

FLORIDA ENERGY EFFICIENT
WATER PROJECT



PHASE I

FINAL REPORT

Contract #968
Between

Florida Energy Office



*Tri-County Community Council, Inc.
Bonifay, Florida*

FLORIDA ENERGY EFFICIENT WATER PROJECT

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EXECUTIVE SUMMARY

The Florida Energy Efficient Water Project (FEEWP) is a unique blend of technology and social awareness. The Florida Department of Community Affairs (DCA) funds the program, by contract with the Tri-County Community Council, Inc. (TCCC) - Bonifay, Florida, using oil overcharge monies. The program is administered by Rural Resources, Inc. (RRI) - Tallahassee, Florida.

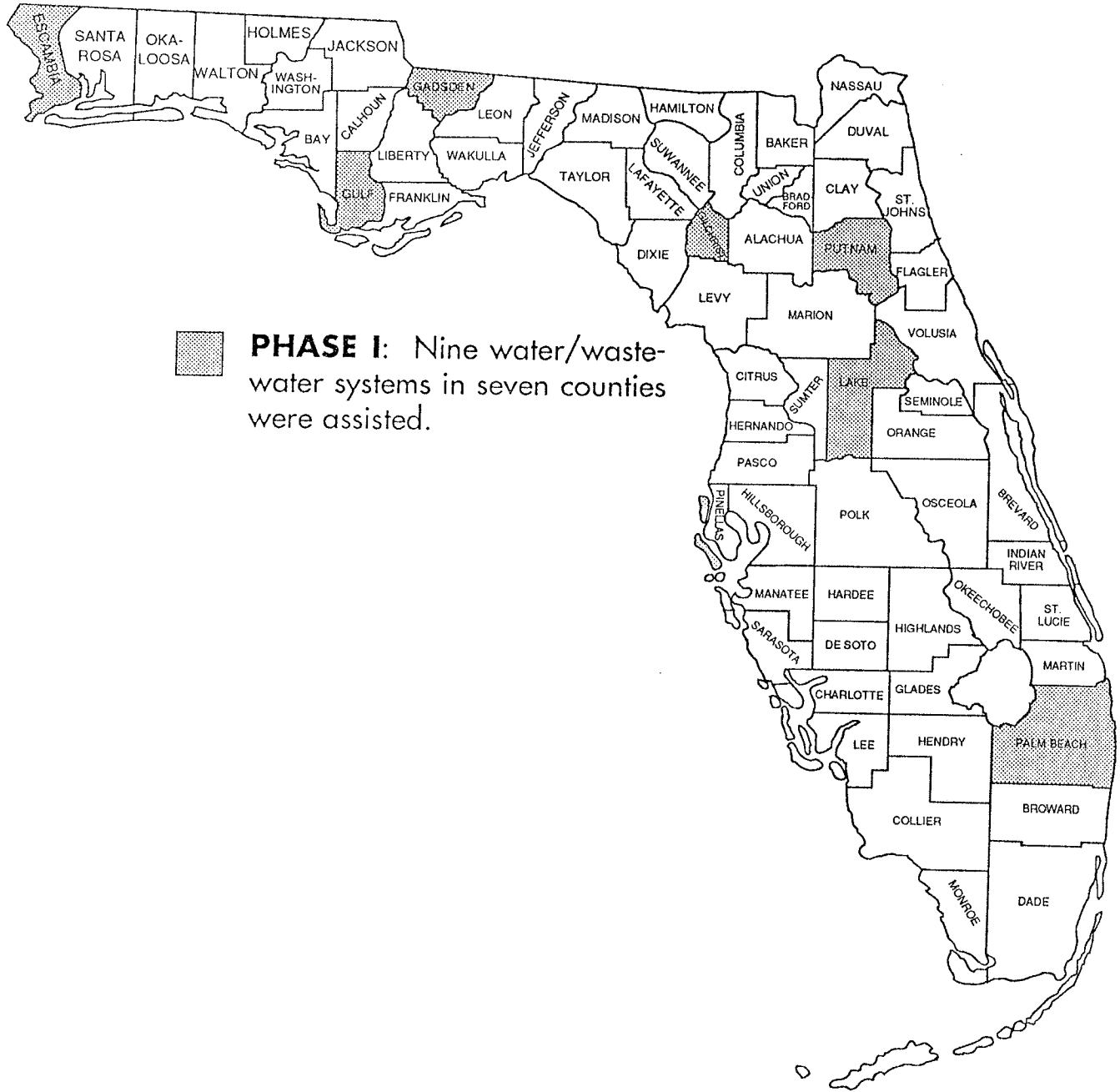
The FEEWP contracts with water and wastewater utilities for energy and lost water audits. The audits identify energy conservation measures (ECMs) or excessive lost water. The program then funds ECMs and/or leak detection/repair projects with a simple payback of less than ten years. Post audits are conducted to verify energy savings.


The unique part of this program is the participation of non-profit organizations in each community. The utility pays FEEWP 50% of the monies funded for ECMs and/or leak detection projects. This 50% is contracted by TCCC to a local non-profit organization and is used to improve low-income water/wastewater services. In two projects (Gretna and Palatka), a portion of the 50% match was provided through in-kind services by the utility.

Through the efforts of both sides of the project, the community obtains a more energy efficient utility and habitation improvements; thus, the quality of life is enhanced for a wide spectrum of residents.

During Phase I of the FEEWP, nine systems participated. Work is substantially complete at these nine utilities with \$499,540.41 worth of funded ECMs. Local non-profits have received \$238,002.75 to improve sanitary conditions. The savings from the implemented ECMs is 1,621,929.44 kWh/year or \$96,560.00/year.

GEOGRAPHIC DISTRIBUTION OF SERVICES THROUGH THE FEOWP



 **PHASE I:** Nine water/waste-water systems in seven counties were assisted.

FLORIDA ENERGY EFFICIENT WATER PROJECT — PHASE I

ENERGY CONSERVATION DATA

SYSTEM/GRANT	KILOWATT HOURS/YEAR SAVED RESULTING FROM IMPLEMENTATION OF ENERGY CONSERVATION MEASURES	KILOWATT HOUR RATE	ENERGY SAVED PER YEAR	10 YEAR PAYBACK (SAVINGS)	MINUS COST OF		NET SAVINGS	# OF YEARS REQUIRED FOR PAYBACK/YEARS/LEAK DETECTION
					LEAK DETECTION (LD)/MINUS COST OF ENERGY CONSERVATION (EC)	LEAK DETECTION (LD)/MINUS COST OF ENERGY CONSERVATION (EC)		
Palatka \$ 89,717.20	218343.00 * 484860.66 **	X.062 X.062	= \$13,537.27 X 10 YRS = \$30,061.36 X 10 YRS	= \$ 135,372.70 = \$ 300,613.60	- \$ 9,960.00 (LD) - \$ 79,757.20 (EC)	\$ 125,412.70 \$ 220,856.40	2.06	
Eustis \$123,820.02	70961.95 * 140688.00 **	X.07 X.07	= \$ 4,967.34 X 10 YRS = \$ 9,848.16 X 10 YRS	= \$ 49,673.40 = \$ 98,481.60	- \$ 6,640.00 (LD) - \$ 117,180.02 (EC)	\$ 43,033.40 - \$ 18,698.42	8.36	
Wewahitchka \$ 9,820.02	52740.00 **	X.05	= \$ 2,637.00 X 10 YRS	= \$ 26,370.00	- \$ 9,820.02 (EC)	\$ 16,549.98	3.72	
Gonzalez \$ 30,458.00	20034.00 * 92894.29 **	X.035 X.035	= \$ 701.19 X 10 YRS = \$ 3,251.30 X 10 YRS	= \$ 7,011.90 = \$ 32,513.00	- \$ 3,200.00 (LD) - \$ 27,258.00 (EC)	\$ 3,811.90 \$ 5,255.00	7.71	
Quincy \$ 54,258.80	177023.00 **	X.045	= \$ 7,966.04 X 10 YRS	= \$ 79,660.40	- \$ 54,258.80 (EC)	\$ 25,401.60	6.82	
Gretna \$ 9,645.14	15452.79 *	X.08	= \$ 1,236.22 X 10 YRS	= \$ 12,362.20	- \$ 9,645.14 (EC)	\$ 2,717.06	7.80	
Mt. Dora \$ 42,677.00	86550.00 **	X.067	= \$ 5,798.85 X 10 YRS	= \$ 57,988.50	- \$ 42,677.00 (EC)	\$ 15,311.50	7.36	
Trenton \$ 48,468.46	13431.05 * 94204.70 **	X.057 X.0576	= \$ 765.57 X 10 YRS = \$ 5,426.19 X 10 YRS	= \$ 7,655.70 = \$ 54,261.90	- \$ 2,490.00 (LD) - \$ 45,978.46 (EC)	\$ 5,165.70 \$ 8,283.44	7.83	
South Bay \$ 90,675.77	27199.00 * 127547.00 ***	X.067 X.067	= \$ 1,872.33 X 10 YRS = \$ 8,545.65 X 10 YRS	= \$ 18,223.30 = \$ 85,456.50	- \$ 3,520.00 (LD) - \$ 71,031.00 (EC)	\$ 14,703.30 \$ 14,425.50	7.19	
TOTALS	1621929.44	N/A	N/A	\$ 965,644.70	-\$ 483,415.64	=\$482,229.06	N/A	

*ENERGY SAVINGS RESULTING FROM REDUCTION IN WATER LOSS.

**ENERGY SAVINGS RESULTING FROM OTHER CONSERVATION MEASURES, I.E. FINE CLEANING, PUMP AND MOTOR REPLACEMENT, LINE REPLACEMENT, ETC.

***ENERGY SAVINGS FOR FORCE MAIN CLEANING ONLY; OTHER DATA TO BE PROVIDED WITHIN 30 DAYS.

8.80

Updated 05/13/94

FLORIDA ENERGY EFFICIENT WATER PROJECT BUDGET ALLOCATION/WATER

PHASE I CLOSEOUT — 03/09/94

LOCATION	TOTAL CONTRACT EXPENDITURES	LEAK DETECTION	LEAK REPAIR	LINE CLEANING	LINE REPLACEMENT	HYDRANT REPAIR /REPLACEMENT	ALTITUDE VALVE INSTALLATION	WELL PUMP REPLACEMENT	HIGH SERVICE PUMP INSTALLATION	WELL MOTOR REPLACEMENT	SOLENOID REPLACEMENT
Palatka	\$ 89,717.20	\$ 9,960.00		\$ 47,433.20		\$ 5,500.00			\$ 8,624.00	\$ 18,200.00	
Eustis	\$ 123,820.02	\$ 6,640.00		\$ 90,580.42		\$ 5,000.00					\$ 506.04
Wewahitchka	\$ 9,820.02								\$ 9,820.02		
Gonzalez	\$ 30,458.00	\$ 3,200.00					\$ 5,890.00			\$ 21,368.00	
Quincy	\$ 54,258.80				\$ 34,550.00						
Gretna	\$ 9,645.14	*	\$ 6,497.36			\$ 3,147.78					
Mt. Dora	\$ 42,677.00										
Trenton	\$ 48,468.46	\$ 2,490.00		\$ 11,796.00						\$ 13,591.23	
South Bay	\$ 90,675.77	\$ 3,520.00		\$ 64,927.00						\$ 10,189.77	
Totals	\$499,540.41	\$ 25,810.00	\$ 6,497.36	\$214,736.62	\$ 34,550.00	\$ 13,647.78	\$ 5,890.00	— 0 —	\$ 18,444.02	\$ 63,349.00	\$ 506.04

*FRWA provided leak detection from other funds.

**FLORIDA ENERGY EFFICIENT WATER PROJECT
BUDGET ALLOCATION/WASTEWATER**

PHASE I CLOSEOUT— 03/09/94

LOCATION	PIGGING FORCE MAINS	MOTOR REPLACEMENT	EFFLUENT PUMP MOTOR OVERHAULING	VARIABLE SPEED DRIVE ON RETURN ACTIVATED SLUDGE PUMP INSTALLATION	REPLACE DIFFUSER DROP PIPE ASSEMBLIES
Palatka					
Eustis		\$21,093.56			
Wewahitchka					
Gonzalez					
Quincy		\$10,155.00	\$3,738.80	\$5,815.00	
Gretna					
Mt. Dora	\$42,677.00				
Trenton	\$10,429.00				\$10,162.23
South Bay	\$6,104.00	\$5,935.00			
Totals	\$59,210.00	\$37,183.56	\$3,738.80	\$5,815.00	\$10,162.23

Updated 03/09/94

FLORIDA ENERGY EFFICIENT WATER PROJECT

PHASE I NON-PROFIT CLOSEOUT REPORT

CATEGORY	PALATKA PUTNAM-CLAY- FLAGLER BOX		EUSTIS LAKE COMMUNITY ACTION AGENCY		VFW/HAITCHKA GULF COUNTY SENIOR CITIZEN ASSOCIATION		GONZALEZ COMMUNITY ACTION PROGRAM COMMITTEE		QUINCY CAPITAL AREA COMMUNITY ACTION AGENCY		GREYNA CAPITAL AREA COMMUNITY ACTION AGENCY		MT. DORA LAKE COMMUNITY ACTION AGENCY		TRENTON SUWANNEE RIVER ECONOMIC COUNCIL		SOUTH BAY URBAN LEAGUE OF PALM BEACH COUNTY		TOTALS
	\$	#	\$	#	\$	#	\$	#	\$	#	\$	#	\$	#	\$	#	\$	#	
Match Funds	8,680.00		61,910.01		3,500.00		15,299.00		29,475.00		2,500.00		45,666.00		24,588.24		46,384.50		238,002.75
# of Units to Complete	23	32		3		16		20		7		23		22		30		176	
# of Units Completed	23	32		4		16		20		7		23		22		17		164	
Commodities	4	20		1		3		9		2		8		13		32		92	
Tubs	2	13						8		2		7				10		42	
Bathroom Sinks	2	9						11		1		4		12		25		68	
Showers		7						5		2		4		4				22	
Shower Heads								1				1				35		37	
Kitchen Sinks	1	14						11		2		5		11		19		64	
Mixing Valves	2	55		4				6		1		17		16		25		126	
Water Heaters	2	3		1		6		8		1		1		2		7		31	
Septic Tanks		1										1						2	
Drain Fields		1										1						2	
Sewage Lines				1								1						2	
Water Pumps		2																2	
Water Tanks		2																2	
Drain Lines		15				2		1				7				6		31	
Line Renewals	*180							4								6		190	
Water Lines	10			2				6				6		12		13		49	

*LINE RENEWAL- REPLACEMENT OF LINE FROM METER TO MAIN LINE AND, IF NECESSARY, INCLUDES METER OR METER BOX AND INSTALLATION OF BACKFLOW PREVENTER. THIS WAS IN-KIND MATCH PROVIDED BY THE CITY OF PALATKA.
 **PLEASE NOTE THAT AS OF THIS REPORT SOUTH BAY'S CONTRACT HAS BEEN AMENDED TO END ON 03/31/94. FINAL REPORT NOT AVAILABLE UNTIL 06/01/94.

AUDITS

Water and wastewater systems were evaluated for participation in the Florida Energy Efficient Water Project (FEEWP) through water and energy audits conducted by the Florida Rural Water Association (FRWA) and the Center for Training, Research, and Education for Environmental Occupation (TREEO) at the University of Florida. Results of the water and energy audits were used by the FEEWP Advisory Panel to determine the nature and amount of assistance to be provided to a given system through the program. A standard methodology is followed for each type of audit in order to ensure a comprehensive review of each system and to provide consistent data for use by the Advisory Panel in selecting program participants. These methodologies are described below:

WATER AUDITS FLORIDA RURAL WATER ASSOCIATION (FRWA)

In its analysis of each water system, the FRWA uses a water system review work sheet to develop data on water loss. The work sheet shows the calculations and numbers used within the audit to calculate the water loss. The total water pumped is calculated from the monthly pumpage records submitted by the system. A correction factor is then used after each of the wells or master meters are checked for accuracy with an ultrasonic flowmeter tester. The correction factor percentage is then used to correct the water pumpage figures.

Total metered sales are calculated from the monthly sales and usage records provided by the system. A representative sample of residential meters is then tested to determine accuracy and develop a correction factor for the total metered water use. Usually one percent of all residential meters is tested, in field, on a random basis. This is done without interrupting service, with customer's consent. This process only uses 10 gallons for the test. The percent accuracy for all meters tested is then used to develop a system wide correction factor. As we know, most meters fail to account for all the water used by the customer because, with age comes wear in the meter mechanism. This may be positive for the customer but very costly for the utility. The amount of the correction factor is then added to metered sales. A corrected total for unaccounted-for-water can then be figured by subtracting water sold from water pumped.

Through discussions and interviews with system employees each authorized unmetered water use is then estimated. The work sheet indicates the uses, which are estimated if appropriate and applicable, and totaled. This total is then subtracted from the

AUDITS
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corrected unaccounted-for-water. If any identified water loss can be estimated by system employees, that would then be deducted. In most cases, theft, illegal connections, etc., exist but it is impossible to establish an accurate correction factor. Therefore, they are noted but not estimated.

At this stage, potential water system leakage is noted, and that number is divided by the total water pumped to reach a water loss percentage. Under normal conditions a percentage of 10 percent or less is considered to be acceptable and it would not be cost effective to recover the lost gallons.

ENERGY AUDITS
CENTER FOR TRAINING, RESEARCH AND EDUCATION FOR ENVIRONMENTAL
OCCUPATIONS (TREEO CENTER)

In order to properly evaluate a system, the utilities director is sent a preliminary questionnaire, by TREEO, requesting information about their system(s). This information is necessary to help determine the amount of energy consumed by each operation of a system. With this questionnaire a system profile is established. This information helps identify the operations that will provide significant energy conservation measures.

Potable water systems are examined from the well pumps to the high service pumping and through the distribution system. Wastewater systems are examined from the collection system through the headworks to effluent, and sludge disposal. Operations are reviewed and discussed with the facility personnel. Operation or management concerns are examined to determine if corrections can be justified through energy conservation measures (ECMs).

Old distribution lines usually have tuberculation or incrustation on the inner walls restricting flow. This restriction creates more head for the pump, lowering the efficiency, and consuming unnecessary energy. With help from system personnel, flow tests on specified fire hydrants are performed. These flow tests create the data necessary to determine the head loss due to friction (using calculations established specifically for this purpose). Using the system distribution map, it is determined which lines have the greatest potential for energy loss affecting the high service or raw water pumps. After determining the extent of build up in the lines, a recommendation for cleaning specific lines is made if energy savings justify the cost.

AUDITS
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For lift stations that run over eight hours per day, electric consumption and flow rates are measured. When force mains have not been cleaned on a regular basis the solids coagulate and adhere to the walls of the lines. These deposits build to a level that restricts the flow through the lines causing the lift station pumps to work significantly less effectively than designed. Force main cleaning restores the hydraulic capacity of the lines and lowers the head on the pump. Recommendations to clean specified force mains may be made after calculating the projected savings. To maintain clean operating conditions, the access points are permanently installed. Collection system personnel can periodically clean the lines as a preventive maintenance operation.

Wastewater aeration systems are examined for possible ECMs. One ECM considered is retrofitting coarse bubble diffusion systems to fine bubble systems.

Pumps are gauged and a flow measurement taken, under typical load, to determine if they are pumping to specification. If a pump is not pumping up to specification, it is wasting energy. This may be corrected by pump replacement, overhaul, a variable frequency drive, coating the interior with an energy efficient coating, or several other strategies.

A timed electric audit is performed on emergency generator heating units to determine wasted kilowatt hours. To conserve energy, a heat pump can be installed. Standard heaters need to be on 60% to 100% of the time, depending on the size of the heaters, the size of the engine, and the environment the engine is in. The heat pump runs 50% to 60% of the time saving a considerable amount of energy.

An electric audit is performed on motors over five horsepower and having run time greater than eight hours per day. The kilowatt hours and dollars per million gallons spent on the present system are determined. Comparing these figures against the estimated savings of various ECMs, recommendations are made based on what changes are necessary to produce a cost-effective reduction in the system's energy consumption. The replacement of standard efficiency motors with premium efficiency models gives a return on the initial investment in a relatively short period of time. The efficiency directly affects the operating cost through the consumption of electricity. The operation and maintenance costs as well as down time for the pump motors are also reduced.

Potential savings are researched and calculated. A report is written and recommendations are presented to the FEEWP Advisory Panel for discussion and decision.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF PALATKA, FLORIDA

COUNTY SERVED:	Putnam County
NUMBER OF CONNECTIONS:	5,000
MAXIMUM DAILY RATE/WITHDRAWAL:	4 Million Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	3 Million Gallons Per Day
AGE OF SYSTEM:	105 Years
RAW WATER SUPPLY:	8 Wells
STORAGE:	950,000 Gallon Ground Storage Capacity
	750,000 Gallon Elevated Storage Tank
	250,000 Gallon Standpipe
EMERGENCY POWER:	Emergency Generation Capacity Is Available To Operate Wells #1 And #2 And High Service Pumps #2 And #4

SYSTEM OVERVIEW

The Palatka water distribution system is supplied by eight wells, each with a vertical turbine pump. The raw water is pumped directly to ground storage prior to treatment. The electrical checks of the high service pumps indicated that motor replacement would be justified as a number of the motors had high amperage (greater than 5%) and voltage (greater than 1%) unbalances. At the time of the preaudit, the practice was to operate a random selection of high service pumps to obtain the necessary flow into the distribution system. This practice fails to use the pumps efficiently.

The water treatment plant provides chlorination and high service pumping. The major flow is through a 24 inch main to the elevated storage tank. From there it breaks down into smaller mains to be distributed throughout the City. Along Moseley Avenue the elevation drops to the St. Johns River. Because of the change in elevation, there are 13 pressure reducing valves (PRV) installed along the ridge. Old, tuberculated lines became candidates for line cleaning. However, for the benefits of cleaning to be reflected in energy savings, the work had to be done on the plant side of the PRV's. Four hydrants were tested to obtain an indication of system condition. The flow from the hydrant at Carr and Cleveland did not clear up during the flow test procedure (approximately 10 minutes). The area bounded by St. Johns Avenue, Moseley Avenue, President Street and Westover Drive, near the elevated storage tank, were designated as candidates for line cleaning. Cleaning the mains leaving the treatment plant would also show direct benefits to pumping costs.

The Florida Rural Water Association (FRWA) found that the system was losing 310,000 gallons annually through leakage and other water losses. Any recovery of lost gallons would reduce the cost of operation, prolong the need for additional supplies and pumping facilities, and reduce the 29.8% water loss percentage.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECM's) were implemented for the Palatka water system:

1. Replacement of the motors at wells #1 and #2 with premium efficiency models, and replacement of the pump, column, stainless steel shaft, and stuffing box for existing head.
2. Replacement of high service motors #4, #5, and #6 with premium efficiency models.

3. Distribution line cleaning.
4. Leak detection.

After review of the operation hours, pumping capacities, and location of the eight wells, replacement of the pumps/motors at wells #1 and #2 was recommended. Well #1 is the oldest well in the system and, based on readings taken by the St. Johns Water Management District, the pump was pumping only 370 gallons per minute rather than its original pumping capacity of 600 gallons per minute. Well #2 was in operation 5,400 hours per year and showed a similar reduction in pumping capacity. Substantial energy savings were achieved by replacing the pump/motor combination with new equipment.

The replacement of standard motors with premium efficient motors gives a return on the investment in four years. The efficiency directly affects operating cost through the consumption of electricity. By replacing rewound 90% efficient motors with 95% efficient motors the City will save \$982.50 per year after period of return is over and 16,823.63 kWh of electricity per year from time of replacement. The operation and maintenance costs as well as down time for the high service pumps would be reduced.

On August 19, 1992, the three lines used for initial flow tests were reflowed. Both the flows and the final C factor were calculated. The flow provides data on how much water the pipe is actually capable of handling. The Hazen-Williams C factor is an indicator of interior pipe roughness or resistance to flow. The initial C values were determined for representative types and ages of pipe within the system. Using this data and comparing it against the new C values shows that there was a significant increase in both flow and the C factor. Distribution line cleaning increases both flow and C value, thereby saving energy.

Additional savings may be realized by the reduction of pumping hours. Both wells #1 and #2 are located at the treatment plant and are thus metered for kW use which contributes to the demand charge. If wells #1 and #2 can be run in non-peak hours and not run at the same time, then the demand can be reduced. The average demand over the period of the audit was 183 kW. If properly monitored, demand at this facility could drop to 160 kW. This would amount to a \$1,725.00/year savings.

LEAK DETECTION

In February 1993, the FRWA performed a post water audit for the

City of Palatka. In Palatka, the leak detection effort and hydrant repair reduced the 29.8% water loss to 8.1%. The difference between the amount of water pumped for the year and water sold for the year has been reduced considerably. This is a very positive sign and indicates the system is also addressing residential meter accuracy.

ENERGY CONSERVATION OUTCOMES

As a result of the leak detection and energy conservation measures implemented through the FEEWP, the Palatka water system reduced its energy consumption by 703,203.66 kWh per year, yielding a reduction in operating costs of \$43,598.63 per year. The \$89,717.20 invested in system improvements will be repaid through energy savings in 2.06 years, well below the 10-year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEERP)

CITY OF EUSTIS, FLORIDA

COUNTY SERVED: Lake County

WATER SYSTEM

NUMBER OF CONNECTIONS: 6,496

MAXIMUM DAILY RATE/WITHDRAWAL: 3.63 Million Gallons Per Day

AVERAGE DAILY RATE/WITHDRAWAL: 2.67 Million Gallons Per Day

AGE OF SYSTEM: 35 Years

RAW WATER SUPPLY: 6 Wells

STORAGE: Ground And Elevated Storage At
The 3 Water Plants Total 2.1
Million Gallons

EMERGENCY POWER: All 3 Water Plants Have Back-up
Generators Sufficient To
Maintain The Water Supply

WASTEWATER SYSTEM

TYPE OF PLANT: Trickling-Filter/Solids-Contact

DESIGN FLOW: Biological Growth / Activated
Sludge

TYPE OF AERATION: Floating Surface

AGE OF SYSTEM: Components Range In Age From 7
To 40 Years

NUMBER OF LIFT STATIONS: 26

POPULATION SERVED: 12,000 Persons; Residential
Connections

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated the system's equipment and operations and revealed the following:

Water is provided for Eustis by the Ardice, Haselton, and Highway 44A water plants. Each of the three plants uses chlorination and fluoridation treatment processes. Treated water is pumped into the storage units, then distributed throughout the system through high service pumps, elevated storage tanks, or hydropneumatic tanks. At the time of the preaudit, the utility was considering the installation of a pressure reducing valve and an elevated storage tank to reduce the pumping requirements during peak water demand and stabilize the pressure.

Each of the three water plants has two well pumps and three high service pumps. The motors that drive these pumps account for the largest energy consumption at each facility. Based on power bills, the average cost per million gallons pumped was \$74 at the Ardice and Highway 44A water plants and \$60 for the Haselton plant. The high service pumps were run in a "lead and lag" mode. The lead pump, however, should be the most efficient pump. The well pumps were run in an "alternating" mode. This is a standard way of running well pumps, but the well pump with the smallest electrical demand should be operated during peak electrical demand periods.

Flow tests were conducted on the water distribution system. These tests determine the "C" value of the lines, which is an indicator of interior pipe roughness or restriction to flow. Initial "C" values were determined for representative types and ages of pipe within the system. Using this data, and the estimated "C" values to result from line cleaning, the lines that would provide an energy payback were determined.

The Eustis wastewater treatment facility services a population of 12,000 persons, consuming 1,241 kWh of energy per million gallons at a cost of \$60 per million gallons. A total of 546,660 kWh per year is used for the treatment process, control building, and effluent pumping. The treatment process is trickling-filter / solids-contact, which is very efficient. However, the two pump motors at the transfer ponds run enough hours to warrant motor replacement with premium efficient models.

The collection system consists of 26 lift stations. The collection lines are 35-year-old cast iron and 6-year-old PVC. Sections of the collection system have been removed during maintenance and the

operating staff found them to be very clean. Therefore, force main cleaning was not recommended as an energy conservation measure. The #5 lift station had a number of problems, was inefficient, and was recommended for replacement.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECMs) were recommended for Eustis:

Water System

Line cleaning of 7.16 miles of water distribution line.

Wastewater System

- 1: Replacing two transfer pond pump motors with premium efficiency motors.
- 2: Replacing lift station #5 with a more efficient submersible system.
- 3: Replacing one hydrant.
- 4: Replacing one solenoid.

During the line cleaning process, several problems occurred. All or parts of five poly pigs were trapped in the distribution system by unknown obstructions. Trapped pigs were retrieved from the lines, but the obstructions that caused them to be trapped were unknown and not investigated by the system during the period of the grant.

LEAK DETECTION

On December 17-18, 1992, the Florida Rural Water Association (FRWA) performed a post water audit for the City of Eustis. In Eustis, the leak detection effort reduced the 13% water loss to 5.7. Through (1) leak repairs; (2) instituting other water conserving ideas; and (3) staff recommendations, a 70,028,470 gallon-a-year loss was recovered.

ENERGY CONSERVATION OUTCOMES

As a result of the ECMs implemented through the Florida Energy Efficient Water Project (FEEWP), the Eustis wastewater system reduced its energy consumption by 140,688 kWh per year. An additional 70,961.95 kWh was saved as a result of the leak detection and repair efforts. The combined 211,649.95 kWh saved yielded a reduction in operating costs of \$14,815.50 per year. The \$123,820.02 invested in system improvements will be repaid through energy savings in 8.36 years, below the 10 year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF WEWAHITCHKA, FLORIDA

COUNTY SERVED:	Gulf County
NUMBER OF CONNECTIONS:	834
MAXIMUM DAILY RATE/WITHDRAWAL:	298,000 Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	156,000 Gallons Per Day
AGE OF SYSTEM:	55 Years
RAW WATER SUPPLY:	2 Wells
STORAGE:	80,000 Ground Storage 120,000 Elevated Storage
EMERGENCY POWER:	Gas Power Take-Off Drives For Well #2 And The Backup High Service Pump

SYSTEM OVERVIEW

The preaudit performed by TREEO evaluated the Wewahitchka water system's equipment and operations and determined the following:

The water system for the City of Wewahitchka produced approximately 2.78 million gallons of potable water per month. The system used 2,652 kWh's of energy for every million gallons of water pumped, at a cost of \$207.00 per million gallons.

Raw water was provided by two wells. The operating characteristics of the pump motors were within the acceptable range. The low cost for kWh and short run times did not provide a payback for motor replacement. Raw water was pumped to a 120,000 ground storage tank. Treatment consisted of aeration and chlorination.

Two high service pumps provided system pressure and filled the 80,000 gallon elevated storage tank. The high service pumps were obsolete and could not be economically overhauled. Both pumps were overhauled in 1984. At that time, the contractor noted that this was the last effective overhaul for these pumps.

Replacement of the #1 and #2 high service motor/pump(s) with premium efficiency motor/pump(s) was recommended. It was also recommended that only one pump be operated at a time and that operation of well pumps and high service pumps at the same time be avoided.

The majority of the distribution system is old and poorly designed. However, because of the low energy costs, there were no cost effective energy conservation measures for the distribution system's piping.

The system was also not considered to be a good candidate for line cleaning due to the small amount of energy used for high service pump operation and the resulting small payback figures.

A formal preventive maintenance program was recommended for all mechanical equipment. This would ensure the repair or replacement of equipment before it becomes so inefficient.

ENERGY CONSERVATION MEASURES

The following energy conservation measure (ECM) was implemented for the City of Wewahitchka water system:

Installation of two Peerless, 15 hp, 3x3x8A in-line high service

pumps with piping and electrical modifications to fit the existing piping and electrical connections.

The new energy efficient pumps allow water to be pumped at the rate originally designed for the system. While the old pumps were handling 103 gallons per minute, the new models pump 250 gallons per minute. This increased capacity reduces run time on both pumps and motors, and reduces maintenance and down time for repairs.

Prior to the installation of the energy efficient pumps, the system used 2,652 kWh per million gallons, costing \$132.60/mg. After installation of the new equipment, energy use was reduced to 1,710 kWh/mg, with a corollary reduction in cost to \$85.50/mg. This is a savings of 942 kWh/mg at a savings of \$47.10 per million gallons pumped.

LEAK DETECTION

On January 23 and February 4, 1992, the Florida Rural Water Association (FRWA) conducted a preaudit of Wewahitchka's water system and found the system to be in good operating order. The system's 5% water loss is considered acceptable and indicates a very low likelihood of large amounts of leakage. Although a full leak detection effort was not justified, the FRWA provided several recommendations concerning lost water and efficiency recovery:

1. Various large commercial meters tested were only 25% accurate and the high flow register on the compound meters were not working. Large meters should be repaired since large amounts of revenue can be lost through slow commercial meters.
2. System employees and fire personnel should record system usages, such as main flushing, fire fighting, and fire training.
3. All service connections should be metered even if the system does not charge for the usage; for example: lift station, parks, and cemetery.
4. Employees and customers should be encouraged to report theft of water through illegal connections.

ENERGY CONSERVATION OUTCOMES

As a result of the energy efficient equipment provided through the Florida Energy Efficient Water Project (FEEWP), the Wewahitchka water system reduced its energy consumption by 942 kWh per million

gallons pumped. Between the time of the preaudit and the post audit, 84 new connections were made to the system, increasing the total volume of water pumped from approximately 33 million gallons to approximately 56 million gallons per year. This increase in volume resulted in a larger energy savings than originally projected. If the current average of 156,000 gallons per day continues to be pumped, the energy efficient pumps will save the system 52,760 kWh per year, yielding a \$2,637.00 reduction in operating costs annually. The \$9,820.02 expended for the new equipment will be repaid through energy savings in 3.72 years, far below the 10 year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

GONZALEZ UTILITIES ASSOCIATION, INC.

COUNTY SERVED:	Escambia County
NUMBER OF CONNECTIONS:	1,124
MAXIMUM DAILY RATE/WITHDRAWAL:	530,000 Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	343,000 Gallons Per Day
AGE OF SYSTEM:	27 Years
RAW WATER SUPPLY:	2 Wells
STORAGE:	40,000 Gallon Elevated Storage Tank 100,000 Gallon Elevated Storage Tank
EMERGENCY POWER:	Gas Engine On Well #2

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated the system's equipment and operations and revealed the following:

The Gonzalez water utility pumped an average of 343,000 gallons per day at an average cost of \$86.00 per million gallons pumped. The system used 1,600 kWh's of energy for every million gallons of water pumped. The maximum daily withdrawal during the period of the audit was 530,000 gallons. The utility's current consumptive use permit (s840081/1-26-84) allowed a maximum withdrawal of 486,000 gallons per day and an annual average of 324,000 gallons per day.

Both well pumps/motors were original equipment and were over 25 years old. The electric panel at Well #1 was found to be in poor condition. The unit was obsolete, parts were unavailable, and the entire unit needed to be replaced in order to protect any new equipment installed.

Treatment of the raw water included chlorination and the addition of a lime slurry to adjust the pH from approximately 5.8 to 7.8. The injection of lime slurry caused severe line incrustation in the area near the injection point creating a build up great enough to cause a considerable increase in pumping head.

From Well #1, the treated water flowed into a 40,000 gallon elevated storage tank or directly into the distribution system. From Well #2, treated water was pumped directly into the distribution system. The system also included a 100,000 gallon elevated storage tank. Neither of the elevated storage tanks were equipped with altitude valves.

Running time of the pumps was based on system pressure. When the pressure dropped below a certain point, both pumps came on. There were two basic problems with this mode of operation. Without an altitude valve on the 100,000 gallon storage tank and with this tank isolated from the system during the day, the system received virtually no energy benefit from having the elevated storage tank. With an altitude valve in place and the tank on line, the run time of the well pumps could be reduced. In addition, turning on both pumps at the same pressure point was not advisable from an energy or operational standpoint. If the elevated storage tank were operating correctly, one pump would probably be sufficient to top off the tank and restore desired system pressure. The best operating strategy would be to hold the elevated stored water for release during the peak demand period.

Pumps should be set up in a lead and lag order with one pump turning on at a certain psi and the second only coming on if the psi dropped to a second threshold. This will reduce the start/stop frequency of each pump which will result in a longer service life of the motor and pump.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECM's) were implemented for the Gonzalez Utilities Association, Inc.:

1. Installation of an altitude valve on the 100,000 gallon elevated storage tank.
2. Relocation of existing control and telemetry system from elevated site #1 to elevated site #2.
3. Modification of control system to provide lead/lag operation and automatic alternation of lead/lag operation.
4. Replacement of existing 250 gpm pump and 20 hp motor at well site #1 with 350 gpm and 30 hp premium efficiency motor.
5. Replacement of existing 40 hp motor at well site #2 with a premium efficiency 40 hp motor.

The improved pumping efficiency resulting from the ECM's produced an energy savings greater than that estimated in the preaudit. Prior to implementation of the ECM's, the system used 1,863 kWh per million gallons at a cost of \$86.00/mg. After implementation of the ECM's, energy use was reduced to 1,549 kWh/mg at a cost of \$54.00/mg. This is a savings of 312 kWh/mg or \$32.00 per million gallons pumped.

LEAK DETECTION

On December 14-15, 1992, the Florida Rural Water Association conducted a post water audit for Gonzalez Utilities Association, Inc. to determine the impact on water loss of the corrective measures performed in response to leak detection. The audit revealed that the leak detection and correction effort had reduced the 16.99% water loss to 6.4%. Through leak repairs and other water conserving measures, a 12,487,000 gallon-per-year loss was corrected. Over the years, this reduction in pumpage will not only provide a considerable energy savings, but will reduce chemical use, lower overall operating costs, and reduce the need for system expansion.

ENERGY CONSERVATION OUTCOMES

As a result of the ECM's implemented through the Florida Energy Efficient Water Project (FEEWP), the Gonzalez water system reduced

GONZALEZ UTILITIES ASSOCIATION, INC.
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its energy consumption by 92,894.29 kWh per year. An additional 20,034 kWh was saved as a result of the leak detection and repair efforts. The combined total of 112,928.29 kWh saved yielded a reduction in operating costs of \$3,952.49 per year. The \$30,458.00 invested in system improvements will be repaid through energy savings in 7.71 years, below the 10 year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF QUINCY, FLORIDA

COUNTY SERVED:	Gadsden County
NUMBER OF CONNECTIONS:	3,383
MAXIMUM DAILY RATE/WITHDRAWAL:	3 Million Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	1.27 Million Gallons Per Day
AGE OF SYSTEM:	37 Years
RAW WATER SUPPLY:	Quincy Creek And 2 Backup Wells
STORAGE:	3 Ground Storage Tanks And 3 Elevated Storage Tanks With A Total Capacity Of 4 Million Gallons

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated Quincy's water and wastewater systems' equipment and operations and revealed the following:

The City of Quincy's water treatment facility services 3,383 connections and produces about 1.27 million gallons per day of potable water. The average energy cost for potable water treatment and distribution was \$54 per million gallons for an average consumption of 1,244 kWh per million gallons.

Quincy Creek is the main raw water source. Raw creek water is treated with alum, chlorine, and fluosilicic acid (fluoride). Sedimentation and filtration are used to remove coagulated particles. The high service pumps have been recently replaced with high efficiency models. When rain increases the creek turbidity, two wells are used. The combined usage of both wells accounts for a little over 9% of the total water pumped to the distribution system. Water from the well located at the plant is chlorinated and aerated before going into the .5 million gallon ground storage tank. Water from the remote well is chlorinated then pumped directly into the distribution system.

The wastewater treatment plant treats 1.2 million gallons per day and was operated in contact - stabilization mode up to the time of the preaudit. Since then, the system has been converted to the extended aeration mode of operation. Potential modifications to the aeration system were evaluated and not found to be cost recoverable under FEEWP guidelines. The other major energy users at the plant were the two pumping stations, consisting of four pumps that move the primary clarifier effluent to the activated sludge contact tank and two pumps that move the return activated sludge to the stabilization tank.

The primary clarifier effluent is collected in a wet well and pumped to the contact aeration tank. This tank is handled by four single-speed, drive shaft, Chicago pumps. The staff was not able to determine the last time the pumps were overhauled or the wear surface clearance checked. The voltage unbalance for pump #2 was 1.2%, which exceeds the generally accepted limit of 1.0%. Since there were no testcocks or flowmeters on the pumps, the pumping efficiency could not be quantified. However, since the pumps had not been overhauled within the recollection of current staff, it was safe to assume that the operating efficiency is low. The projected excess kWh savings from the other energy conservation

measures is sufficient to cover the overhaul of one pump. It was recommended that over the next three years, the City of Quincy budget to have all pumps inspected, then adjusted and overhauled if necessary.

The operation of an activated sludge plant requires that secondary sludge be returned to the aeration tank to seed it with microorganisms. However, the volume of the return must be controlled to prevent hydraulic conditions that can upset the process. To control the output of the return activated sludge pumps, the operating staff throttle the pump discharge valve. This practice imposes an artificial head on the pumps and consumes extra energy to pump the same volume. Replacing the RAS pump motors with premium efficiency models and installing a variable speed drive to eliminate the need for throttling was recommended.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECM's) were implemented for the Quincy water and wastewater systems:

Water System

Replacement of distribution lines.

Wastewater System

1. Replacement of two primary effluent pump motors with premium efficiency models.
2. Overhauling one primary effluent pump to original specifications.
3. Replacement of the two return activated sludge pump motors with premium efficiency models.
4. Installation of a variable speed drive on the return activated sludge pumps to eliminate the need for pump discharge throttling.

ENERGY CONSERVATION OUTCOMES

As a result of the energy conservation measures implemented through the FEEWP, the City of Quincy water and wastewater systems reduced their energy consumption by 177,023 kWh per year. This yields a reduction in operating costs of \$7,966.04 per year. The \$54,258.80 invested in system improvements will be repaid through energy savings in 6.8 years, below the 10-year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF GRETNA, FLORIDA

COUNTY SERVED:	Gadsden County
NUMBER OF CONNECTIONS:	575
MAXIMUM DAILY RATE/WITHDRAWAL:	400,000 Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	210,000 Gallons Per Day
AGE OF SYSTEM:	32 Years
RAW WATER SUPPLY:	2 Active Wells
STORAGE:	1 Elevated Storage Tank With A 50,000 Gallon Capacity

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated the system's equipment and operations and revealed the following:

The City of Gretna's water system pumped an average of 210,000 gallons per day at an average cost of \$159.62 per million gallons pumped. The system used 1,910 kilowatt hours per million gallons.

The City's potable water is obtained from two active wells operated on a lead/lag basis. Well #2 is used when pressure in the elevated storage tank drops below 46.5 psi, but this rarely occurs. Water from both of these wells is chlorinated before entering the distribution system. A third well is available for pumping only in a dire emergency such as total failure of the rest of the system because the well has an unacceptably high level of dissolved solids.

The system's "lead well" is equipped with a premium efficiency motor and a Peerless pump. The "lag well" is equipped with a Berkeley submersible pump which is a candidate for replacement.

Kohler generators are located at both well sites to provide emergency power. These generators are automatically run one hour per day.

LEAK DETECTION AND REPAIR

On February 13, 1992, the Florida Rural Water Association completed a leak survey of Gretna's water system. One leak was located near the wastewater treatment plant, two leaks were found on the standpipe of the water tower, and a leak was detected near the corners of First and Church Streets. In addition, two leaky fire hydrants were detected, each of which was estimated to be losing over 10,000 gallons per day. The FEEWP provided funds for repair of these leaks and replacement of the faulty hydrants.

In September of 1993, the Florida Rural Water Association performed a post water audit for the City of Gretna to determine the impact on water loss of the corrective measures performed in response to leak detection. The audit revealed that the leak detection and correction effort had reduced the 27 percent water loss to 2.9 percent. Through leak repairs and other water conserving measures, a 15,363,680 gallon per year loss was corrected. Over the years, this reduction in pumpage will not only provide a considerable energy savings, but will reduce chemical use, lower overall operating costs, and reduce the need for system expansion.

CITY OF GRETNA, FLORIDA
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ENERGY CONSERVATION OUTCOMES

As a result of the leak detection and repair measures implemented through the FEEWP, the City of Gretna reduced its energy consumption by 15,452.79 kWh per year. This yielded a reduction in operating costs of \$1,236.22 per year or \$12,362.20 over 10 years. The \$9,645.14 invested in system improvements will be repaid through energy savings in 7.81 years, below the 10 year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF MT. DORA, FLORIDA

COUNTY SERVED:	Lake County
NUMBER OF CONNECTIONS:	5,142
MAXIMUM DAILY RATE/WITHDRAWAL:	4 Million Gallons Per Day
AVERAGE DAILY RATE/WITHDRAWAL:	3 Million Gallons Per Day
AGE OF SYSTEM:	Over 30 Years
RAW WATER SUPPLY:	4 Wells
STORAGE:	2 Half-Million Gallon Ground Reservoirs 1 Half-Million Gallon Elevated Tank
EMERGENCY POWER:	Diesel Powered Plant Generator

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated the system's equipment and operations and revealed the following:

The Mt. Dora water utility pumped an average of three million gallons per day at an average cost of \$90.37 per million gallons pumped. An average of 1,485 kWh is consumed per million gallons. The raw water is provided by four wells that pump to two half-million gallon ground storage reservoirs and to one half-million gallon elevated storage tank. Water treatment consists of aeration and chlorination. The chlorine residual entering the system averages 1.5 mg/L, resulting in a 0.2 level when the water reaches the system's customers. The distribution system is over 30 years old and consists of PVC, cast iron, ductile iron, galvanized, copper, poly tubing, and lead gooseneck taps. Flow tests were performed on the 10-inch distribution line that runs parallel to the 20-inch diameter main distribution line. The 10-inch line was found to be in need of cleaning. Since the 20-inch line has been in use over the same time span, it was assumed to be in similar condition and in need of cleaning.

The system's pumps alternate according to pressure fluctuations in the system. Customers have complained about low water pressure, which occurs during pump change over. Installation of variable speed drives on pumps A and B would enable the pumps to be sensitive to system pressure, thus alleviating the pressure fluctuation problem. Installation of premium efficiency motors with variable speed drive was recommended to replace two high service pump motors. Operating the new pump motors under a different pumping sequence would reduce energy consumption. A preventive maintenance program was recommended, along with proper metering of all pumps and motors. The altitude valve on the elevated tank was found to be in good condition. No pressure reducing valves are used in the system.

The City's wastewater reclamation facility services a population of 7,500 persons. The facility is a secondary activated sludge modification system using an oxidation ditch and is capable of treating 1.5 million gallons of wastewater daily. Treatment consists of a mechanical screen grit removal, oxidation ditch, clarifier, filter, chlorination, percolation, and irrigation pumping (direct water reuse). Replacement of the four brush aerator motors with premium efficiency motors was recommended. Cleaning of force mains was also recommended.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECMs) were recommended for Mt. Dora.:

Water System:

- 1: Replace motors at wells #3 and #4 with premium efficiency models.
- 2: Repair well #1 pump, line the column and sterilize the well.
- 3: Replace motors on the high service pumps A, B, and D with premium efficiency models and a variable speed drive (VFD) to run A and B.
- 4: Develop schedule for the A and B high service pumps to alternate every other day.

Wastewater System:

- 1: Clean force mains of three lift stations.
- 2: Replace four brush aerator pump motors with premium efficiency models.
- 3: Implement preventive maintenance program.

With respect to the water system recommendations, the City of Mt. Dora chose not to clean the water distribution lines and deferred the other recommendations to Phase II of the FEEWP. For the wastewater system, only the cleaning of the force mains was carried out under Phase I. The remaining energy conservation measures for the wastewater system will be implemented under Phase II of the project.

ENERGY CONSERVATION OUTCOMES

As a result of the force main cleaning provided through the FEEWP, the Mt. Dora wastewater system reduced its energy consumption by 86,550 kWh per year. This yielded a reduction in operating costs of \$5,798.85 per year. The \$42,677.00 invested in system improvement will be repaid through energy savings in 7.36 years, below the 10 year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF TRENTON, FLORIDA

COUNTY SERVED:	Gilchrist County
<u>WATER SYSTEM</u>	
NUMBER OF CONNECTIONS:	900
MAXIMUM DAILY RATE/WITHDRAWAL:	327,000 Gallons
AVERAGE DAILY RATE/WITHDRAWAL:	260,000 Gallons
AGE OF SYSTEM:	30 Years
RAW WATER SUPPLY:	2 Wells - Located Behind City Hall
STORAGE:	1 Elevated 7,500 Gallon Tank - Located 1/4 Mile Northeast Of The Wells
EMERGENCY POWER:	Kohler Power System Generator
<u>WASTEWATER SYSTEM</u>	
TYPE OF FACILITY:	Extended Air (Conventional)
PLANT CAPACITY:	200,000 Gallons Per Day
AVERAGE FLOW:	130,000 Gallons Per Day
TYPE OF AERATION:	Drop Pipe Assembly (Coarse Bubble)
TYPE OF SLUDGE REMOVAL:	2 Drying Beds (Land Application)

SYSTEM OVERVIEW

The preaudit conducted by TREEO evaluated the water and wastewater systems' equipment/operations and revealed the following:

This water system pumps an average of 26,000 gallons per day at an average cost of \$63 per million gallons. The raw water is provided by two wells that pump directly into the distribution system. Treatment consists of chlorination by direct injection into the distribution line as it leaves the pumping site. Chlorine needs contact time before it reaches the first customer. Lack of contact time can be a possible health hazard. The system needs to address this concern.

Well #1A yields water of poor quality as a result of an oil leak in the old oil lube pump shaft. For this reason, the well is used only as a standby during the summer when irrigation is necessary. Sanitizing well #1A should be considered if it is to be used at all since questionable levels of bacteria were identified during testing. By replacing well #1A pump and motor, including a pressure control switch, timer control, and a pressure test gauge (to keep the pressure switch calibrated), this smaller pump could be run during the night when demand is low, saving approximately half the run time of the larger horse-power pump.

Storage consists of one elevated tank with a 7,500 gallon capacity. The distribution system consists of unlined cast iron and PVC was found to be encrusted and in need of cleaning.

At well #1, the Florida Rural Water Association (FRWA) found the check valve to be leaking water back into the well at a rate of 20 gallons per minute. This means that 6,490,320 gallons per year had been going back into the well to be repumped and rechlorinated. Replacement of the check valve was recommended and the system implemented this repair.

Trenton's wastewater reclamation facility services a population of 1,500 and treats an average of 3.69 million gallons per month at an average cost of \$187 per million gallons. The wastewater facility is an oxigest unit. The flow is pumped to the wastewater plant by two lift stations. The raw waste enters the aeration tank, goes through the clarifier, then the chlorine contact tank, and, finally, into the percolation ponds. A return activated sludge unit recirculates the sludge for further digestion after which the sludge is pumped onto a drying bed for drying and removal.

Evaluation of the wastewater reclamation facility revealed a number of problems. The primary problem relating to energy consumption involved the aeration method. If the coarse bubble diffusers were retrofitted to become fine bubble diffusers, it would no longer be necessary to run more than one blower at a time. While the diffusers are being changed over, it would be advisable to replace the filters with pleated paper elements and install a pressure gauge with a gauge guard in the blower discharge to properly monitor the possible head loss. A differential gauge on each filter would determine when the filters need to be changed. The variable speed drive motor, which had not been in use, should be placed on the larger blower.

The wastewater system includes six lift stations which are in operation 12.5 hours per day. The rest of the time, the solids settle out and adhere to the walls of the pipe, restricting flow. This causes the pumps to work longer and harder than they are designed to do and uses more energy than necessary. In over 30 years of operation, the system has never been cleaned. The force main after the master lift station warrants line cleaning. Typically, the kilowatt per hour consumption can be reduced by 50% when the force mains leaving the lift stations are cleaned. Pigging the force main from the master lift station should be included in the preventative maintenance program on a periodic basis along with regular monitoring of the run times on the lift stations.

The preaudit also identified several problems with the wastewater facility that do not relate to energy savings. First, chlorine safety needs to be more carefully addressed. Second, the bearings that run the skimmer arm in the clarifier tank need to be repaired. Third, either more drying beds are needed to sufficiently dry the sludge before removal or another method of sludge removal (eg liquid hauling which is far less labor intensive) should be adopted. It is important for environmental reasons that the sludge be sufficiently dried before removal. Fourth, enforcement of the ordinance requiring grease traps would reduce problems resulting from grease-clogged lift stations.

ENERGY CONSERVATION MEASURES

The following energy conservation measures were implemented for the Trenton water and wastewater systems:

Water System

1. Replacement of check valve at well #1.

2. Replacement of motor on well #1, including timer control switch.
3. Replacement of pump and motor on well #1A, including the pressure control switch, timer control switch, pressure test gauge, bailing old lubrications from the well, and sanitizing the well.
- 4: Leak detection.

Wastewater System

1. Replacement of eleven coarse bubble diffusers with fine bubble diffusers, including ten extra diffuser heads.
2. Replacement of filters on blowers, placement of air filter restriction gauges on each filter, and installation of pressure gauge with gauge guard on the blower discharge.
3. Cleaning of the primary force main.
4. Installation of hour meter on the master lift station.

The recommendation to replace the check valve at well #1 was implemented by the City of Trenton at its own expense prior to the execution of the FEEWP contract. This improvement to the system saves 6,490,320 gallons per year from being repumped, conserving 7,052 kWh per year, at a savings of \$409.00. In addition, chemical bills are reduced since the water does not have to be re-chlorinated. In addition, 63,621 kWh per year were saved as a result of the ECM's funded under the FEEWP contract, saving the Trenton water system \$3,690.00 annually in energy costs.

Energy consumption by the wastewater facility was reduced by a total of 27,000 kWh/year (rounded) for a savings of \$1,600.00. Approximately 40% of this savings resulted from the force main cleaning and installation of an hour meter on the master lift station. Sixty percent of the energy savings at the wastewater facility was due to the replacement of eleven diffuser drop pipe assemblies and the related filter replacement and pressure gauge installation.

LEAK DETECTION

In August of 1993, the Florida Rural Water Association conducted a post water audit for the City of Trenton water system to determine the impact on water loss of the corrective measures performed in response to leak detection. The audit revealed that the leak detection and correction effort had reduced the 20.4% water loss to 8.2%. Through leak repairs and other water conserving measures, a 13,431,049 gallon per year loss was corrected. As a result, 13,431 kWh per year are saved, reducing

costs by \$765.00 annually. Over the years, this reduction in pumpage will not only provide a considerable energy savings, but will reduce chemical use, lower overall operating costs, and reduce the need for system expansion.

ENERGY CONSERVATION OUTCOMES

As a result of the energy conservation measures implemented through the FEEWP, the City of Trenton water and wastewater systems reduced their energy consumption by 94,204.70 kWh per year. An additional 13,431.05 kWh was saved as a result of the leak detection and repair effort. The combined total of 107,635.75 kWh saved yielded a reduction in operating costs of \$6,191.76 per year. The \$48,468.46 invested in system improvements will be repaid through energy savings in 7.8 years, below the 10-year payback required under the FEEWP.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

CITY OF SOUTH BAY, FLORIDA

COUNTY SERVED:	Palm Beach County
<u>WATER SYSTEM</u>	
NUMBER OF CONNECTIONS:	1350
MAXIMUM DAILY RATE/WITHDRAWAL:	1,001,000 Gallons/Day
AVERAGE DAILY RATE/WITHDRAWAL:	625,000 Gallons/Day
AGE OF SYSTEM:	Original: 32 Years Expansion: 12 Years
RAW WATER SUPPLY:	Surface Water
STORAGE:	Ground And Elevated Storage Total In Excess Of 1 Million Gallons
EMERGENCY POWER:	Gas Powered Plant Generator
<u>WASTEWATER SYSTEM</u>	
TYPE OF FACILITY:	Secondary Treatment Using Rotating Biological Contactor
DESIGN FLOW:	1.42 Million Gallons/Day
TYPE OF AERATION:	Rotating Biological Contactor Plant
AGE OF SYSTEM:	12 Years (1982)
NUMBER OF LIFT STATIONS:	9
POPULATION SERVICED:	3552 To 8000 (Seasonal)

SYSTEM OVERVIEW

The pre-audit conducted by TREEO evaluated the system's equipment and operations and revealed the following:

The South Bay Utility pumped an average of 625,000 gallons per day at an average cost of \$137 per million gallons. The raw water was provided by three pumps supplied from a rim canal of Lake Okeechobee. One of these pumps was out of service and being repaired. The treatment provided was aeration, flocculation, lime softening, settling, chlorination, filtering, and rechlorination. The treated water was then pumped directly into the system by the 125 hp high service pump #4, which had a back flow problem and has been corrected. High service pump #1 was used only 0.32 hours per day. High service pump #2 was very small and not used. High service pump #3 was originally connected to a gas engine and was making a grinding noise in the gear box, so was not used. In the system there was a 1,000,000 gallon ground storage reservoir and a 100,000 gallon elevated storage tank.

In order to keep the levels of trihalomethanes (THMs) down, chlorination prior to the water entering the clarifiers was no longer practiced. The clarifiers needed to be emptied and scrubbed once a month for algae. The rim canal pump motors, the high service pump motor #4, and the lime slurry pump motors will give an energy savings great enough to give a return on the investment of less than 10 years if replaced with premium efficient models.

The only altitude valve was located on the ground storage and did not work. Parts of the distribution system were over 30 years old, made up of cast iron, ductile iron, galvanized, copper, PVC, and poly tubing. The pipes exiting the high service pumps were 30 year old cast iron. The C values were low indicating the pipes needed to be cleaned.

The Wastewater Reclamation facility provided secondary treatment using rotating biological contactors. The treatment was primary clarification, biological contact (four trains with three rotating biological contactors per train), secondary clarification, effluent filtering, chlorination, and deep well injection. The sludge from the two clarifiers was repumped to the aerobic digester for further digestion, from there pumped into the drying beds. This type of operation is energy efficient. The only energy savings at this plant will be replacing the digester motor which runs 24 hours per day and replacing the blower motor which also runs 24 hours per day.

There were nine lift stations in the collection system. The force mains from four of these stations need to be cleaned. These are lift stations #1, #2, #6, and #9. The savings calculated are using conservative estimates. The utilities director said that they have access to a jet truck and will have it available to clean the gravity drops before and after the force mains are to be pigged. This will ensure that the gravity drops do not clog up during the pigging. Access points will be left available to allow the City to include regular pigging as part of the preventive maintenance program.

ENERGY CONSERVATION MEASURES

The following energy conservation measures (ECMs) were implemented for the South Bay Utility:

Water System

- 1: Replacement of three rim canal pump motors;
- 2: Replacement of two lime slurry pumps;
- 3: Replacement of motor on high service pump #4 with premium efficiency model;
- 4: Distribution line cleaning.

Wastewater System

- 1: Cleaning of force main #2;
- 2: Replacement of mechanical digester motor;
- 3: Replacement of blower motor.

The results of the implementation of the ECMs has yet to be determined due to tardy delivery and installation of equipment.

LEAK DETECTION

In May of 1993, the Florida Rural Water Association (FRWA) performed a post water audit for the City of South Bay. The post water audit is designed to analyze the water loss for the water system after a full leak detection effort has been performed and corrective measures have had an opportunity to show savings.

In South Bay, the leak detection effort reduced the 16.1% water loss to 2.4%. Through leak repairs, control/check valve repair and instituting other water conserving ideas and recommendations a 27,594,000 gallon-a-year loss was recovered. Over the years not only will this reduction in pumpage provide considerable energy savings, but other benefits such as lower chemical bills as well as other operational costs, and a reduced need for future expansion.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF PALATKA

ADDRESS OF SUBGRANTEE:
201 NORTH 2ND STREET
PALATKA, FLORIDA 32177

CONTACT PERSON(S)/TITLE:
ALLEN R. BUSH / CITY MANAGER

WORK TO BE COMPLETED UNDER CONTRACT:

- 1: LINE CLEANING;
- 2: PUMP MOTOR REPLACEMENT;
- 3: LEAK DETECTION.

COMMENTS BY SUBGRANTEE:

(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

The program was excellent. The city had difficulty getting assistance from the subgrantee, Putnam-Clay-Flagler Economic Opportunity Council

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?

YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?

YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEWP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 04/30/93

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JUL 28 1993
RURAL RESOURCES, INC.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEERP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF EUSTIS, FLORIDA

ADDRESS OF SUBGRANTEE:
10 NORTH GROVE STREET (32726)
POST OFFICE DRAWER 08 (32727-0068)
EUSTIS, FLORIDA

CONTACT PERSON(S)/TITLE:
CHIN KHOR / PUBLIC SERVICES COORDINATOR

WORK TO BE COMPLETED UNDER CONTRACT:
WATER: LINE CLEANING; SOLENOID REPLACEMENT; LEAK DETECTION;
HYDRANT REPLACEMENT.

WASTEWATER: PARTIAL PAYMENT FOR REPLACEMENT OF LIFT STATION #5
AND TWO TRANSFER POND PUMP MOTORS.

COMMENTS BY SUBGRANTEE:
(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING
SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR
IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES,
ETC.)

*This program is a big help to small cities for energy
saving. The program is very successful because of
excellent communication, cooperation and assistance
provided to the city. The program needs to cover
more on old motor replacement and increase the 10 year
pay back to 15 year pay back.*

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?
 YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?
 YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM
DIRECTOR, FEERP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE,
FLORIDA 32312, NO LATER THAN 05/16/93.

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MAY 13 1993

RURAL RESOURCES, INC.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF WEWAHITCHKA

ADDRESS OF SUBGRANTEE:
POST OFFICE BOX 966
GULF COUNTY, FLORIDA 32465

CONTACT PERSON(S)/TITLE:
D. GENE HANLON (MAYOR)
DAVID HINES (ADMINISTRATOR)

WORK TO BE COMPLETED UNDER CONTRACT:
FURNISH AND INSTALL 2 PEERLESS, 15 H.P., 3X3X8A IN-LINE HIGH SERVICE PUMPS WITH PIPING AND ELECTRICAL MODIFICATIONS TO FIT THE EXISTING PIPING AND ELECTRICAL CONNECTIONS.

COMMENTS BY SUBGRANTEE:
(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

The accomplishments are those described above as work to be completed under the contract. Substantial delays were caused in part by the difficulty of using three different funding sources to complete a major project. The technical assistance received from FEEWP was helpful, especially in the final weeks of the contract period.

Please provide additional information on the use of matching funds to assist certified low income individuals.

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?

YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?

YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEWP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 07/15/93.

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JUL 15 1993

RURAL RESOURCES, INC.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
GONZALEZ UTILITIES ASSOCIATION, INC.

ADDRESS OF SUBGRANTEE:
POST OFFICE BOX 314 / 1610 OLD CHEMSTRAND ROAD
GONZALEZ, FLORIDA 32560

CONTACT PERSON(S)/TITLE:
JOHN CASEY / LEAD OPERATOR

WORK TO BE COMPLETED UNDER CONTRACT:

- 1: INSTALLATION OF ALTITUDE VALVE;
- 2: RELOCATE EXISTING CONTROL AND TELEMETRY SYSTEM FROM ELEVATED SITE #1 TO ELEVATED SITE #2;
- 3: MODIFY CONTROL SYSTEM TO PROVIDE LEAD/LAG OPERATION AND AUTOMATIC ALTERNATION OF LEAD/LAG OPERATION;
- 4: REPLACE EXISTING 250 GPM PUMP AND 20 HP MOTOR AT WELL SITE #1 WITH 350 GPM PUMP AND 30 HP PREMIUM EFFICIENCY MOTOR;
- 5: REPLACE EXISTING 40 HP MOTOR AT WELL SITE #2 WITH A PREMIUM EFFICIENCY 40 HP MOTOR.

COMMENTS BY SUBGRANTEE:

(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

"See Attached"

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?

YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?

YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEWP, 1391 TIMBERLAKE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 04/30/93

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APR 20 1993

RURAL DEVELOPMENT

Gonzalez Utilities Assoc. Inc.

P.O. Box 314
Gonzalez, FL 32560
Phone 968-5434

Thanks to the Florida Energy Efficient Water Project, Gonzalez Utilities has improved it's overall system operations tremendously.

The areas of improvements were many and sometimes time consuming due to the degree of technical difficulty required for the implementations of the equipment and components installed to work in conjunction with one another for a complete system enhancement.

The installation of the altitude valve, relocation and modification of the control and telemetry system was a three fold effort to accomplish several goals within the same area of deficiency.

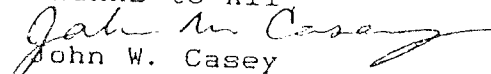
Prior to entering into the project, our Controls and Telemetry System was operated under original system design which did not allow for future improvements or expansion. We were unable to effectively control our additional 100,000 gallon storage tank, which was added to our system some years ago. We were also unable to control the lead/lag operations of our wells as we would have liked to. With these improvements we are now better able to utilize the full capacity of both our pumps and storage facilities.

The new pump and premium efficiency motor at Well #1 was a badly needed and much welcomed addition to our plant operations. Our old units were far from operating at their peak performance.

Overall I can't think of a better program of any kind that could have been as beneficial as this one. The input, advice and suggestions received by "all" parties involved has been greatly appreciated and a special thanks to the FRWA and TREEO Centers and their staff.

We are proud to have had the opportunity to participate in such wonderful program and will recommend it at every given opportunity.

Thanks to All


John W. Casey
Gonzalez Utilities Association

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF QUINCY

ADDRESS OF SUBGRANTEE:
404 WEST JEFFERSON STREET
QUINCY, FLORIDA 32351-2328

CONTACT PERSON(S)/TITLE:
KENNETH A. COWEN (CITY MANAGER)

WORK TO BE COMPLETED UNDER CONTRACT:

- WASTEWATER:
- 1: REPLACEMENT OF 2 PRIMARY EFFLUENT PUMP MOTORS.
 - 2: OVERHAULING OF 1 PRIMARY EFFLUENT PUMP MOTOR.
 - 3: REPLACEMENT OF 2 RETURN ACTIVATED SLUDGE PUMP MOTORS.
 - 4: INSTALLATION OF A VARIABLE SPEED DRIVE ON THE RETURN ACTIVATED SLUDGE PUMPS.

WATER: REPLACEMENT OF DISTRIBUTION LINES.

COMMENTS BY SUBGRANTEE:
(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

The above cite work was completed under this contract. We experienced some delay due to non-standard size pump motor requirements. Generally we feel that the program is well run and of great benefit to small communities.

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?
 YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?
 YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEWP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 07/15/93.

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MAY 1 1993

RURAL RESOURCES, INC.

FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEMP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF GRETNA, FLORIDA

ADDRESS OF SUBGRANTEE:
POST OFFICE DRAWER A / U. S. HIGHWAY 90
GRETNA, FLORIDA 32332

CONTACT PERSON(S)/TITLE:
JAMES CARTER / CITY MANAGER

WORK TO BE COMPLETED UNDER CONTRACT:
LEAK/HYDRANT REPAIR

COMMENTS BY SUBGRANTEE:
(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

The Leak/Hydrant Repair work is complete. The assistance received from Mrs. Nan Gilleland was most beneficial. She answered questions promptly and provided positive feedback.

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?

YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?

YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEMP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 05/10/93.

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FLORIDA ENERGY EFFICIENT WATER PROJECT (FEEWP)

NAME OF PRIME CONTRACTOR:
TRI-COUNTY COMMUNITY COUNCIL, INC.

ADDRESS OF PRIME CONTRACTOR:
301 NORTH OKLAHOMA STREET
BONIFAY, FLORIDA 32425

NAME OF SUBGRANTEE:
CITY OF MT. DORA

ADDRESS OF SUBGRANTEE:
POST OFFICE BOX 176 / 510 BAKER STREET
MT. DORA, FLORIDA 32757

CONTACT PERSON(S)/TITLE:
ROD J. STROUPE (PUBLIC SERVICES DIRECTOR)

WORK TO BE COMPLETED UNDER CONTRACT:

WATER: REPLACEMENT OF PUMP MOTORS.

WASTEWATER: REPLACEMENT OF BRUSH AERATOR MOTORS AND PIGGING OF FORCE MAINS INCLUDING SITE PREPARATION.

COMMENTS BY SUBGRANTEE:
(PLEASE DESCRIBE ACCOMPLISHMENTS, DELAYS, COMMENTS CONCERNING SERVICES RECEIVED, POSITIVE FEEDBACK, CONSTRUCTIVE INPUT FOR IMPROVEMENT OF THE PROGRAM, SUGGESTIONS FOR EXPANSION OF SERVICES, ETC.)

The pigging of the force mains (sewer) has been completed while we get off to a very slow and UNEASY start. The results appear to be good. The energy audit will have to concern this however I think it will turn out well. I wish that I would have read the agreement more thoroughly because it favored the contractor. *RD*

DO YOU WISH TO RECEIVE A CLOSE OUT REPORT ON YOUR SYSTEM?
 YES NO

DO YOU WISH TO RECEIVE A FINAL REPORT ON THIS YEAR'S PROGRAM?
 YES NO

PLEASE RETURN THIS INFORMATION TO NANCY H. GILLELAND, PROGRAM DIRECTOR, FEEWP, 1391 TIMBERLANE ROAD, SUITE 102, TALLAHASSEE, FLORIDA 32312, NO LATER THAN 07/15/93.

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