package	0			0	0
SUBTOTAL of Funds Available less Proposed Loans & Grants	**-$11,760,758**	**$30,542,524**	**$10,324,440**	**$2,122,250**	**$31,228,456**
PROJECTIONS THRU August-2015					
2015 Grant proceeds estimate (inc state match)	0				
2014 Grant $9,000,000 less set-asides	6,056,000				
2014 State Match for Grant	1,514,000				
Projected repayments & revenue during the next twelve months		5,774,246	1,426,487	420,176	7,620,909
Projected annual investment earnings on invested cash balance		180,000	12,000	9,600	201,600
TOTAL	**-$4,190,758**	**$36,496,770**	**$11,762,927**	**$2,552,026**	**$46,620,965**

Agenda Item 6(A)(i)

Drinking Water Energy (Cost) Savings Handbook

Table of Contents

Acknowledgements

This document was prepared by many people and it is appropriate that they be given credit for their work. I will proceed in giving credit consistent with the order in which this document is presented. First, I thank **Frances Bernards**, Environmental Scientist with the Department of Environmental Quality's Business Assistance Program, for her work in researching and preparing case histories of the energy and cost savings realized by the three drinking water systems mentions in Chapter 1 (Mountain Regional Water Special Service District, Logan City and Riverton City). Only a portion of her work is presented in this chapter, but a web link is provided in the appendix of each completed case history. **Ryan Taylor**, with Epic Engineering provided information on the approach to selecting a consulting engineer.

The funding incentives provided by the **Drinking Water Board** is a matter, as set forth in State Statute (19-4 UCA) that must be formally acted upon by the Board. At the Board's August 28th meeting **Michael Grange**, Construction Assistance Section Manager within the Division of Drinking Water, provided well-reasoned options for the Board to consider. Board members: **Paul Hansen**, Board Chair, **Betty Naylor**, Board Vice Chair, and members: **Brett Chynoweth**, **Tage Flint**, **Roger Fridal**, **Brad Johnson**, **David Sakrison**, **David Stevens**, and **Mark Stevens**, asked questions, weighed options and gave directions to **Michael Grange** to follow-up with the writing of draft changes to the Board's rules and policies.

Next I recognize **Doug Evans**, who prepared the entire contents of Chapter 2. The content of this chapter contains an extensive and possibly exhaustive list of ideas that water systems can utilize to save money on their energy bills. **Doug** has tried, with success, many of the ideas listed in the chapter for the benefit of the utility, Mountain Regional Water Special Service District (Summit County), he works for. Chapter 1 states that Mountain Regional Water SSD has saved over $300,000 per year in energy cost savings. It is important to note that the chapter does not state that **Doug's** work is complete. He has specific plans in the near term that he will pursue, which will increase the annual savings for his water system.

Chapter 3 of this document lists the funding opportunities provided by varies entities. As should be suspected, the individual sections were authored by representatives of these entities. Therefor I thank **Michael Grange**, who wrote the section dealing with the Drinking Water Board's funding program; **Jennifer Gardner**, of the Utah Office of Energy Development, who wrote the section dealing with her office's program; **Mark Cram**, with Siemens, an energy service company that is Certified by the State, who wrote the section dealing with Energy Service Companies; **Martie Leo**, and the Rocky Mountain Power External Communications Group, who wrote the section dealing with Rocky Mountain Power's Wattsmart Program; and **Johnathan Ward**, Vice President with Zions Bank, who wrote the section dealing with bank financing.

Kenneth H. Bousfield, P.E., Director
Utah Division of Drinking Water

1. Introduction

This document was prepared to provide water system operators and managers with ideas on how to save a significant amount of money by reducing the cost of power necessary to provide water to their customers. As a minimum, the ideas presented herein should enable water systems to lower the cost for power in spite of rate increases implemented by power companies in the coming years.

A. Energy Savings Potential: A number of drinking water systems throughout the State have realized significant dollar savings by implementing strategies that promote energy efficiencies. As an example, Mountain Regional Water Special Service District (Summit County) saved over $300,000.00 per year on projects throughout their system, Logan City (Cache County) saved over $119,500 per year by adding a new pressure zone, and Riverton City (Salt Lake County) saved over $42,000 per year on modifications to a single pump station. Each of these water systems were able to realize these savings by implementing one or more of the strategies listed in Chapter 2 of this handbook.

What is interesting about these savings is that there are a number of financing approaches available to water systems that take advantage of them. These include: a) low cost loans offered by the State's Drinking Water Board (administered by the Division of Drinking Water) as well as the State's Energy Office, b) design, build projects by State Pre-Qualified Energy Service Companies, c) cost reimbursement programs offered by Rocky Mountain Power, d) in some cases short term loans from other agencies within a city's government, and of course bank financing.

B. How to Use This Document: This document is designed to give suggestions on: a) what to look for to save energy costs, b) where to look for funding needed to pay for changes in infrastructure, and c) where to look for helpful information available via the web.

The second chapter lists more than 300 ideas that may be available for water systems to take advantage of. It is divided into three sections: 1) operational changes that water system operators and managers may implement, 2) areas that an appropriately qualified technical advisor may assist in identifying and 3) designed and constructed facilities that will result in cost savings.

The third chapter lists six different funding sources for implementing ideas that save money. A description of these funding sources and the requirements needed to qualify are also provided. The Appendix lists helpful websites and gives a brief description of what the site offers as well as the web's URL address.

It is recommended that the reader proceed by reading and consider implementing applicable suggestions listed in the first section of Chapter 2. The Rural Water Association of Utah's Circuit Riders (1-801-756-5123) are available to provide counsel and advice on implementation

strategies. For the second and third sections in the next chapter, it is recommended that you seek the services of an appropriately qualified technical expert.

C. Finding the Right Consultant: The serious water system should consider pursuing all applicable suggestions in each of the three sections listed in Chapter 2. To adequately pursue sections 2 and 3 of Chapter 2 it is recommended that the water system obtain the services of an expert. To help ensure that the "expert" will provide the desired help, it is recommended that the water system go through a "Request for Proposal" (RFP) process. In essence, the RFP process involves sending out an invitation to multiple consultants to respond. In the response, the consultant provides information which the water system uses to select the best candidate consultant.

The RFP should list the objectives of a proposed project, such as: "a desire to significantly reduce power costs for the utility". To enable applicants to provide meaningful and helpful information, the RFP should include, possibly in a table format, the following information about your water system: number of pumps, age of each pump, horse power and flow rate of each pump, service area elevation range, number of pressure zones, and location, elevation and volume of each storage tank. The RFP should include a request for at least the following information:

1. List the drinking water system the consultant has worked with and identify the energy cost savings each system realized. Provide contact information for the systems that the consultant worked with.

2. Provide the names of staff, including sub-contracted staff, which will be assigned to do the work for the water system. Include the water systems that each identifies staff has done comparable work for. Also provide resumes of identified staff, including: education, training and applicable experience.

3. Provide a statement of the specific areas of opportunity for energy cost savings that the consultant feels can be implemented for the water system.

4. Provide a statement of the consultant's qualification to investigate each suggested element in Chapter 2 of this document.

With the RFP a water system must decide if they want to have a separate consultant to report on energy efficiency opportunities from the consultant that actually designs the project. If a second consultant is used then a second RFP and selection process is needed. If the same consultant is used for both planning and design, additional questions may be desirable to ask in the RFP. The desired additional questions should focus on the experience related to the design of drinking water projects.

During the design phase, the consultant should also identify funding sources in cooperation with the water system. Chapter 3 of this document gives insights on 6 different sources of funding. Some funding may involve all or partial grant funding or cost recovery. Other sources of funding involve loans, with varying loan interest rates and loan time periods.

The appendix includes links to websites that provide helpful information. Most of the informational websites relate to specific funding options. The South Dakota's website provides additional information on energy efficiency approaches.

D. Drinking Water Board's State Revolving Fund: By State Statute, the Drinking Water Board has the authority to administer State funded drinking water projects. There are two sources of funds, federal and State that the Board oversees. The Division of Drinking Water acts as staff to the Board in implementing the funding process. The following discussion explains the Board's Rules relating to benefits for designing and constructing energy efficient projects. The Board is providing this encouragement for energy efficient projects with the express purpose of lowering on-going operation and maintenance costs and thereby making a project more affordable.

[More from Michael Grange pending Board in-put]

2. Energy Saving Investigation Process

[To be provided by Doug Evans]

3. Funding Opportunities

A. Drinking Water Board The Drinking Water Board administers the State's Revolving Fund which provides financial assistance to public drinking water systems for water project construction. The Division of Drinking Water (the Division or DDW), acting as staff to the Drinking Water Board (the Board), provides oversight to the Drinking Water State Revolving Fund (DWSRF) financial assistance program. The DWSRF provides financial assistance to public water systems for planning, designing and constructing improvements to drinking water system infrastructure. This section of the Guidance Document provides an overview of the DWSRF application process.

The application for financial assistance, for either planning or design and construction projects, is available from the Division's Internet web site at:
http://www.drinkingwater.utah.gov/documents/engineering/Utah_SRF_Application.zip.

The Drinking Water Board meets at least six times per year. A schedule of upcoming meetings, along with application deadlines, is available here:
http://www.drinkingwater.utah.gov/documents/engineering/SRF_schedule.pdf.

The completed application must be submitted to DDW prior to the deadline for the specific meeting you wish to attend, as listed in the schedule. A complete application is a critical part of an accurate evaluation. Please be sure to fill in each section of the application with as much information as possible. Division staff is available to answer any questions about the application, the application process, or the DWSRF program in general.

Division staff will review the application and evaluate the project to determine its feasibility. A major part of the evaluation focuses on affordability and staff uses financial information provided by the applicant to determine an appropriate financial assistance proposal to present to the Board. Under specific circumstances an applicant may qualify as a "disadvantaged community" and may therefore be considered for subsidies under the DWSRF program. These subsidies can take the form of a lower interest rate and/or grant/principal forgiveness, either of which will lower the overall cost of borrowing money to complete the project.

Once financial assistance has been authorized by the Board, staff works with the applicant to meet the requirements to close the loan and make the money available for construction. The loan closing process is extensive and can take several months to complete. This timeline must be taken into consideration when a water system is planning a project.

A more detailed overview of the state's Financial Assistance Programs is available here:
http://www.drinkingwater.utah.gov/loan_program_intro.htm.

B. Utah Office of Energy Development The Utah U-Save Energy Fund Program ("U-Save") finances energy-related cost reduction retrofits for publicly-owned buildings, including: state, tribal, municipal (city and county - which can include publicly-owned drinking water systems), public school districts, charter schools, public colleges, public university facilities. Through U-Save, low interest rate loans are provided to assist these institutions in financing their energy cost reduction efforts. Because this is a revolving loan fund, U-Save permits borrowers to repay loans through the stream of cost savings realized from these projects. Also because it is a revolving fund, the availability of funds may have to wait for fund repayments by previous applicants.

All U-Save projects must be analyzed by a Professional Engineer who meets the criteria outlined in Section II of the U-Save Program Guidebook (available on the Office of Energy Development (OED)'s website listed in the Appendix of this document). Project descriptions and calculations are presented in an Energy Assessment Report ("EAR"), which is then reviewed and approved by the OED's technical staff before project financing is authorized. Projects financed by U-Save must have an average simple payback of five years or less. In the alternative, borrowers have the option of "buying down" paybacks to meet the five-year limit.

U-Save funds are available to retrofit existing equipment and installations. In identifying potential projects, technical analysts are encouraged to evaluate renewable energy technologies as well as more traditional energy retrofits. Such projects may include rooftop solar, water and space heating systems, electric generation with photovoltaic or small wind systems, or hydro-electric projects.

Following the approval of the borrower's loan application by OED, project designs are reviewed and monitored during the construction phase, as well as at project completion. The process for designing and implementing the project(s) approved for the borrower includes several milestones:

1. *Selecting a design engineer.* This can be the same engineer who prepared the EAR – however, the borrower must follow competitive procedures (unless the borrower has an engineer under an existing contract – e.g., the City Engineer).
2. *Preparing the design documents.* To ensure that the design specifications match the projects identified in the report, the OED technical staff will typically prepare the following reports: (1) Design Development Report ("DDR"); and (2) Detailed Design Review Report ("DDRR"). The DDR will be completed when the design process is approximately 50% complete and will verify that the design is proceeding in a direction that conforms with the EAR. The DDRR will evaluate the proposed schedule and estimated project construction budget provided by the design engineer.
3. *Bidding the work.* Borrowers must competitively select contractors or bidders as required by state law.

4. *Installing the projects.* To ensure that the work meets all technical and state requirements, OED will perform a construction monitoring visit at least once while the work is in progress.
5. *Closing out the project.* Upon completion of the project, the borrower will submit a Final Completion Report to OED.
6. *Repaying the loan.* OED will forward an Amortization Schedule to the borrower based on the incurred loan amount. Loan repayments will begin within 60 days of project completion and are due quarterly. The amount of annual loan repayment is based on the energy cost savings projected in the EAR. The typical borrower is obligated to repay the loan in 20 quarterly installments over a five-year period.

Post-retrofit energy savings should be monitored by the borrower to insure that energy is being conserved and energy cost savings are being realized. The level of monitoring can range from utility bill analysis to individual system or whole building metering, depending on the size and types of retrofits installed. Additional funds can be borrowed for the metering of large, complex retrofits. Loans are also available for systems considering to maximize the probability of achieving, or exceeding, calculated savings.

While the U-Save program is designed for retrofits to publicly-owned *buildings*, water system-related improvements may be included in these retrofits. Examples of potential retrofits include, but are not limited to, improvement to heating and cooling systems within water system buildings, and:

1. Replacing constant speed motors with variable speed motors or soft start motors
2. Replacing strategically located undersized pipelines or leaking pipelines with new adequately sized pipes
3. Adjusting and/or installing SCADA systems to maximize pumping during off-peak time periods
4. Replacing pumps: a) with worn out impellers, or b) operating outside its pump curve efficiency range.

C. Energy Service Companies: Energy performance contracting is a method of procurement that enables public entities to select a partner in making energy efficiency improvements to their facilities, without the need for capital expenditures. Enabled in Utah by the State legislature, (Utah Code 11-44), this method of construction has three significant requirements: 1) Annual savings must exceed annual project repayment cost, 2) Guarantees are required to ensure savings, and 3) Annual reporting is required to verify savings are being realized. These requirements protect the interests of the public entity.

Siemens will evaluate a process and if there is an opportunity for the public entity to save money, will design, build and operate the facilities to ensure its success. The public entity will then apply the savings from the improvements toward project repayment over the repayment term.

As mentioned previously, by state statute, all projects must be cash flow positive each year during the project repayment term. The public entity will receive the difference between the annual savings and the annual project repayment costs. Upon complete payment, the public entity will receive the constructed facilities and reap the full annual savings thereafter. The provisions of the State law protect the public entity. The State also maintains a list of pre-qualified Energy Performance Contractors.

D. Rocky Mountain Power's Wattsmart Program Rocky Mountain Power offers a variety of ways to assist customers in maximizing the efficient utilization of electricity. Customer participation is voluntary and is initiated by following the participation procedures on the *watt*smart® Business section of the Company website at wattsmart.com.

The *watt*smart Business program offers a variety of services and cash incentives to encourage Rocky Mountain Power commercial, industrial and agricultural customers to build energy efficiency into their businesses. Retrofit and new construction projects can receive cash incentives for the implementation of approved energy efficiency measures. Typical upgrades, common in most buildings or businesses, have a pre-determined incentive value and can be found at rockymountainpower.net/utincentives.

Custom projects, such as those associated with water systems, are outside the scope of typical upgrades on the incentive lists. Rocky Mountain Power customers can benefit from the technical expertise of energy experts who will evaluate electric energy-saving options and estimate savings. Incentives for custom projects are $0.15 per annual kilowatt-hour savings, not to exceed 70% of eligible project costs for projects that meet simple payback period criteria. Customers looking at custom projects must contact Rocky Mountain Power before equipment is purchased to confirm that it qualifies for the custom incentive.

Beyond typical and custom incentives for energy-saving projects, Rocky Mountain Power non-residential customers can also benefit from guidance on day-to-day energy management of their systems. Customers can receive potential incentives of $0.02 per kilowatt-hour for verified savings of energy management measures. Visit rockymountainpower.net/utsave and select the Energy Management icon to learn more.

To participate in Rocky Mountain Power' energy efficiency programs, visit wattsmart.com and inquire online, email wattsmartbusiness@rockymountainpower.net or call toll free at 1-800-222-4335. As a reminder, contact the company early, before projects are initiated to confirm the project meets program criteria and eligibility

E. Self-funding through Energy Savings Some communities may be able to self-fund energy efficient projects. This is typically done with a fund within the City's budget that is not needed for a couple of years. The responsible party of the fund (let's call it the "Agency Fund") will

arrange to invest its money into the City's water fund to build the energy saving project, and the Agency Fund will increase as an interest bearing investment. To accomplish this, the water fund will pay back the loan with monthly or yearly payments. The period of the loan, or its time duration will be within the time constraints of the Agency Fund. The City's water fund will make payments to the Agency Fund from surplus revenues generated by the energy cost savings.

The following two tables are presented to enable an estimation of the water fund costs for varies interest rates and time periods for complete payback, with interest.

To determine the **monthly** payments associated with an enter-agency loan, determine the interest rate and the loan period in months. Then find the factor in the table below for the interest rate and time period. Then multiply the amount of the loan by the identified factor.

	12 Months	24 Months	36 Months	48 Months	60 Months	72 Months	84 Months
1 %	0.08379	0.04210	0.02821	0.02126	0.01709	0.01432	0.01233
2 %	0.08424	0.04254	0.02864	0.02170	0.01753	0.01475	0.01277
3 %	0.08469	0.04298	0.02908	0.02213	0.01797	0.01519	0.01321
4 %	0.08515	0.04342	0.02952	0.02258	0.01842	0.01565	0.01367
5 %	0.08561	0.04387	0.02997	0.02303	0.01887	0.01610	0.01413

To determine the **yearly** payments associated with an enter-agency loan, determine the interest rate and the loan period in years. Then find the factor in the table below for the interest rate and time period. Then multiply the amount of the loan by the identified factor.

	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
1 %	1.0100	0.5075	0.3400	0.2563	0.2060	0.1725	0.1486
2 %	1.0200	0.5150	0.3468	0.2626	0.2122	0.1785	0.1545
3 %	1.0300	0.5226	0.3535	0.2690	0.2184	0.1846	0.1605
4 %	1.0400	0.5302	0.3603	0.2755	0.2246	0.1908	0.1666
5 %	1.0500	0.5378	0.3672	0.2820	0.2310	0.1970	0.1728

F. Bank Financing Banking institutions provide financial assistance to public water systems to design and construct capital improvements to drinking water system infrastructure. This section provides an overview of the financing tools available and an explanation of the process.

Banks lend money to public water systems and like other funding partners evidence that loan with one of two instruments: 1) municipal bond certificates, or 2) lease purchase agreements. The bank's benefit for lending the money is received from the interest charged on the loan. Interest paid by public water systems is exempt from federal income tax requirements, allowing banks to charge a lower interest rate than would otherwise be charged.

Because banks lend money to make money, interest rates are determined by market conditions present at the time the financing takes place. Interest rates are a function of a bank's cost of funds, the credit profile of the borrower, and the credit structure of the financing instrument used. To determine the best course of action, the public entity will generally contact their public finance banker. Although the process varies by institution, in general obtaining bank financing is fairly simple and involves the following steps.

- Provide financial information regarding the governmental entity
- Provide details regarding the project
- Determine the timing of the project and when funds are needed
- Determine the financing tool that works best
- Finalize credit and pricing determination
- Execute the necessary steps to consummate the transaction and close the loan

A decision to provide bank financing can be obtained within a week or two in most cases. Executing the necessary steps to finalize a transaction depends on which instrument is used, but ranges from one to three months in most cases and can take much longer in some cases. These cases are rare.

Governmental entities in Utah are political subdivisions of the State of Utah, with laws dictating the process by which funding occurs. If these laws are not followed, the financing would be considered illegal, and therefore not enforceable for repayment.

Municipal Bonds

The key legal steps required to sell municipal bonds generally follow the pattern below and can be taken simultaneously with the financing steps outlined above.

- Initial resolution of the governing body starting the process
- Public hearing
- Authorizing resolution of the governing body
- Closing/funding

It is possible to combine the resolutions approved by the governing body to expedite the process.

Types of Municipal Bonds

Municipal bond is a generic label describing a wide variety of tax exempt obligations. Governmental entities may issue different types of municipal bonds depending on the revenue sources that they receive and that can legally be pledged. The decision regarding the correct type of municipal bonds to sell can usually be determined by examining what will be pledged, the nature of the project, and the expected source of repayment.

General Obligation (G.O.) Bonds: G.O. bonds pledge the ad valorem property taxes of a governmental entity and usually use this property tax revenue stream to repay the bonds. These bonds can be used to finance water system projects or energy conservation projects and are typically viewed as being low risk and, therefore, result in lower interest rates. These bonds must be approved by over 50% of the voters in a special bond election held in November. There is a limit to the amount of G.O. bonds that can be issued based upon market value, population, and the type of governmental entity.

Revenue Bonds (Enterprise Fund): Revenue bonds pledge water, sewer, electric, or other enterprise funds and usually use these revenues to repay the bonds. They can only be issued after authorization from the governing body. Legal covenants typically require that revenues after operational expenses are paid equal at least 125% of the required bond payment. A governmental entity will have to increase its user fees to maintain this 125% coverage ratio.

Sales, Franchise, and Excise Tax Revenue Bonds: Local governments can pledge sales, franchise, or other excise taxes for bonds sold to finance water or energy conservation projects, and they can use these same funds or other funds to repay the bonds. Sales, franchise, and excise tax bonds have been a popular financing tool because they can be used to finance nearly any type of capital improvement; they do not require voter authorization—only authorization from the governing body; and they generally receive favorable credit reviews which lower the interest rates.

Lease Revenue Bonds: Lease revenue bonds can be issued by a governmental entity and its Local Building Authority (LBA, formerly known as an MBA or Municipal Building Authority). An LBA is created for the express purpose financing, acquiring, building, owning, selling and leasing real property and equipment. The LBA becomes the owner of the facility being financed and leases it to a governmental entity on an annual basis. The bonds are secured by the lease payments and by a first lien on the financed improvements. Because lease revenue bonds are subject to annual appropriation or annual lease payments, they do not require voter authorization, but are considered more risky and bear higher interest rates.

This tool could be used to finance equipment meant to conserve energy, but might be limited by other bonds outstanding that prohibit the use of system assets as security.

Tax Increment Bonds: Some governmental entities may create a Community Development Area (CDA), Economic Development Area (EDA), or an Urban Renewal Area (RDA), to facilitate a water project that benefits only a specific geography, not the entire jurisdiction, and uses tax revenue generated within this area for repayment of the obligation. These areas are called increment areas. The tax revenues generated are derived from the increase in the taxable value in a project area and would generally only

exist in areas that did not have water access previously. The incremental increase in taxes generated from the higher taxable value that results from new water improvements acts as the collateral, or security, for these bonds and usually acts as the source of repayment as well. These types of bonds are relatively risky because the increase in tax increment is often based on projected increases of development and valuation; hence, the full tax increment may not always be realized. Bond covenants usually require that debt-service coverage be at least 1.25 times to 2.00 times, which will dictate the amount of tax increment bonds that can be issued.

Special Assessment Bonds: Similarly, governmental entities can create special assessment areas within their boundaries to finance water improvements oar energy efficiency projects that will have a benefit to a specific group of properties; the owners of which will be required to pay special assessments that are used to repay the bonds. Governments create assessment areas by adopting an ordinance (as long as those property owners responsible for more than 50 percent of assessment do not oppose the ordinance). Once the assessment area is created and an assessment ordinance is approved, bonds can be sold. Special assessments on real property acts as security for these bonds and the repayment source. In the event of default, the properties are subject to foreclosure. Land values should exceed the bond amount by at least three times, and usually more.

Bond Type	Security/Collateral	Payment Source
General Obligation	Ad valorem property tax	Property taxes or other legally available revenue
Enterprise Revenue	Water, sewer, electric or other enterprise revenue	Enterprise revenue
Excise Tax Revenue	Sales or other excise taxes	Excise taxes or other legally available revenue
Lease Revenue	Annual lease payments and financed improvements	Any legally available funds
Tax Increment	Incremental tax revenue from growth in CDA, EDA, or URA	Incremental tax revenue
Special Assessment	Land within an assessment area	Special assessment revenue

Lease Purchase Agreements

Lease purchase agreements are very similar to Lease Revenue Bonds described above, however a bank takes the place of the Local Building Authority and accepts lease payments from a governmental entity. Unlike a LBA, the bank does not own the financed improvements, instead they take a lien position on whatever is financed enabling them to foreclose, repossess or otherwise confiscate the improvements in the event of default. Because the financed improvements are used as collateral, this financing tool is not useful for improvements buried in the ground or difficult to move. Additionally, as mentioned previously, if water or energy efficiency improvements are integral to a system and other bonds are outstanding, it would generally be prohibited to take new improvements as collateral making this tool ineffective.

This tool works well for vehicles, solar panels, detachable equipment, and in some cases land or buildings that would not interrupt the water system process were they taken in a foreclosure.

Appendix

The Appendix lists helpful web sites that relate to energy efficiency and/or funding opportunities.

A. Case Histories of Water Systems taking advantage of energy cost savings: Mountain Regional Water Special Service District:

Logan City:

Riverton City:

B. Drinking Water Board's financing program: The following web site accesses the application form for the Drinking Water Board's finance program:

http://www.drinkingwater.utah.gov/documents/engineering/Utah_SRF_Application.zip

The following web site provides the scheduled for Board meetings:

http://www.drinkingwater.utah.gov/documents/engineering/SRF_schedule.pdf

The following web site lists all the State agencies involved in funding drinking water projects:

http://www.drinkingwater.utah.gov/loan_program_intro.htm

C. Utah Office of Energy Development's U-Save Program: Here is the link for more information on the U-Save program:

http://energy.utah.gov/funding-incentives/energy-financing/

Here is the link to the U-Save Program Guidebook:

http://energy.utah.gov/download/u-save_documents_category_/U-Save%20Documents/U-Save%20Program%20Guidebook.pdf

D. Energy Service Companies: The following web site accesses the text of the State's "Facility energy efficiency Act":

http://le.utah.gov/UtahCode/section.jsp?code=11-44

The following web site provides a list of State Pre-Qualified Energy Performance Contracting Service providers. Companies appearing on this list are pre-qualified to do work for the State of Utah by the Division of Facilities Construction Management:

http://www.deq.utah.gov/Topics/General/energyefficiency/docs/2014/08Aug/PQ601.pdf

E. Rocky Mountain Power's wattsmart program: For access to Rocky Mountain Power's website dealing with their wattsmart program, including information about the program and application forms:

http://www.rockymountainpower.net/utincentives, wattsmart.com and http://www.rockymountainpower.net/utsave

E. South Dakota's "Handbook on Eneergy Audits of Water Systems": The following web site links to a document prepared by HDR Engineering Inc. for the State of South Dakota in fulfillment of a contract:

http://denr.sd.gov/documents/11energyaudits.pdf

Agenda Item 6(A)(ii)

The Conservation of Energy and Power in Water Supply Systems

A Comprehensive List of Processes and Methods to More Efficiently Manage the Water Resource

-DRAFT-

By Doug W. Evans 6/3/14

INTRODUCTION:

The art of energy and power conservation in a water supply system finds its roots in the development and implementation of water conservation principles. They both are tied together in a relationship that plays out when water conservation is fully understood and extended further to the conservation energy and power, and the fiscal savings which may be realized through the application of both.

One of the largest direct costs of delivering culinary water involves the cost of pumping. Every foot of pumping head, between the Dynamic drawdown water level of a well, to a reservoir serving a customer or zone of users costs money. The higher the head, the greater the cost per ERC (Equivalent Residential Connection), at a standard ERC flow demand. Head is also increased on a system by any process that imposes unwanted friction, i.e. improper pipe sizes, corrosion, scaling, pipe age, improper design, PRV and valve issues, etc.

Further - pumping during peak electrical utility loads increases costs more and reduces the reliability of the electrical service or system(s). These costs are passed on to the customer as additional Power and Energy Costs. Pumping at a high capacity for even a short period of time increases the Power load and accompanying Power Demand Charge. Pumping at unnecessarily high flow rates for short periods of time also increases head losses and consumes more energy. These costs are also passed on to the customer as an additional Energy Charge. Running an Electrical AND/OR Water Distribution System inefficiently (leaks and short circuits) also imposes more charges and costs to the customer.

In summary – as can be ascertained below, there are numerous ways (simple and more complex) to save energy and money. But it should be noted that - a properly designed and implemented energy management system is an ongoing or dynamic process, and begins properly with one or more inspections, comprehensive energy audits, and must, at a minimum, include an extended period water system model.

I. **System Modeling Strategies.** The first step to developing a comprehensive energy audit of a water system is to perform an extended period water model to evaluate the distribution and pump system performance. As a part of this evaluation, the following energy ambitious scenarios should be studied:
   A. **Looping**. The process of unwarranted or repeated boosting of the same water. Could a pump or systems of pumps be boosting water, or any portion thereof in one or more loops? These loops can be found:
      1. In the distribution system piping through inter-zonal connections:
         a. PRV stations – where one or more are primarily designed to be normally closed, but fail through:
            i. Improperly maintained PRV's, Failed Solenoid Controls, or Relief Valves and related pilot control systems.
            ii. Leaks in PRV valve diaphragm or across valve seat.
            iii. Leaks in standby or backup fire-flow PRV.

iv. Leaks in by-pass gate or butterfly valve.
b. Leaking normally closed zone isolation valves.
c. An improperly designed or applied PRV station, which should be kept closed or eliminated.

2. In pumping stations through:
   a. Leaking check valves, when one or more pump(s) are off.
   b. Leaking surge anticipator or pressure relief valves to the pump suction zone.
   c. Leaking pump by-pass PRV or solenoid valve systems used to deliver fire return flows from the pumped zone to the pump suction zone.
   d. Leaks from corroded or damaged source well pump line or columns, flowing back into casing annular space.
   e. Pump water cooled air-handling systems, where a solenoid valve leaks water back to the suction side when a pump is off.
3. Source and Treatment Facilities through:
   a. Chemical feed systems or ejection systems, i.e. leaking check valves, solenoid valves, etc.

B. **Leaking.** Accounted and Unaccounted Water Loss wastes energy and money and can be remedied by implementing one or more of the following:
1. Distribution System:
   a. Leak detection audits.
   b. Leak detection instruments.
   c. Meter testing. How much water passes through undetected? As much as a cup per minute can pass undetected.
   d. Master metering and mass balance tests.
   e. Fire hydrant leak tests.
   f. Operational leaks, i.e. flushing and testing.
   g. Fire department tests – unmetered
   h. Sewer system flushing meters
   i. Construction metering program
   j. Establish system typical loss baselines.
   k. Bulk water stations - metered
   l. PRV adjustment for high and low demand periods.
   m. Main Leaks.
   n. Service Line Leaks.
   o. Meter Inaccuracies.
   p. Types of Unaccounted for water:
      i. Unbilled Metered Consumption
      ii. Unbilled Unmetered Consumption
      iii. Unauthorized Consumption
      iv. Customer Metering Inaccuracies
      v. Systematic Data Handling Errors
      vi. Leakage on Mains
      vii. Leakage on Service Lines
      viii. Leakage on Tanks and Overflows
   q. Potential Losses:
      i. Water losses at regulation valves, altitude valves, electric and pneumatic actuated valves, pump to waste PCV's, and PRV's
      ii. Leaking Check Valves
      iii. Reservoir Inlet and outlet detection devices

iv. Reservoir emergency or seismic control valves
v. Reservoir overflow detection systems

2. Pumping Systems.
    a. Leaking surge anticipator or pressure relief valves to atmosphere.
    b. Leaking pump control valves (deep well type) to atmosphere.
    c. Leaking pump seals.
    d. Leaking Air-Vac valves.
3. Storage Systems.
    a. Leaking Tanks
    b. Overflowing Tanks
    c. Proper Placement of Reservoirs and PRV's. Keep pressures at a minimum. Use PRV's less and reservoirs more.
4. Source and Treatment Facilities.
    a. Investigate Backwash water re-use, either internally or for irrigation etc.
    b. Inspect sedimentation, mixing, clarifier, filter basins, systems and the like regularly for leaks, etc.

C. **Leaping**. The process of unnecessarily pumping a source, i.e. a well around (or "leaping" over) an upper PRV zone (often by a separate pumping line) to a tank, when the pump would be using significantly less energy by just pumping the necessary pressure into the pressure zone in which it is located. This process can only be fully utilized if there are other sources that can supply the actual tank zone above it. The PRV's are now only used for emergency backup, or when the well or pumps cannot meet the necessary supply. Leaping can be mitigated by:
    1. Well or booster pump station pumped exclusively into hosted pressure zone, with flow controlled by zone pressure, i.e. VFD's or multiple pumps.
    2. Well or booster pump station(s) pumped into upper tank zone pipeline only when needed by an automatic diverting valve, but used in lower zone as much as possible.
    3. Adding a separate or smaller pump (or dividing pumps) to keep the hosted zone in water, with the others used for upper zones.
    4. Performance can be monitored by metering the zone PRV's.
D. **Breaking.** The process of breaking a usable water pressure supply unnecessarily, and is found in the following situations:
    1. Breaking a spring HGL pressure pre-maturely or re-pumping a spring unnecessarily.
    2. Underutilization of a flowing well, even if it is seasonal in nature.
    3. Breaking a high pressure zone in a pump system – just to be pumped up again to that zone or another higher pressure zone.

II. Water Source or Supply Side Efficiencies:

A. Is the source water making it to a tank? Does it really need to? (See Leaping). This can be modeled and monitored in a SCADA system setting.
B. Run sources (or prioritize them) based on cost per unit of water, and choose the most efficient sources first – given water rights and other water quality implications and considerations.
C. Monitor well specific capacity (standard flow per standard drawdown unit) on a real time basis using SCADA to test for changing well efficiencies over time or by season.
D. Can water rights be transferred from an expensive source to a less expensive one?
E. Monitor in real time with SCADA, and Log Sources and Pumping Systems for gal/kwh and gpm/kw to check for the trending of inefficiencies and need for well pump maintenance.
F. Remain current on all water source protection plans and work to mitigate any possible threats to said source(s). Ensure that each source has a recorded protection zone.

G. Monitor Source Production monthly and daily if possible. Tie source capacity to the number of standard ERC's to establish a running trend of efficiency.

III. Water User or Demand Side Efficiencies:

A. Implement increasing block water rates (with many tiers), including surcharges to higher volume customers, which actively encourages customer water conservation measures.
B. Investigate zero based rates.
C. Review possible high elevation rates or elevation surcharges to assess customers who place a higher pumping demand on the system.
D. Review and update the Water Conservation plans and strategies as necessary.
E. Review system Rules and Regulations – to ensure that they promote conservation and penalize users for unnecessary water use and waste.
F. Demonstrate green and resource conservation strategies by participating in the annual school water fairs.
G. Provide public education and assistance when possible to help conserve water or find known water losses.
H. Reduce system leaks and water losses by implementing fixed based meter read systems, which read meters daily and hourly. Tie customer water meter reading system to work in conjunction with a carefully implemented master meter system(s). Generate daily reports, pinpointing areas where a water leak or break may be occurring. Use this system to assist customers in troubleshooting leaks on their side of the meters. Make modifications to the SCADA system to make it capable of handling this larger bandwidth of data. Provide customers with daily water use statistics on company web pages to promote conservation.
I. Regularly test and calibrate meters and perform regular upgrades as necessary.
J. Follow AWWA Water Audit standards or your own and perform annual water audits.
K. Consider secondary water system metering, if you provide such, to save higher quality and treated water sources.
L. Consider irrigation metering systems or the metering of pools or large water features, separate from customer meters with large high use customers.
M. Consider ET Irrigation Control Systems, or providing ET data to customers to assist in the programing of their irrigation systems.
N. Provide Customer – On-Site Evaluations and Audits.
O. With fixed base and hourly customer meter read data – investigate and consider an additional demand surcharge based on peak daily flows, which have a larger impact on a distribution or pumping system than annual or monthly volume usage.
P. Investigate installation of real time leak detection monitoring equipment.
Q. Master Meter new developments where practical.
R. Investigate water re-use systems and possible MBR scalping plants to facilitate the irrigation of large institutional, agricultural, or private irrigation needs
S. Provide lawn watering and irrigation schedules to customers.
T. Implement water theft regulations and provide the policing of such.
U. Provide Annual Water Loss Reports to your public and board.
V. Track what a system ERC standard really is, and trend regularly it's claim on water Source and water Demand.
W. Know more what water use is in the middle of night in the winter to estimate water losses, etc.
X. If necessary - meter around larger PRV's at low water use periods to help establish a system or regional base leakage rate.

IV. Pumping System Efficiencies:

A. Pump Efficiency is decreased if:
    1. The pump is operating outside of its pump curve efficiency range.
    2. The pump is worn or not of a proper design.
    3. The flow of water is restricted or throttled on the suction (and/or) discharge side.
    4. The electrical control system, i.e. VFD is not designed for the application (common in high head pumping systems).
    5. The Distribution System is not routing and controlling the flow of pumped water properly to its destination, i.e. re-pumping or short circuiting, faulty PRV's.
    6. Other Distribution System Problems, i.e. storage, leaks, pipe age and interior quality.
    7. The electrical Load Factor is too low and the head losses on the distribution system are excessive.
    8. The Electrical System Power Factor is not efficient or too low.
    9. The Water System Peaking Factor is too high (above 2.0).
    10. The Pumping Systems are not cooled properly.
    11. Metering issues, such as old worn meters, no master metering strategy, and no leak detection. Etc.

B. Pump Curves and pump performance should be regularly reviewed and tested. Test each pump on at least 4 points on the curve. Have a VFD curve available if the pump is on a VFD and test at several speed points.

C. If you use the correct utility power rate for your pumping systems, significant money can be saved.

D. If you pump during the designated off peak periods of the Electrical Utility – you can also save money, by completely eliminating or reducing the Power Demand Charge. Proper storage capacity is essential to follow this strategy.

E. If you use Variable Frequency Drives (VFD's) to increase your Load Factor, or use jockey type pumps – you reduce your costs – by reducing your demand and energy charge.

F. If you have a high head loss on a pump plant, a VFD can reduce your energy cost by reducing the total dynamic pumping head.

G. If you are charged a power factor penalty – you can eliminate that charge by implementing power factor correction strategies.

H. Pump cycles and operation should be always selected for efficiency, yet be prepared for any emergency.

I. Always match the VFD to the proper pump and pump curve.

J. Carefully review the necessity for pump trimming when using a VFD.

K. Never use a restrictor valve to control the flow rate of a pump.

L. Evaluate multiple smaller pump designs, vs. one or 2 large pumps in a pumping plant.

M. Carefully develop effective multiple pump rotation and lockout strategies.

N. Provide for pump back-up strategies.

O. Review well pump designs to evaluate if a line drive pump is more efficient than a submersible pump system. Submersible motors are typically less efficient.

P. Run pumps more often (prioritize) based on their costs per unit of water pumped. Choose the most efficient pumps first in a system for pumping.

Q. Implement SCADA and control system lockouts to prevent operators from running multiple pumps when not needed, or bumping pumps unnecessarily.

R. Typically small jockey type pumps should run first and as long as possible to extend the load factors as much as possible.

S. Evaluate for service or replacement any old and worn pumping equipment.

T. Provide grounding brushes to protect bearings on VFD operated pumps.

U. Use high performance lubricants on motors for extended performance and lower operating temperatures.
V. Provide engineered pressure and surge protection systems to better protect distribution infrastructure and pumps from wear, breaks, leaks, etc.
W. Well "pump to waste" cycles typically run pumps at their highest energy and power demands. Provide a back pressure or pressure sustaining valve in line with the pump control valve, or add a sustaining pilot on the pump control valve, to hold waste discharge pressures closer to the efficiency point on the curve. An alternative for a VFD controlled pump would be to run the waste cycle at a lower speed.
X. Evaluate your pump exercise and water testing strategies. Avoid running a pump for a short period just to exercise it. If a pumping system needs this, evaluate running it in an off-peak period or on a generator regularly. The same applies to running well pumps for a simple water test, when they would normally be idle for a month or more.
Y. Ensure that you r well and well pump performance matches its design characteristics and pump curve. Also monitor well static and dynamic drawdown and specific capacity over time. If there are irregularities – the pump may be worn, or the pumping column may be leaking into the well annular space. When changing or servicing well pumps, perform a video inspection to ensure that the well casing is in good condition. A corroded or malfunctioning casing and screen system will restrict flow into the well casing and lower drawdown levels, thus increasing energy and power requirements.
Z. In summary, implement water pumping and operational management strategies similar to the following:
    1. Reduce Energy usage on pumping facilities by ensuring that pumps are not running at a level or in a configuration which increases head losses in the pumping or piping systems.
    2. Eliminating a possible return flow loop or leak in a pumping station through relieve/surge anticipator valve(s) or emergency fire flow PRV's.
    3. Review pump curves to better limit Variable Frequency Drives (VFD's) to their optimum frequency range settings.
    4. Ensure where feasible, that pumps controlled by Variable Frequency Drives (VFD's) do not have their impellers trimmed – thus allowing for a wider range of operational flows and pressures.
    5. Monitor temperatures and environmental variables better in all pumping and other remote facilities to get better controlled energy use for heating and/or cooling. Use Motion detectors for lighting controls and install more efficient fluorescent or LED lighting.
    6. Evaluate and implement better and more efficient cooling systems for the larger pumping facilities, to not only save energy but extend pump life.
    7. Improve the efficiency and reliability of larger HVAC heating and cooling systems by, monitoring air pressures, humidity, and other parameters. And to better control operation in the winter months, using the heating systems only when needed. Integrate HVAC controls into PLC's and integrate with system SCADA equipment.
    8. Establish Power Quality meters on larger facilities with daily SCADA logging capabilities.

V. Storage System Efficiencies:

A. Know all tank dimensions, including elevations of floor and overflow.
B. Verify tank capacities and capacity per foot.
C. Know the equalization, fire, and emergency levels and capacities.
D. Know your tank rate of changes +/- at all times with the SCADA system.

E. With this information, make informed decisions, instead of relying on the classic “saw tooth” decision, for leaks, etc.
F. With our ability to STORE Water in Tanks!, think of a tank as an energy storage battery, and run pumps as such.
G. Storing Water is similar to storing energy, which in turn allows us:
    1. The ability to run high energy and power motors and other equipment at controlled rates, and
    2. During controlled periods of time.
    3. This is unique in the world of commercial and industrial power consumption.
H. Size all new tanks for:
    1. Required ERC Demands as per State DEQ Standards, plus
    2. Fire and Emergency Storage, plus
    3. Energy Storage volumes (for Off-Peak Pumping).
I. Inspect and clean all reservoirs regularly, check for leaks and security issues.
J. Have a reservoir back-up plan in case a reservoir needs to be taken down, w/ PRV’s, pressure regulated pumps etc.
K. Install backup floats in reservoirs in case of transducer failures.
L. Investigate possible ASR (Aquifer Storage and Recovery) projects to reduce the Seasonal Peaks, and better optimize the usage of water sources or treatment facilities.

VI. Distribution System Efficiencies:

A. Ensure that all PRV’s are properly maintained and tuned to provide optimum pressure levels which may in turn reduce accompanying distribution system water losses.
B. Review fire hydrants annually and test for possible leaks.
C. Keep a centrally accessible and well maintained set of pipe location and leak detection instruments to ensure rapid and accurate assessments of infrastructure.
D. Investigate installing a centrally located and efficiently accountable bulk water filling station for construction water – minimizing water losses and unauthorized use by contractors.
E. Develop and implement a distribution system flushing program to ensure that water quality is maintained as well as friction losses minimized and water quality is optimized.
F. Review and maintain key air-vac devices in the distribution system to ensure that they are functioning properly with no build-up of air. This will maximize flow of water and can significantly decrease energy demands.
G. Where practical, install customer services in the top zone of distribution piping to ensure air is kept out of the piping systems, and reduce the need for air-vac devices.
H. To optimize energy efficiency on any raw un-treated water transmission lines – implement pipeline pigging programs to ensure that pipe wall friction coefficients are maintained at a minimum, thus reducing pumping energy costs.
I. Model the distribution system using a steady state AND extended period model, to evaluate possible undersized piping systems and networks, including water flow patterns, water quality characteristics, and energy demands over different scenarios.
J. Test water for possible tuberculation and corrosion (iron and sulpher reducing bacteria, and langler index) issues which can impose energy inefficiencies.
K. Be careful not to crush PE piping in new piping installations.
L. Investigate the installation of real time pressure transducer monitoring at key distribution sites and use the data to calibrate system models.
M. Implement and monitor Backflow testing programs to protect water quality.
N. Check the distribution system(s) for partially closed or lost isolation valves.

O. Incorporated pressure management PRV control valve systems. These systems can drop the pressure from say, 125 psi to 70 psi, which helps to reduce water use and lower the leak rates. It also limits the wear and tear on the water system. But when higher flows are needed in that zone, the pressure automatically increases to 125 pounds for such use as fire-flow or heavy demand. When demand subsides, the valve automatically returns to 70 pounds.
P. Develop an upgrade plan for piping systems which are deficient in size, materials, or quality.
Q. Investigate looping and additional network upgrades in the system to reduce head losses on pumping systems, etc.
R. Specify pipe materials which have a higher "C" coefficient in future upgrades or expansions.

VII. Plant or Treatment Facility Efficiencies:

A. Upgrade key chlorinating disinfection units to more efficient systems, utilizing less energy either in production and/or transportation and handling of product.
B. Investigate chlorine generation systems. We live in a State with accessible and cheap salt deliveries, making the electrolytic generation of chlorine much more efficient.
C. Improve treatment plant process control and efficiency through proper utilization and dosing of chemicals to reduce chemical waste, etc.
D. Improve chemical storage to increase bulk purchase discounts and reduce delivery frequency thus saving energy and costs.
E. Implement more natural and energy efficient systems to reduce algae growth in raw water systems, which could reduce the costs and amount of chemicals used for treatment.
F. Monitor electrical facilities for inefficient heat dissipation or cooling, through increased building insulation, etc.
G. Use more efficient lighting in plants.

VIII. Energy Sources, Strategies, and Backup:

NOTE: much of the data and work necessitated by this section should be performed by qualified personnel, who are adept at electrical safety and arc-flash procedures:

A. Carefully select the appropriate utility energy rate for the pumping application.
B. Pumping Selections should be based on unit water costs. Know the power cost per ac-ft/year, mgd or gpm. Also know the energy cost per k-gal, ac-ft, or mg.
C. Make all motor selections for efficiency rather than economy.
D. Evaluate Conventional vs. Off-Peak Pumping in systems using the following criteria:
    1. Electrical Power systems size power generating and delivery systems using the same concepts of a water system.
    2. Power plants are sized to meet the peak daily energy and power load of their users, even if for a very short time.
    3. The art of energy conservation is based on reducing the overall peaking factor of a system, thus reducing peak generating demands, brown outs, rolling blackouts, and minimizing the carbon footprint of a power system.
    4. The SMART energy grid is an attempt to reduce adverse peaking impacts.
    5. Peak water demands like power deliveries are the most costly.
    6. Peaks require the greatest usage of resources.
    7. Peak demands rob a system of customer growth capacity – whereas reducing the peak through conservation allows for the economic servicing of more customers with fewer upgrades.
    8. Peak demands increase O&M on a system.
    9. Peak demands have a greater impact on the environment.

E. Evaluate the pumping plant Load Factor – (Another Green Strategy), using the following criteria:
    1. Load Factor is a measurement of the amount of time a facility runs during the billing cycle. A large part of an electrical bill is the demand or peak power charge, and if a pumping system runs at a high capacity for a short time – the peak power (kw) charge is assessed – on as little as a 15 minute pumping period.
    2. The Load Factor (LF) on a pumping system also has a big impact on monthly power rates.
    3. If the pumping system can run longer – say 80% of the time, at a lower capacity – the same amount of water is pumped during a day or month, but the peak power charge is much less.
    4. LF is expressed as a %, where 100% means the pumps run 24/7. 50% means they run half of the time during the billing period, etc.
    5. Most pumping facilities are designed inefficiently to run for short periods normally, around 25% LF, and cost considerably more to run.
    6. They are also designed so longer run periods are saved for emergencies or build-out.
    7. A VFD can have a big impact on Load Factors if run correctly, and can save on motor maintenance and efficiency as well.
    8. A small jockey type pump can also increase the Load Factor.
    9. An ideal Load Factor would be 80 percent or above.

F. Low Power Factor (as opposed to Load Factor), which is caused by an inefficient pumping system can also significantly increase electrical inefficiencies and may result in an electrical utility penalty. The power factor decreases as more reactive power is utilized in a system (VAR's). Reactive energy can be reduced generally by adding capacitors to a circuit or utilizing VFD's.

G. Energy Savings and a VFD:
    1. Besides saving Power in a pumping system as previously explained, VFD's can also be utilized to save energy (kwh). This can be a significant savings in some systems.
    2. Many pumping systems are pumping too great of a flow in a restricted piping system and the head losses can be significant, i.e. improperly sized pump to pipe system.
    3. Other pumping systems are using a valve to restrict the flow in a pumping system to accomplish the above.
    4. Imagine driving down the road at 100 mph, and while keeping your foot at the same position on the accelerator, stopping or slowing down your speed with your brake. You consume the same amount of energy but instead of using it, you are burning it up in your braking system.
    5. This is similar to the energy losses in a system that restricts flow with a valve.
    6. A VFD can save considerable energy by replacing the valved system or restricted distribution piping. It can run pumps for a longer period at a lower flow (similar to the power savings above).
    7. This solution can result in energy savings as well as power savings.
    8. VFD's do not ALWAYS save energy however, and are not always ideal for some pumping systems, namely high head systems which have a large static head to overcome.
    9. VFD's can also add extra heat to a pumping system.

H. Soft Start's or Reduced Voltage Soft Starters – (RVSS) can be a viable alternative to a VFD, where a VFD is not an efficient alternative. RVSS reduce the peak loads and stress on a starting pump, and also contain valuable motor energy and power data, which is usable in an advanced

SCADA monitoring and control system. They also run cooler and can significantly outlast an across the line starter.

I. Regularly review plant Wire to Water Efficiencies.
J. Test for Harmonics on VFD pumping systems and remedy with properly sized filtering systems. Many newer VFD's come with these features.
K. Ensure that plant motor and VFD equipment is properly and efficiently cooled. Investigate using system water for air handling equipment.
L. Have a Back-up Power System program and optimize any generator efficiency. Conserve potential generator use. Generators should start remotely, based upon one of the following selector switch positions in the telemetry system:
    1. Auto Lock Out - meaning that generator fuel will not be used,
    2. Auto Start in Outage - meaning that generator will switch on whenever the power goes off, and
    3. Auto Start Pump Call - meaning that generator fuel will only be used when the reservoir calls for water, and generator will automatically shut off when the reservoir is full. This is designed to conserve fuel during emergency situations. Diversify generator fuels, with some using diesel fuel, and some using natural gas and propane. Have a diversity of types, stationary and mobile, and do not oversize them. VFD pumps take less starting capacity. Some starting capacity can be saved by starting at shut-off head.
M. Utilize Solar Cells and battery (UPS) on SCADA systems to keep the data coming in a power outage and protect security.
N. Implement security systems to protect water quality and quantity.
O. Incorporate energy management and operation of back-up systems into your emergency preparedness and response systems.
P. Investigate using a small solar powered DC/AC well for long term emergency water (if only 1 gall per person per day), with portable tank if needed. A 10 gpm well, run for 12 hours per day will supply 7,200 people.
Q. Provide a good backup supply of key equipment to promptly implements repairs and save water, i.e. transducers, SCADA equipment, pumps, valves, repair parts, etc.
R. Provide advanced Power Quality Monitoring equipment at pumping plants (on either a per pump basis or per plant) to assist in the diagnosis of pump problems, etc.
S. Perform regular IR Camera Tests on electrical facilities to determine any potential thermal electric problems with motors, transformers, breakers, electrical connections, etc.
T. Building and plant design and energy efficiency.
    1. Insulation
    2. Lighting
    3. HVAC
U. Keep all electrical and control equipment clean.
V. Keep accurate records for daily, monthly, and annual water use at source and demand, also calibrate to correspond to energy billing periods.
W. Large energy accounts should be on-line for daily review, reports, etc.
X. If you uses off-peak power strategies, check utility energy meters regularly to ensure that they are synchronized with the correct time. Always leave a small time buffer on your start and stop times.
Y. External Energy Service Provider Strategies:
    1. Ensure key facilities are accessible to outside utilities in all seasons to guarantee that meters are read in an accurate and timely fashion and not estimated. Estimates eliminate much of the benefits to off-peak strategies or low load and high load factor strategies.

2. Perform regular utility bill audits. Record and log power and gas consumption data as needed to ensure accuracy in billings as well as facilitating reliable budgetary projections.
3. Graph energy and gas use to demonstrate success of conservation and management strategies.
4. Eliminate small unnecessary or redundant electrical accounts – replace with solar systems if and where feasible.
5. Investigate net metering opportunities on smaller accounts using solar, wind, or energy recovery generation devices or other similar and authorized equipment

Z. Potential energy sources and Net-Metering opportunities:
1. Natural Gas / Propane:
2. Diesel
3. Solar Electric
4. Solar Thermal
5. Geo Thermal
6. Wind
7. Energy Recovery at PRV's, i.e. Hydro, DifGen, etc.

IX. Rate Dynamics – RMP:

A. Commercial Tariffs:
1. Rate 23 –Small Commercial –low demand < 30kw, This is typically the highest unit cost rate for water production.
2. Rate 6–Commercial –Medium Demand < 1 mw (most common pumping rate). 6B * (see note) is its power time of day off-peak rate.
3. Rate 6A –A commercial time of day energy rate. If you have a low load factor –you can save on this rate. It also has an off peak rate built in.
4. Rate 8–Large commercial / industrial rate > 1 mw. Slightly lower rates but the off-peak period DOUBLES in the summer months from 8 hours to 16 hours per day!
5. Rate 9–Large industrial transmission rate. Should be considered if loads are consistently above 1-2 mw. Considerably lower rates and off peak periods are the same as rate 8, but you need to take the service from a transmission line at the high voltage side, 46kv and above, and construct, own, and operate a sub-station.
6. NOTE -Rates can be changed, but not more than once a year.

B. Off-Peak Power periods:
1. 11:00 PM to 7:00 AM all year
2. All day on weekends and holidays.
3. For Rate 8 and 9 Customers they are:
4. 9:00 PM to 1:00 PM in the Summer Months, and
5. 11:00 PM to 7:00 AM in the Winter Months.
6. All day on weekends and holidays
7. Summer months are May through September
8. You lose the power demand savings if you go on peak for even a minute (except 6A).
9. NOTE *: Rate 6B has a 12 month averaged minimum Kw –prior to the 6B Election. Be careful and practice for a year before electing this rate (try to get on-peak loads as low as possible)! OR –start a new facility with this rate if you are going to go Off-Peak.

C. Off-Peak Implications:
1. Beware of Rate 6B –with Great Savings comes Great Responsibility.
2. Source tests or pump exercise schedules.

3. Check meter Clocks at least annually –provide a small time buffer in your run schedules.
4. Study the Rate Tariffs REGULARLY!
5. The "Daylight Savings Time" Challenge!
6. Due to the expansions of Daylight Saving Time (DST) as adopted under Section 10 of the U.S. Energy Policy Act of 2005 the time periods shown herein (Off-Peak) will begin and end one hour later for the period between the second Sunday in March and the first Sunday in April, and for the period between the last Sunday in October and the first Sunday in November.

D. Larger User Implications:
   1. The Off-Peak rate for rate 6 and the rates 8 and 9 look similar, but the following needs to be remembered:
   2. The Off-Peak periods for the number 6 rates (6A and 6B) can never go more than 8 hours per day.
   3. The Off-Peak periods for the 8 and 9 rates go to 16 hours per day in the summer.
   4. Most pumping systems will need to go partially ON-PEAK in the peak months to meet the daily and monthly demands of the system when the limitation is only 8 hours per day.
   5. If you have the ability to use 1 MW –you may want to consider a forced change to Rate 8 (pay a large power penalty at first) to enjoy the benefits of a longer off peak summer period (study carefully).
   6. This makes the savings for rate 8 and 9 larger than may appear in this simplified model, since the Off-Peak periods will likely be maintained.

E. A Conservation -Savings Management Cycle (The greater the effort –the greater benefit):
   1. Easy–If you have low LF, (<50%) move to rate 6A.
   2. Moderate–Stay on rate 6 and Increase your LF or pumping efficiency by:
      a. Managing your control scheme better (SCADA)
      b. Installing VFD's on pumping systems (RMP may help pay!)
   3. Harder–Move your rate to 6A and shed your energy loads to Off-Peak periods.
   4. Hardest–If you are a large user –Move to rate 8 or 9 and go Off-Peak as much as is possible. Use high pump loads Off-Peak and reduce loads On-Peak –with large Load Factors. And investigate ASR and Energy Recovery.

F. The Energy Rate and Load Factor Dynamic:
   1. Rate 6A is more economical for a low Load Factor (<50%).
   2. Rate 6 or 6B is more economical for a higher Load Factor (>50%).

X. Technology and SCADA Strategies:

A. Key to the operation of a successful advanced energy management strategy is the close and persistent review of pumping and energy data. While many SCADA systems are adept at general plant operations, an advanced system requires more analysis of the situations at hand, and must make more complex decisions, as well as provide more comprehensive reporting and alarming features. We call this SCADA 2.0. Presented below are some of the SCADA 2.0 and Control Strategies:
   1. Typical Operation based on Reservoir Set Points
   2. Off Peak Mode –Run everything off-peak if reservoirs allow (can eliminate power charge - 6B, 8, 9, or reduce energy charge – 6A).
   3. Off Peak -Load Factor Mode – Run everything off-peak if reservoirs allow, but pump the entire off-peak period at lower flows (can eliminate power charge – 6B, 8, 9, AND reduce energy charge for all rates.

4. Load Factor Mode –Fill the entire day with as few of pumps as possible (or run smaller pumps) or reduce Hz on VFD's (can significantly reduce energy charge AND power charge).
5. Efficiency Failover Mode Option - If #2 or #3 fails –then switch to #4, Additional Option - If #4 fails –then switch to #1.
6. SCADA system reviews continuous pump efficiency, with GPM per KW, and Gallons per KWH, and Power Factor monitoring data historical trends and alerts. (Note: some power and energy monitoring equipment upgrades may be necessary).
7. Detailed reports are provided to alert for possible water loss, etc.

B. Implement energy and power monitoring reporting into the SCADA system to better monitor the performance of pumping systems. This will allow for more rapid reporting of pump failure or blockage by rocks or debris in an impeller or impeller wear, significantly reducing its efficiency, or motor malfunction.
C. Through the implementation of a GIS system – provide geographically accurate infrastructure information and maintenance history to empower staff with the information necessary to make timely repairs, reduce travel, and improve maintenance decisions.
D. Have proper power backup generators and equipment available so key infrastructure can be operated in an emergency. Backup all SCADA, security, and critical control systems at key locations using a backup generator and/or UPS system.
E. Move more critical computer server applications into the "cloud" as they become available and more mature, reducing local costs of hardware management, software maintenance, as well as energy costs.
F. Install "water bug" type water leak detection devices on all SCADA sites to enable staff to react quickly to any type of facility leak or water loss promptly.
G. Develop and practice backup procedures for failed SCADA system(s) (i.e. a communication loss plans), etc.
H. Basic SCADA reports:
    1. Daily Consumption – net reservoirs, etc.
    2. Hourly Consumption as above.
    3. Pump performance data.
    4. Power quality data.
    5. USE the SCADA DATA gathered efficiently and properly.
I. Important SCADA Efficiency Data:
    1. Amps
    2. Volts
    3. VAR's
    4. Kilowatts
    5. Kilowatt hours
    6. KVAR hours
    7. Power Factor
    8. THD
    9. Well drawdown
    10. Well Specific Capacity Calculation
    11. Kw/gpm or MGD
    12. Kwh/gallon or KG or MG
    13. Rate cost data - What does a pump cost per day, month, year, etc.?
J. Tie real time SCADA data into a dynamic water model.
K. Tie real time SCADA data into an asset management or work order system, where work orders are issued automatically based on equipment run metrics, i.e. run hours, etc.

L. Record system pressures at key points and in PRV stations, etc. See real time performance in emergencies, pipeline breaks, etc. pinpoint trouble areas for potential cross connections, etc.
M. Using the above data and resources - predict areas for future improvements and repairs.

XI. Engineering and Design Goals:

A. Ensure that all new water storage and pumping facilities are designed and sized with off-peak pumping demands in mind.
B. Implement potential ASR programs (Aquifer Storage and Recovery), including possibly other similar groundwater programs to reduce the peak pumping and treatment load on the company facilities in the summer months.
C. Study other possible major surface water storage projects to reduce the peak capacity of secondary systems if applicable.
D. Study where hydro-electric energy recovery may be implemented at large pressure reduction locations or other storage locations.
E. Investigate the possibility of incorporating wind and/or solar energy systems to facilitate net metering opportunities near plants or other facilities.
F. With mature GIS data – computer model the distribution systems to find areas or facilities that may be inefficient of undersized, decreasing possible water losses and pumping demands.
G. Provide workable and dynamic water models to staff and train in the proper use thereof.
H. Study water sources and pumping facilities to find the actual energy and power costs per acre foot or MG. The company can then develop a strategy to pump water from more efficient pumping systems and also shut down or mothball facilities that are inefficient or redundant.
I. In large ground water systems –Investigate ASR.
J. Make your SCADA system smarter. Monitor areas for real-time water losses and pressure changes.
K. Model the system to test for efficiencies in pumping, distribution, and storage systems.
L. Automate meter reading and billing systems, upgrade meters if needed.
M. Choose the correct power rates for each service.
N. Enlarge water storage systems if possible (require more of new developers).
O. Pump OFF-PEAK as much as practicable.
P. Improve the Water Distribution System where needed.
Q. Design pumping plants with more and smaller selectable pumps and motors, or with larger motors on VFD's.
R. Consider a Seasonal 2 Stage pumping system with smaller pumps in the winter and larger pumps in the summer.
S. Use a VFD rather than a restricting valve –or change out the pumps.
T. Increase sizes of transmission lines or loop distribution lines if pumping head is too high on a pumping plant.
U. Correct power factor on accounts that are penalized.
V. Investigate the Industrial Rate 9 feasibility on large projects.
W. Implement a regular water and energy audit program.
X. Recover energy if feasible.

XII. Energy Audits:

A. A water system Energy Audit is essentially an Extended Water Audit.
B. An Extended Period Hydraulic Water Model is a key component to an Energy Audit
C. Gather the following data:
    1. All power bills for proposed study period(s).

2. All water use calculations for same periods.

D. Read from the facility Power Meter(s) the following:
    3. Meter Number, Time/Date, and Meter Multiplier
    4. Current Recorded Peak Power, KWH, and KVARHr
    5. Meter time – if applicable.

E. Using an accurate power quality meter, record the current power in KW, Amps, and Volts of the following facility scenarios (allow for a 15 minute adjustment time if using the utility meter instead of a portable power quality meter):
    1. Everything turned OFF in the facility.
    2. Just normal lights, heat or A/C, etc. turned ON, with NO motors running.
    3. All possible lights and heating or A/C, etc. turned ON with NO motors (i.e. pumps) running.
    4. Each motor running individually and in sequence.
    5. All motors running cumulatively, i.e. pump 1, then pump 1 + 2, then 1+2+3, etc. (ONLY perform this if possible).
    6. List of all of the motors in the facility, including their nameplate rated Horsepower or KW, Service Factors, and whether they are activated with across the line starters, VFD's or Soft Starts.

F. Record the static and dynamic pressure at the inlet and outlet of each pump and the plant for each operation sequence as noted above. Use elevation data to verify static heads if possible.

G. Monitor power factor and THD under each scenario above if possible.

XIII. Internal or Operational and Behavioral Strategies:

A. Sustainability (Review State Standards):
    1. Managerial Capacity
    2. Financial Capacity
        a. Effective Rates
        b. Impact Fees
        c. Levels of Service standards
    3. Technical Capacity

B. Administrative:
    1. Develop a realistic capital improvement program to replace old systems with more efficient systems.
    2. Implement efficient Utility Billing and related financial data systems.
    3. Develop sound emergency management programs, including redundant communication systems for SCADA and personnel access.
    4. Asset Management Systems:
        a. O&M
        b. Capital Improvements

C. Operational:
    1. In large utilities, Distribute Operational Personnel - Create possible small satellite offices, with SCADA access to more efficiently position operation staff across the service area.
    2. Train operators regularly in the efficient and proper diagnostic procedures used to determine system water losses.
    3. Reduce paper output by providing work orders, system maps, O&M manuals, and system photos digitally to remotely accessible computers and mobile devices (iPads, etc.).
    4. Optimize and centralize spare parts and other inventory in key locations to reduce energy and time related travel needed for the proper operation and maintenance of District assets and services.

5. Ensure that all operations and management staff have reliable access to SCADA, security systems, and server data and resources to minimize the amount of travel need to check systems in person.
6. Encourage telecommuting with certain staff where practical.
7. Compile and regularly train on Employee or Operators "Water Operations Manuals" – with emergency and energy management procedures, etc.
8. Practice "table top exercises" and drills and tests, etc. in company operation and emergency procedures.
9. Teach operations staff to be creative and innovative. Reward for such.

D. Office Facilities:
1. Implement Energy management strategies in our offices – i.e. programing thermostats effectively and using low energy lighting, motion controlled light switches, etc.
2. Install a backup generator for the administrative offices.

E. Public Relations and Education:
1. Make the company WEB Page more public friendly, usable, and efficient.
2. Education (start early to instill a conservation ethic in children):
3. Conservation
4. Water Fairs
5. Back-flow and cross connection prevention
6. Groundwater protection
7. Conservation Garden(s) and xeriscaping displays
8. Public Educational Press Releases

F. Materials and Equipment Recycling
1. Recycle paper and other appropriate office items. Provide accessible bins for such purposes.
2. Recycle used metal scrap, copper, brass, (meters) and bronze, from old water facilities, equipment, and meters.
3. Re-use older electrical and water distribution equipment where feasible.
4. Recycle all SCADA and UPS system batteries.
5. Recycling programs for pipe, copper, brass and other materials
6. Implement the proper re-use of used materials in bone yards, etc.

G. Fleet and Transportation
1. Reduce fuel usage by operations staff through the proper implementation and use of a field accessible customer service order, asset management system, and inventory control system. This will significantly reduce the need to return to the office frequently to gather work orders, directives, etc.
2. Procure more energy efficient vehicles and equipment in District operations.
3. Investigate CNG conversions for viable equipment.

H. System Regionalization Efficiencies:
1. Economies of Scale.
2. Shared source and storage facilities extend capacities.
3. Lower staffing levels per customer.
4. More efficient use of heavy equipment and repair parts inventories.
5. Regionalizing can sometimes be inefficient regarding energy due to the interconnection of systems that were not designed for such.

XIV. Outside Resources:

A. DDW and Loan Programs
B. RMP Incentive Programs

C. Rural Water Association
D. State Energy Office Programs
E. ESCO Projects
F. Siemens Industry, Inc.
G. Rural Development?
H. Bureau of Reclamation?
I. Self-Funded
J.

XV. Definitions:

Abbreviation	Meaning
A/C	Air Conditioning
AC	Alternating Current
ac-ft	Acre Feet (a volume of water covering an acre of land a foot deep (43,560 cubic feet)
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
C	the discharge coefficient used in the Hazen Williams equation of flow (the higher the C value the higher the flow through a pipe)
CNG	Compressed Natural Gas
DC/AC	Direct Current / Alternating Current
DEQ	Department of Environmental Quality
ERC	Equivalent Residential Connection
ET	Evapotranspiration
gal	gallons
GIS	Geographic Information System
gpm	gallons per minute
HGL	Hydraulic Grade Line
HVAC	Heating, Ventilating and Air Conditioning
Hz	Hertz (a measure of the cycles per second -used with electrical equipment)
IR	Infrared
k-gal or KG	1,000 gallons
kw	Kilowatts - the primary unit of Power
kwh	Kilowatt Hours - the primary unit of Energy usage.
KVAR	1,000 VAR's. See VAR below.
KVARHr	The portion of energy usage attributed to reactive energy.
kwh	Kilowatt Hours
LF	Load Factor (the measure of time a facility runs during a billing cycle)
mg or MG	million gallons
mgd	million gallons per day
O & M	Operation and Maintenance
PCV	Pressure Control Valve
PE	Plain End or Professional Engineer
PLC	Programable Logic Controller
PRV	Pressure Reducing Valve

RMP	Rocky Mountain Power
RVSS	Reduced Voltage Soft Starters
SCADA	Supervisory Control and Data Acquisition (Water system operation automation)
SMART Energy Grid	A method by which energy suppliers can monitor and control energy loads, such as reducing AC loads during the peak periods of the day.
THD	Total Harmonic Distrotion
UPS	Uninterruptible Power Source
VAR	Volt-Ampere Reactive, a unit of reactive power in an electrical system. Reactive power exists in an AC circuit when the current and voltage are not in phase.
VFD	Variable Frequency Drive

Agenda Item 6(A)(iii)

Energy Efficiency

By
Ken Bousfield, Director
Utah Division of Drinking Water

Why Energy Efficiency

- Power costs are rising
- Some water systems and consultants have investigated options and developed strategies to save significant savings on their power bills
- These strategies are available to any water system that pumps
- Cutting power costs will blunt power rate increases and may result in significant savings

Savings Potential

- A water system must have pumping facilities (a total gravity system is not using electricity and thus can not save on power bills)
- The actual savings is dependent on:
  - The water system's size and nature of physical facilities
  - How aggressive the system is in implement energy saving strategies

Drinking Water Energy (Cost) Savings Handbook

- The Division, with the help of others has developed a Handbook:
- Acknowledgements
- Chapter 1: Introduction
- Chapter 2: Energy Saving Investigation Process
- Chapter 3: Funding Opportunities
- Appendix, web links

The Handbook – Chapter 1

- 1. Introduction:
  - Energy savings potential
  - How to use the handbook
  - Finding the right consultant
  - The Drinking Water Board's State Revolving Fund

Energy Savings Potential

- Three case histories:
  - Mountain Regional Water SSD saved more than $300,000.00 per year involving system wide projects
  - Logan City saved $119,700 per year by creating a new pressure zone
  - Riverton City saved $42,000 per year with a newly revised pump station

How to Use the Handbook

This section of the Handbook describes its purpose and what the Handbook contains, including:

a) what to look for to save on energy costs,
b) what funding sources are available and
c) additional references

Finding the Right Consultant

This section describes a process a water system can pursue to ensure that it retains the services of a properly qualified expert to assist in developing strategies to save on energy costs

The Drinking Water Board's State Revolving Fund

- This section describes how an applicant for State Drinking Water Board funding can get a lower interest rate on its loan.
- This program will build understanding amongst the design community on energy efficient strategies and result in lower O & M costs for utilities
- Lower O & M costs lead to:
  - a) more affordable projects
  - b) more loan and less grant projects
  - c) which leads to the preservation of the Board's revolving funds

The Handbook - Chapter 2

- 2. Energy Saving Investigation Process
  - Things water system personnel can do
  - Things a consultant can assist water system personnel to do
  - Things that require the acquisition of equipment and/or involve a construction project

Examples of Things Water System Personnel Can Do

- Investigate and repair leaks
- Develop a strategy to meter and charge for currently un-metered water use
- Determine the unit power cost per gallon of water pumped for each pumping unit then turn on low cost pumps first and high cost pumps last and turn off high cost pumps first and low cost pumps last

Examples of Things Water System Personnel Can Do

- Develop a rate schedule where high cost pumping zones are assessed a proportionally higher water rate
- Inspect air-vacuum valves and bleed off excess air to maximize flow
- Regularly exercise valves in the distribution system and leave the valves fully open
- Avoid pumping against a throttling valve

Examples of Things a Consultant can Assist Water System Personnel to Do

- Assist a water system in finding leaks using leak detection equipment
- Evaluate power rate structures and recommend a pumping plan that maximizes the pumping during off peak hours
- Adjust the SCADA system to implement the pumping plan
- Institute a meter change out program with the replaced meters being accurately calibrated

Examples of Things that Require Equipment Replacement and/or Constructed Facilities

- Install automated meter read system and advise customers of suspected water leaks
- Utilize soft start pumps and variable speed drive pumps
- Develop a capital facility plan to systematically replace undersized lines
- Construct additional storage to take advantage of off peak pumping

Examples of Things that Require Equipment Replacement and/or Constructed Facilities

- Using extended period hydraulic modeling techniques to evaluate where pumped water is actually going – This may lead to a pumping and piping scheme into a lower pressure zone
- Compare actual pump efficiencies with the pump curve and repair or replace impellers and motors as appropriate

The Handbook – Chapter 3

- 3. Funding Opportunities
  - Utah Drinking Water Board
  - Energy Service Companies
  - Rocky Mountain Power's wattsmart program
  - Self funding through energy savings
  - Bank financing

Utah Drinking Water Board

- The State Drinking Water Board (DWB) has two funding sources: a) a State source and b) a federal source
- The DWB is desirous of lowering the O&M costs of applicants and will fund and provide incentives to enable them to do so
- The EPA's SRF program guidelines encourage the use of federal funds for energy saving

Drinking Water Board Loan/Grant Procedures

- Complete an engineering study of a project
- Complete an application available via the web
- Obtain authorization from the Board
- Proceed with:
  - Project design (include energy efficient strategies)
  - Obtain necessary Rights of Way
  - Prepare Bond documents
- Obtain project approval from the Board

Utah Energy Office

- U-Save Program:
  - Low interest loans with 5 year payback
  - Projects analyzed by Pre-qualified engineer, and utility audit may be performed
  - Engineer prepares an Energy Assessment Report (EAR)
  - Office of Energy Development (OED) reviews the EAR
  - OED approves the application
  - OED reviews and approves the design
  - OED monitors the construction

Energy Service Companies

- State statutes govern Energy Service Companies (ESCO):
  - Annual savings must exceed annual project repayment costs
  - The company must guarantee a savings
  - Annual reporting is required to verify savings
- The State maintains a list of pre-qualified ESCO's

Energy Service Companies

- The ESCO pays for the designs, construction and operation of the project
- The ESCO receives repayment from the energy savings
- Any excess savings is remitted to the water system
- Upon full repayment the water system retains the physical assets and reaps the entire savings thereafter

Rocky Mountain Power's wattsmart Program

- Rocky Mountain Power's (RMP) wattsmart program is designed to encourage energy efficient power usage
- RMP offers incentives as encouragement
  - Partial construction reimbursement, and/or
  - Reductions in kilowatt-hour power costs
- Information and application forms are available on their website

Self Funded Through Energy Savings

- Some communities may have funds set aside for another purpose that will be utilized at some future date
- Those funds should be invested in an interest baring account
- That investment could go to the water system construction fund who would pay for the loan with interest using money from energy savings

Bank Financing

- With publicly owned water systems, banks don't have to pay federal income tax on interest payments – this enables them to loan money at lower interest rates
- Bank financing steps:
  - Applicant provides financial information
  - Applicant provides details of the project
  - Bank and applicant determine project timing
  - Bank and applicant determine best financing tools

Bank Financing

- Bank financing steps:
  - Bank finalizes credit and pricing determinations
  - Bank closes loan
- Bank's financial tools:
  - Municipal bonds
  - General Obligation bonds
  - Revenue bonds
  - Sales, franchise and excise tax revenue bonds
  - Lease revenue bonds
  - Tax increment bonds
  - Special assessment bonds

The Handbook - Appendix

- The following information and associated web sites provide: additional information, application forms and entity contact information:
  - Case Histories of water systems with energy savings
  - The Drinking Water Board's SRF application forms
  - The Utah Energy Office's funding program
  - Energy Service Companies' State laws and lists
  - Rocky Mountain Power's wattsmart program
  - South Dakota's "Handbook on Energy Audits of Water Systems"

Agenda Item 6(A)(iv)

Water/Energy Summit

The following is offered as ideas for agenda topics related to the Water/Energy Summit. For maximum benefit the following groups of people should be encouraged to attend: Elected officials (both local and State officials), drinking water managers and operators, engineering consultants, land developers and vendors of products and services related to water/energy efficiencies.

Plenary Session:

The Summit could start with a plenary session where welcoming remarks are made and a mission statement and goal statements are presented. This would be followed with breakout sessions. However during the plenary session a description of the breakout sessions should also be offered along with a characterization of the target audience for each session.

The suggested breakout sessions with the indicated topics of discussion, are as follows:

Elected Officials Breakout:

- Present case studies explaining what water systems have done to save money and how much money they've saved.
- What experts (Certified Consultants) are available to assist water systems
- What funding options are available
- Introduction to the State's Energy Efficiency Handbook for use in encouraging colleagues and water officials to action

Drinking Water Operators and Managers Breakout:

- Operational changes that can make a difference
- Power companies rate structure
- Trusting your engineer's recommendations coming from calibrated hydraulic model evaluations
- Meter reading evaluations and leak detection investigations
- Introduction to the State's Energy Efficiency Handbook for use in generating ideas for improvements

Engineering Consultants Breakout:

- Preforming Energy Audits (what information they contain and how are they used)
- Available energy saving equipment
- Proper wiring of variable speed drive pumps
- Power company rate schedules
- Possible funding options
- Introduction of the State's Energy Efficiency Handbook for use as a "check list" for an engineering report and subsequent projects
- Potential State Certifications
- Extended time hydraulic model evaluations for use with determining:

    - Acceptable water levels in reservoirs to ensure peak demands and fire flows can be addressed
    - Areas where water is pumped to higher pressure zones, released through pressure reducing stations to lower pressure zones and then re-pumped over and over again to the higher pressure zone.

Land Developers Breakout:

- What it takes to ensure a safe and reliable supply of drinking water
- Applicable regulatory agency requirements
- The State's initiative for energy efficiency to be used as a marketing tool
- Using a State Certified engineering consultant

Equipment and Service Provider Vendors Breakout:

- The State's initiative for energy efficiency to be used as a marketing tool
- Products and services that can help water systems

Agenda Item 6(B)

Providing incentives for Energy Efficiency efforts through the Drinking Water SRF Program

There are several ways the Drinking Water Board can incentivize Energy Efficiency at Drinking Water Systems in Utah. Some questions the Board must answer include:

- How much of an incentive should be offered?
- Should the incentive be based on which level of energy efficiency is proposed?
  - Level 1 – planning
    - Planning advances are already either all grant or 0% interest
    - Can this be further incentivized from an SRF standpoint?
  - Level 2 – low-cost or no-cost measures
    - Results from this level of audit do not necessarily lend themselves to a construction project.
    - Can this be incentivized from a construction project standpoint?
  - Level 3 – capital intensive measures
    - Usually at this point the system has already completed a Level 1 and a Level 2 audit.
    - Level 3 results, by nature, are at least part of a system improvement project.
- Should the incentive be based on how far down the list of energy efficiency audits the system has progressed?
- Should the incentive be based on a modification of Table 2 in R309-700 & 705 or should the board offer a direct interest rate reduction?
  - See sample modifications to Table 2 (Attachment 1)
  - A 10 point change in Table 2 Financial Considerations results in an approximate 0.5% change in interest rate (See sample evaluation sheets, Attachment 2)
  - A 0.5% interest rate reduction reduces the average annual payment by approximately 4.4% for a 20 year loan and 6.1% for a 30 year loan (see sample rate reduction sheet, Attachment 3)

E. System experiences a heavy leak rate in the distribution lines. 10

Total 75

Emergencies

Upon the Board finding of an emergency as required by R309-705-9. Total 100

Priority Rating = (Average Points Received) x (Rate Factor) x (AGI Factor)

Where:
* Rate Factor = (Average System Water Bill/Average State Water Bill)
** AGI Factor = (State Median AGI/System Median AGI)

(2) Financial Assistance Determination. The amount and type of financial assistance offered will be based upon the criteria shown in Table 2. As determined by Board resolution, disadvantaged communities may also receive zero-percent loans, or other financial assistance as described herein.

Effective rate calculation methods will be determined by Board resolution from time to time, using the Revenue Bond Buyer Index (RBBI)as a basis point, the points assigned in Table 2, and a method to reduce the interest rate from a recent RBBI rate down to a potential minimum of zero percent. To encourage rapid repayment of a loan the Board will increase the interest rate 0.02 per cent (0.02%) for each year the repayment period exceeds five (5.0) years.

TABLE 2

REDUCTION FACTORS FOR INTEREST, HARDSHIP GRANT FEE AND OTHER FEES

	POINTS
1. COST EFFECTIVENESS RATIO (SELECT ONE)	
A. Project cost $0 to $500 per benefitting connection	16
B. $501 to $1,500	14
C. $1,501 to $2,000	11
D. $2,001 to $3,000	8
E. $3,001 to $5,000	4
F. $5,001 to $10,000	1
G. Over $10,000	0
2. CURRENT LOCAL MEDIAN ADJUSTED GROSS INCOME (AGI) (SELECT ONE)	
A. Less than 70% of State Median AGI	19
B. 71 to 80% of State Median AGI	16
C. 81 to 95% of State Median AGI	13
D. 96 to 110% of State Median AGI	9
E. 111 to 130% of State Median AGI	6

F. 131 to 150% of State Median AGI	3
G. Greater than 150% of State Median AGI	0

3. APPLICANT'S COMMITMENT TO PROJECT
PROJECT FUNDING CONTRIBUTED BY APPLICANT (SELECT ONE)

A. Greater than 25% of project funds	17
B. 15 to 25% of project funds	14
C. 10 to 15% of project funds	11
D. 5 to 10% of project funds	8
E. 2 to 5% of project funds	4
F. Less than 2% of project funds	0

4. ABILITY TO REPAY LOAN:

4. WATER BILL (INCLUDING TAXES) AFTER PROJECT IS BUILT RELATIVE TO LOCAL MEDIAN ADJUSTED GROSS INCOME (SELECT ONE)

A. Greater than 2.50% of local median AGI	16
B. 2.01 to 2.50% of local median AGI	12
C. 1.51 to 2.00% of local median AGI	8
D. 1.01 to 1.50% of local median AGI	3
E. 0 to 1.00% of local median AGI	0

5. SPECIAL **FINANCIAL** INCENTIVES: Applicant (SELECT ALL THAT APPLY.)

A. Has a replacement fund receiving annual deposits of about 5% of the system's annual drinking water (DW) budget and fund has already accumulated a minimum of 10% of said annual DW budget in this reserve fund.	5
B. Has, in addition to item 5.A., accumulated an amount equal to at least 20% of its annual DW budget in its replacement fund.	5
C. Is creating or enhancing a regionalization plan	16
D. Has a rate structure encouraging conservation	6
TOTAL POSSIBLE POINTS FOR FINANCIAL NEED	100

6. ENERGY EFFICIENCY INCENTIVES (SELECT ALL THAT APPLY)

A. No energy audit has been completed or is planned.	**0**
B. An energy audit of the water system will be completed as part of the proposed project.	**3**
-or-	
C. An energy audit of the water system has been completed	**4**
D. In addition to C. above, audit recommendations have been incorporated into the proposed project.	**5**
-or-	
E. In addition to C. above, audit recommendations have been incorporated into the proposed project and are	

estimated to achieve at least a 20% decrease in energy costs. 10

The energy audit report highlighting recommendations and estimated results must be submitted with the SRF application to qualify for the incentive points in Items B, C, D, and E above.

The energy efficiency points are meant as an incentive only and are not intended to punish any prospective SRF applicant for not implementing such efficiency measures. Therefore, the incentive points associated with these measures are not included in the base calculations for financial need point reductions but are considered "extra credit" that can be applied to the reduction calculation as applicants qualify for them.

R309-705-7. Project Authorization.

A project may receive written authorization for financial or technical assistance from the Board following submission and favorable review of an application form, engineering report (if required), capacity development (including financial capability) assessment and staff feasibility report. The engineering report shall include a cost effective analysis of feasible project alternatives capable of meeting State and Federal drinking water requirements. It shall include consideration of monetary costs including the present worth or equivalent annual value of all capital costs, operation, maintenance, and replacement costs. The alternative selected must be the most economical means of meeting applicable State and Federal drinking water requirements over the useful life of the facility while recognizing environmental and other nonmonetary considerations.

Once the application submittals are reviewed, the staff will prepare a project feasibility report for the Board's consideration in Authorizing a project. The project feasibility report will include an evaluation of the project with regard to the Board's funding priority criteria, and will contain recommendations for the type of financial assistance which may be extended (i.e., for a loan, credit enhancement agreement, or interest buy-down agreement).

The Board may authorize financial assistance for any work or facility to provide water for human consumption and other domestic uses. Generally, work means planning, engineering design, or other eligible activities defined elsewhere in these rules.

Project Authorization is conditioned upon the availability of funds at the time of loan closing or signing of the credit enhancement, or interest buy-down and upon adherence to the project schedule approved at that time. The Board, at its own discretion, may require the Applicant to enter into a "Commitment Agreement" with the Board prior to execution of final loan documents or closing of the loan. This Commitment Agreement or Binding Commitment may specify date(s) by which the Applicant must complete the requirements set forth in the Project Authorization Letter. The Commitment Agreement shall state that if the Department of Environmental Quality acting through the Drinking Water Board is unable to make the Loan by the Loan Date,

e. Energy Efficiency

1. Projects which through an energy audit have been shown to potentially conserve energy may be eligible for additional consideration. Provide an explanation of the project components that meet these requirements and explain how this was determined.

2. Energy Efficiency measures (Check all that apply.)

- ☐ We will complete an energy audit of the water system as part of this project.
- ☐ We have completed an energy audit of the water system. (Please provide a copy of the audit report highlighting the recommendations and projected results.)
- ☐ We have completed an energy audit of the water system. Audit recommendations have been incorporated into this project. (Please provide a copy of the audit report highlighting the recommendations and projected results.)
- ☐ We have completed an energy audit of the water system. Audit results show that the recommendations will yield a potential increase in efficiency of at least 20%. Audit recommendations have been incorporated into this project. (Please provide a copy of the audit report highlighting the recommendations and projected results.)

End of Tab 3 - PROJECT INFORMATION AND COSTS Worksheet

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Big Plains Water and Sewer SSD
COUNTY: Washington County
PROJECT DESCRIPTION: System Purchase, Distribution Lines, and Storage Tank

FUNDING SOURCE: Federal SRF

80 % Loan & 20 % P.F.

ESTIMATED POPULATION:	600	NO. OF CONNECTIONS:	223 *	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$56.05 *			PROJECT TOTAL:	$4,400,000
CURRENT % OF AGI:	2.10%	FINANCIAL PTS:	50	LOAN AMOUNT:	$1,803,000
ESTIMATED MEDIAN AGI:	$32,076			PRINC. FORGIVENESS:	$450,000
STATE AGI:	$37,718			TOTAL REQUEST:	$2,253,000
SYSTEM % OF STATE AGI:	85%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 4.97%		AFTER REPAYMENT PENALTY & POINTS 2.79%
SYSTEM				
ASSUMED LENGTH OF DEBT, YRS:	20	20		20
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	4.97%		2.79%
REQUIRED DEBT SERVICE:	$90,150.00	$144,309.60		$118,849.20
*PARTIAL COVERAGE (15%):	$0.00	$21,646.44		$17,827.38
*ADD. COVERAGE AND RESERVE (10%):	$9,015.00	$14,430.96		$11,884.92
ANNUAL NEW DEBT PER CONNECTION:	$444.69	$808.91		$666.20
O & M + FUNDED DEPRECIATION:	$62,621.00	$62,621.00		$62,621.00
OTHER DEBT + COVERAGE:	$218,750.00	$218,750.00		$218,750.00
REPLACEMENT RESERVE ACCOUNT:	$16,388.55	$0.00		$0.00
ANNUAL EXPENSES PER CONNECTION:	$1,335.24	$1,261.75		$1,261.75
TOTAL SYSTEM EXPENSES	$396,924.55	$461,758.00		$429,932.50
IMPACT FEES:	$2,000.00	$2,000.00		$2,000.00
TAX REVENUE:	$0.00	$0.00		$0.00
RESIDENCE				
MONTHLY NEEDED WATER BILL:	$147.58	$171.81		$123.59
% OF ADJUSTED GROSS INCOME:	5.52%	6.43%		4.62%

* Equivalent Residential Connections

ATTACHMENT 2

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Big Plains Water and Sewer SSD
COUNTY: Washington County
PROJECT DESCRIPTION: System Purchase, Distribution Lines, and Storage Tank

FUNDING SOURCE: Federal SRF

80 % Loan & 20 % P.F.

ESTIMATED POPULATION:	600	NO. OF CONNECTIONS:	223 *	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$56.05 *			PROJECT TOTAL:	$4,400,000
CURRENT % OF AGI:	2.10%	FINANCIAL PTS:	60	LOAN AMOUNT:	$1,803,000
ESTIMATED MEDIAN AGI:	$32,076			PRINC. FORGIVENESS:	$450,000
STATE AGI:	$37,718			TOTAL REQUEST:	$2,253,000
SYSTEM % OF STATE AGI:	85%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 4.97%		AFTER REPAYMENT PENALTY & POINTS 2.29%
SYSTEM				
ASSUMED LENGTH OF DEBT, YRS:	20	20		20
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	4.97%		2.29%
REQUIRED DEBT SERVICE:	$90,150.00	$144,309.60		$113,375.45
*PARTIAL COVERAGE (15%):	$0.00	$21,646.44		$0.00
*ADD. COVERAGE AND RESERVE (10%):	$9,015.00	$14,430.96		$11,337.55
ANNUAL NEW DEBT PER CONNECTION:	$444.69	$808.91		$559.25
O & M + FUNDED DEPRECIATION:	$62,621.00	$62,621.00		$62,621.00
OTHER DEBT + COVERAGE:	$218,750.00	$218,750.00		$218,750.00
REPLACEMENT RESERVE ACCOUNT:	$16,388.55	$0.00		$17,549.82
ANNUAL EXPENSES PER CONNECTION:	$1,335.24	$1,261.75		$1,340.45
TOTAL SYSTEM EXPENSES	$396,924.55	$461,758.00		$423,633.82
IMPACT FEES:	$2,000.00	$2,000.00		$2,000.00
TAX REVENUE:	$0.00	$0.00		$0.00
RESIDENCE				
MONTHLY NEEDED WATER BILL:	$147.58	$171.81		$121.24
% OF ADJUSTED GROSS INCOME:	5.52%	6.43%		4.54%

* Equivalent Residential Connections

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Big Plains Water and Sewer SSD
COUNTY: Washington County
PROJECT DESCRIPTION: System Purchase, Distribution Lines, and Storage Tank

FUNDING SOURCE: Federal SRF

80 % Loan & 20 % P.F.

ESTIMATED POPULATION:	600	NO. OF CONNECTIONS:	223 *	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$56.05 *			PROJECT TOTAL:	$4,400,000
CURRENT % OF AGI:	2.10%	FINANCIAL PTS:	70	LOAN AMOUNT:	$1,803,000
ESTIMATED MEDIAN AGI:	$32,076			PRINC. FORGIVENESS:	$450,000
STATE AGI:	$37,718			TOTAL REQUEST:	$2,253,000
SYSTEM % OF STATE AGI:	85%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 4.97%		AFTER REPAYMENT PENALTY & POINTS 1.79%
SYSTEM				
ASSUMED LENGTH OF DEBT, YRS:	20	20		20
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	4.97%		1.79%
REQUIRED DEBT SERVICE:	$90,150.00	$144,309.60		$108,043.63
*PARTIAL COVERAGE (15%):	$0.00	$21,646.44		$0.00
*ADD. COVERAGE AND RESERVE (10%):	$9,015.00	$14,430.96		$10,804.36
ANNUAL NEW DEBT PER CONNECTION:	$444.69	$808.91		$532.95
O & M + FUNDED DEPRECIATION:	$62,621.00	$62,621.00		$62,621.00
OTHER DEBT + COVERAGE:	$218,750.00	$218,750.00		$218,750.00
REPLACEMENT RESERVE ACCOUNT:	$16,388.55	$0.00		$17,283.23
ANNUAL EXPENSES PER CONNECTION:	$1,335.24	$1,261.75		$1,339.26
TOTAL SYSTEM EXPENSES	$396,924.55	$461,758.00		$417,502.22
IMPACT FEES:	$2,000.00	$2,000.00		$2,000.00
TAX REVENUE:	$0.00	$0.00		$0.00
RESIDENCE				
MONTHLY NEEDED WATER BILL:	$147.58	$171.81		$118.95
% OF ADJUSTED GROSS INCOME:	5.52%	6.43%		4.45%

* Equivalent Residential Connections

Impact of Interest Rate Reduction on Loan Repayments
Based on $ 100,000 loan value

Interest Rate	Term (yrs) 20	Annual Difference	Term (yrs) 30	Annual Difference
3.50	$ 7,036.11	$ -	$ 5,437.13	$ -
3.00	$ 6,721.57	$ 314.54	$ 5,101.93	$ 335.21
2.50	$ 6,414.71	$ 306.86	$ 4,777.76	$ 324.16
2.00	$ 6,115.67	$ 299.04	$ 4,464.99	$ 312.77

Rule of thumb: a 1% reduction in interest rate is approximately equal to 10% grant.

At 20 years, each .5% interest rate reduction reduces the average annual repayment by ~4.4%.

At 30 years, each .5% interest rate reduction reduces the average annual repayment by ~6.1%.

Agenda Item 7

Operator Certification Commission

Member Appointment

As of December 31, 2014, Jim Callison, representing the Joint Training Coordinating Committee, will complete his current term on the Operator Certification Commission for the Division of Drinking Water (the Division). Jim has indicated to Division staff that he would be willing to fill the position for another term.

Division staff recommends that the Board re-appoint Jim Callison to the Operator Certification Commission for another 3 year term.

OPERATOR CERTIFICATION COMMISSION

Member	Agency Represented	Date of Original Appointment	Term of Office Expires
Quinn Fenton Orem City 39 West 1790 North Genola, Utah 84655 Phone: (801) 229-7546 Fax: (801) 229-7599	American Water Works Association – Distribution	November 8, 2013	December 31, 2016
Mark Clark Weber Basin Water Conservancy District 2837 East Highway 193 Layton, Utah 84040 Phone: 771-1677 Fax: (801) 544-0103	American Water Works Association – Treatment	January 1, 2001	December 31, 2016
Gary M. Larsen P.O. Box 72 Millville, Utah 84326 Phone: (435) 750-0924	Rural Water Association of Utah	January 1, 2007	December 31, 2016
Brett Chynoweth P.O. Box 1 141 West 100 South Tropic, Utah 84776 Phone: (435) 689-8713 Cell: (435) 690-0563	Drinking Water Board	May 10, 2013	December 31, 2016
James Callison, Environmental Technology Utah Valley State College 800 West 1200 South Orem, Utah 84058-5999 Phone: (801) 222-8000, x 8677 Fax: (801) 226-5207	Joint Training Coordinating Committee	January 1, 1993	December 31, 2014
Dr. David K. Stevens Utah State University Department of Civil & Environmental Engineering Logan, Utah 84331-4110 Phone: (435) 797-3229 Fax: (435) 750-1185	Higher Education	January 1, 1987	December 31, 2015
Bart Simons Provo City 1371 West 1730 North Provo, Utah 84604 Phone: 852-6782 Fax: (801) 852-6778	Utah League of Cities & Towns	January 1, 1995	December 31, 2015

11/8/13
Term is: 3 years
OpCert