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Executive Summary

CITY OF RAWLINS WATER MASTER PLAN - LEVEL I

MAY 2010
RAWLINS MASTER PLAN
LEVEL I STUDY
- Executive Summary -

Submitted To:
STATE OF WYOMING
WATER DEVELOPMENT COMMISSION
6920 YELLOWTAIL ROAD
CHEYENNE, WYOMING 82002

THE CITY OF RAWLINS
PUBLIC WORKS DEPARTMENT
521 WEST CEDAR STREET
P.O. BOX 953
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Prepared By:

In conjunction with:

MAY 2010
Executive Summary

1 GENERAL
This document briefly summarizes information and recommendations presented in subsequent chapters of the Rawlins Master Plan – Level I Study.

2 EXISTING SYSTEM
The City of Rawlins obtains water for municipal use from three sources which is stored in three large reservoirs upstream of the water treatment plant. The water treatment plant filters and treats the water to compliance with EPA primary and secondary water quality standards. Upon leaving the water treatment plant, finished water is collected in four storage tanks which feed the City’s two pressure zones.

The City of Rawlins three water supply sources are 14 springs located in the upper Sage Creek Basin, three Nugget Formation wells located approximately 14 miles south of the City, and the North Platte River from its diversion facility near the Town of Sinclair. The water from all three sources is treated at the City’s Water treatment plant which utilizes diatomaceous earth filters as a means of mechanical filtration and chlorine gas for disinfection. Incorporated in and critical to the operation of the City’s water supply system are a series of three earthen reservoirs – Rawlins Reservoir, Atlantic Rim Reservoir, and Peaking Reservoir. Figure 1-1 illustrates the major components of the Rawlins Water System.

The Sage Creek Basin springs have been in use since 1924. Water from the springs is collected in a series of collection pipelines located approximately 23 miles south of the Water treatment plant. The Sage Creek Pipeline runs between the Rawlins Reservoir and the Water treatment plant and consists of 20-inch and 24-inch steel pipeline. This pipeline conveys up to 6.92 CFS (3,100 GPM) of water from the 14 springs in the Sage Creek Basin and up to 2.0 CFS (900 GPM) from three Nugget Formation Wells. The Nugget wells (Nos. 1, 2 and 3) are artesian wells that were completed in the mid-1980’s and had initial flows ranging from 350 GPM to 900 GPM (after stimulation).

The City of Rawlins currently has water rights on the North Platte River for 2.01 cubic feet per second (CFS) which was acquired from the Union Pacific Water Company. The Union Pacific Water Company originally had water rights for 2.32 CFS, but opted to retain 0.31 CFS for railroad and domestic use. In 2002, the Town of Sinclair transferred 1.0 CFS of territorial water rights on the North Platte River to the City of Rawlins and bestowed to the City of Rawlins an additional 1.21 CFS of their water rights on the North Platte River. In exchange, the City of Rawlins agreed to deliver up to 1.21 CFS of potable water to the Town of Sinclair as well as construct and maintain any pipelines and facilities associated with the delivery of water to the Town of Sinclair. The North Platte River Pipeline conveys water from the North Platte River Pump Station to Peaking Reservoir. Midway in the pipeline is a diversion to the Rochelle Ranch Golf Course to provide raw water for irrigation. Water must be boosted at Thayer Booster Station in order to reach Peaking Reservoir. Water from the North Platte River is subject to unpredictable turbidity from seasonal or climatic changes and is used only to supplement water from the Sage Creek Springs Pipeline.
In order to fully utilize the water from the Sage Creek Basin springs, a series of reservoirs were constructed and incorporated into the system. The first of these was the Rawlins Reservoir which was permitted in 1955 for 624 acre feet of water. Rawlins Reservoir is located about 4 miles upstream on Sage Creek from Highway 71 approximately 25 miles south of the city. Water can be conveyed from Rawlins Reservoir to the Water treatment plant through the Sage Creek Pipeline. The second reservoir constructed was the Peaking Reservoir which is located approximately 0.25 miles southeast of the water treatment plant. Peaking Reservoir was permitted in 1966 and is appropriated for 346.66 acre feet of water. The reservoir is primarily filled via the Sage Creek Pipeline, but can also accept water from the North Platte River. The last reservoir, and the most problematic, is the Atlantic Rim Reservoir. Atlantic Rim Reservoir was permitted in 1978 for 644.5 acre feet of water. The reservoir is located along Highway 71 approximately 2.25 miles south of the water treatment plant. The reservoir is filled via the Sage Creek Pipeline. The reliability, usability, and sustainability of the Atlantic Rim Reservoir have been in question for many years because it has leaked since its construction.

3 SERVICE AREA, POPULATION PROJECTIONS, AND DEMAND

As part of this study the City of Rawlins service area was identified, population projections were developed, and current and future demand for the City of Rawlins and the Town of Sinclair were identified and/or calculated. The service area for this study includes the incorporated and unincorporated areas of Rawlins currently served by the water supply and distribution system. Additionally, the incorporated and unincorporated areas of the Town of Sinclair are also included in this study since they have an agreement with the City of Rawlins for finished water from Rawlins’ treatment facilities in exchange for the use of the Town of Sinclair’s water rights to the North Platte River.

The City of Rawlins, Town of Sinclair, and Carbon County population forecasts from: 1) the Economic Analysis Division of the Wyoming Department of Administration and Information (WDAI), and 2) past water master plan reports. The developed population growth rates were then used to estimate the future water demands for the service area.

There are a number of external factors that may influence the future population of the City of Rawlins and thus it was decided to pursue a model that shows a moderate growth rate for the City of Rawlins. The population model was developed using the historical population data (Census, City and County records) and the information from the WDAI while taking into account the known external factors that will have a significant impact on the City of Rawlins’ population. These external factors include nearby construction and energy development projects in the area as well as adjustments to the U.S. Census data to better correspond to the utilities use by residents as monitored by the City of Rawlins.

The baseline model uses data from the U.S. Census Bureau for the population of Rawlins in 1970, 1980, 1990, and 2000. Between 2001 and 2007, the populations are as estimated by the WDAI for the City of Rawlins and the Town of Sinclair. Current projections from the WDAI show the population declining which is unlikely to occur with the potential development from the energy industry. For the purpose of forecasting, the WDAI’s forecast for the state of Wyoming was utilized to forecast the population of Rawlins, which averages to 0.8% population increase per year between 2009 and 2020. The forecast data between 2009 and 2020 was extrapolated out to the year 2038.

The projections for the City of Rawlins and Town of Sinclair are summarized in Table 3-5 and are shown graphically in Figure 3-3.
Finished water production provided by the City was used in conjunction with population estimates to determine the average daily water usage per person. Between 2003 and 2008, usage has averaged 201 gallons per capita per day (GPCD). Rawlins’ water usage typically peaks in July due to increased residential and municipal irrigation. The peak monthly usage to average day ratio is 1.91 between the years of 2003 and 2008. This figure also corresponds well to the previous ratio calculated by JMM at 1.88 (JMM, 1983). WWC did not calculate this figure, but recalling their peak month usage of 391 GPCD and average day usage of 206 GPCD would result in a ratio of 1.90. The average peak day usage to average day usage ratio is approximately 2.16.

Future demands for the Rawlins water were estimated using the future population projections and average usage figures. Average daily demand on the water system is projected to increase from 2.2 million gallons per day (MGD) to 2.9 MGD. Peak month usage is expected to increase from 4.2 MGD to 5.5 MGD and peak day usage will increase from 5.7 MGD to 7.5 MGD. The latter two figures were calculated from peak month ratio and peak day ratios described previously. The estimates are summarized in Table 3-9 and shown graphically in Figure 3-4.

### Table 3-9
**Future Demand Projection 2008 - 2038**

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Avg. Day Demand (MGD) @ 200.8 GPCD</th>
<th>Peak Month Usage (MGD) @ 1.91 Ratio</th>
<th>Peak Day Usage (MGD) @ 2.16 Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>10,922</td>
<td>2.2</td>
<td>4.2</td>
<td>4.7</td>
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<td>13,591</td>
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<td>2012</td>
<td>13,915</td>
<td>2.8</td>
<td>5.3</td>
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</tr>
<tr>
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<td>13,582</td>
<td>2.7</td>
<td>5.2</td>
<td>5.9</td>
</tr>
<tr>
<td>2014</td>
<td>13,568</td>
<td>2.7</td>
<td>5.2</td>
<td>5.9</td>
</tr>
<tr>
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<tr>
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<td>2035</td>
<td>13,996</td>
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<tr>
<td>2038</td>
<td>14,418</td>
<td>2.9</td>
<td>5.5</td>
<td>6.3</td>
</tr>
</tbody>
</table>

### Figure 3-4
**Future Demand Projection 2008 - 2038**

4 WATER SUPPLY

This study reviewed the use, availability, reliability, and operations of the water sources currently in use by the City of Rawlins and identified and discussed the system deficiencies and presented recommended remedial actions for deficiencies. The deficiencies identified were:
1) **Atlantic Rim Reservoir Leak** - The Atlantic Rim Reservoir has leaked since it was first constructed in the early 1980s. Several studies have been conducted to evaluate the seepage from the reservoir. Some of the early studies suggested lining the reservoir with a synthetic liner, but this was never done due to cost.

2) **Adequate Raw Water Storage** - From previous studies it was demonstrated that the City could meet their water demand by solely pumping from the North Platte River. Unfortunately, the water treatment plant is designed to treat the water from Sage Creek Basin which is very low in turbidity and total dissolved solid. A mass balance study was conducted on Peaking Reservoir identified that additional storage beyond just the Peaking Reservoir is required in the system. The excess flows from Sage Creek Basin can either be stored in Atlantic Rim Reservoir or a new reservoir constructed to replace Atlantic Rim Reservoir.

3) **Atlantic Rim Reservoir to Water Treatment Plant Pipeline** - The 18-inch A.C. (asbestos cement) pipeline spans nearly 13,000-feet between Atlantic Rim Reservoir and the water treatment plant, and has seen an increased number of operational and maintenance issues over the last several years. The pipeline has consistently proven unable to withstand the high pressure as there is a failure of the pipeline almost every time the pipeline is valved off at the water treatment plant. The City avoids closing the valve on this pipeline in anticipation of a failure. The pipeline is also a bottleneck in the system as it is undersized for the rating of the Sage Creek Pipeline.

4) **Nugget Wells Declining Yield** - The actual capacity of the well field is dependent upon backpressure applied to the wells and how aggressively they are utilized. At the time of construction, production of the wells was projected to decline due to interference between the wells, turbulent losses associated with the flow from each well, and back pressure imposed on the wells from the transmission pipeline. In 1997, the shut-in pressure on the wells was tested at 100 PSI, a 40 PSI reduction since construction.

5) **Use of Raw Water for Irrigation** - The City of Rawlins currently utilizes a great deal of finished water to irrigate the City’s parks and cemetery. Under current operation, the City irrigates a total of 50 acres at these two facilities, and at this rate, the City of Rawlins likely distributes 1.35 MG of finished water every week to these two facilities alone. This could increase to 1.90 MG each week if the cemetery is expanded to full capacity.

6) **Water Treatment** - A very cursory evaluation was made of the treatment plant to determine if the facility used to house the Actiflo system could be adapted for pre-treatment of the water prior to going to the diatomaceous earth filters in the water treatment plant. An immediate solution was not obvious. But simply installing screens to remove the daphnae and shrimp from Peaking Reservoir would be a great help.

7) **Optimal Use Raw Water Sources** - The City currently utilizes water from the springs in the Sage Creek Basin, the Nugget Wells, and the North Platte River. Additionally, this report identifies a fourth source, resurrecting the cemetery and penitentiary wells for raw-water irrigation of City-owned facilities. All of these sources are constrained by issues with water quality, yield, seasonal influences, pumping and treatment costs, filtration, and potability. The City also uses earthen reservoirs for storage of raw water for use during peaking periods. The reservoirs also offer the potential for detention and settling as well as blending of various sources. An operational study should be completed to ensure that the City utilizes existing water sources effectively and in compliance with future regulation of the North Platte River.
5 DISTRIBUTION AND GIS

After the water is treated at the Rawlins water treatment plant, it is conveyed to the City via two pipelines. The City has a low pressure zone and a high pressure zone, and there is a 12-inch pipeline that feeds the low pressure zone and a 20-inch pipeline that services the high pressure zone. Tied onto the pipeline feeding the low pressure zone, are two 7.5 million gallon reservoirs known as the Tank Farm. There are two storage tanks that service the high pressure zone. The first of these tanks is the hospital tank situated on the east side of City with a capacity of 1 million gallons and the second, the Painted Hills tank, is situated on the north side of City and has a capacity of 3 million gallons.

The water system was modeled using the H2ONet modeling program. The computer modeling showed the operational capacity of the distribution system to be in fairly good shape. A few deficiencies were identified. It was noted when looking at the diurnal cycle in the development of the model that the tank levels at the Tank Farm varied very little during the course of the day. Part of this is due to the fact that the tanks float on the system and if sufficient water is coming from the water treatment plant there is no need to take water from storage. Also, the tanks run in parallel so that water is added and removed from each tank simultaneously. The piping to the tanks needs to be modified so that they can operate in series or independently from each other so that the water goes through one tank and then into the second tank. The distribution system modeling also showed the need for a third pressure reducing station to allow the flow of water from the high pressure zone to the low pressure zone at Spruce and Pine Streets.

In addition to the development of the computer hydraulic model, the scope of the project called for the compilation and integration of a complete Geographic Information System (GIS). At the beginning of the project, spatial data relevant to the City’s water system was collected. Data collection was performed using Magellan Professional Mobile Mapper CE GPS units rated to submeter accuracy. Approximately 200 data points across the City, including several fire hydrants, as well as major water system facilities (wells, springs, diversion structures, water treatment plants, storage tanks, pump stations, etc.) were collected. Digital photographs were taken at these major system components and were linked to their relevant GPS locations.

6 ECONOMIC ANALYSIS AND WATER SYSTEM FINANCING

The City of Rawlins’ finances as they pertain to their water system were examined and revealed that for fiscal year 2008-09 there was a budget forecast shortfall of $239,743.00 between revenues and expenses (revenues of $1,692,650 and expenses of $1,932,393). Actual revenues and expenses turned out to yield a $178,082.23 surplus (revenues of $1,698,811.68 and expenses of $1,522,729.31). The practice of understating revenues and overstating expenses when assembling the water department budget appears to have occurred for many years and is ongoing. This is not a recommended practice. In addition to the financial status review, recommendations for water rates adjustments and financing structures were made.

The City of Rawlins currently categorizes their 3950 water customers into twelve types. Even though the City classifies users into twelve categories, the basic rate structure is simple. The City has two components to its water charge. The first is an availability fee which is flat rate of $14.00 per month. The second is a $2.00 per thousand “commodity charge” for water used. The same flat monthly fee is charged to all water customers, with two exceptions. Users “Outside Corporate Limits” pay $2.70 per thousand gallons. Construction water users in town pay $5.00 per thousand and out of town pay $10.00 per thousand. The Town of Sinclair, which is a consecutive public system, is not required to pay the standard base $14.00 per month. Based on a negotiated agreement between the two towns, Sinclair is billed at 62.5% of the standard
rate, or $1.25 per thousand gallons, for water consumption. The other exception to the standard rate structure is the Glenn Addition, otherwise known as the “corrals.” This city-owned area on the south side of Rawlins provides an area for people to keep horses in town. Corral pens are not metered. Each account is simply charged a flat monthly rate of $10.00. One master meter measures the total water usage to the corrals so the City can account for the amount of water used.

As of December 2009 the city does not have a tiered rate for the commodity portion of its water use fees. In April 2009, Rawlins raised their base water rate to $14.00, which previously was $10.00 per month. This was done in anticipation of the need to begin making payments on their WWDC loan for the Sage Creek Project. With just under 4,000 accounts, not including City-owned accounts, the base fee now raises approximately $190,000 per year of additional revenues over the previous rate.

The City of Rawlins’ water accounting system was also reviewed. Water accounting is similar to financial accounting in that it simply means tracking amounts of water as it moves through the collection, treatment, and sale cycle. During the most recent year for which we have data there was an inordinately high percentage of finished or treated water lost from the system. According to metering information, the City’s treatment facility produced over 805 million gallons of potable water during FY2008. However, during that same period point-of-use meter readings totaled only 552 million gallons billed to customers. This means that 253 million gallons, 31% of the potable water produced at the Rawlins treatment plant, was lost as non-revenue water. Part of the disparity can be explained by incidents for which the losses are known or can be estimated. Still, losses exceeding 10% in a municipal system are considered excessive.

In addition to the finished water, Rawlins also experiences a significant loss from their raw water sources. The City is only able to compare the total raw water produced against the total water treated at the plant. Data kept since 2003 indicates that only approximately 80% of the raw water collected annually makes it into the system as finished water.

7  SYSTEM IMPROVEMENTS
The major component of this study is to identify areas of improvement that are beneficial for all aspects of the water system. These include system improvements, operational improvements, and managerial improvements. The improvements identified are summarized below. The projects are summarized here in the order of precedence.

1) Replace the Pipeline Between Atlantic Rim Reservoir and the Water Treatment Plant Pipeline and Construct a Booster Station to Deliver Water from the North Platte River to Atlantic Rim Reservoir - Based on WWDC’s recommended scope, the replacement of the main pipeline was estimated at $3,024,484 and the construction of the booster station was estimated at $858,521 for a total of $3,883,005. The WWDC has requested money from the legislature in the amount of $3,883,005. The WWDC has requested money from the legislature in the amount of $3,900,000 for the project. Of this, $2,613,000 will be in grant form and the remaining $1,287,000, or 33% of the total funding package, will be a loan at 4% interest over 30 years.

2) Atlantic Rim Reservoir Rehabilitation - As a cost-effective alternative, this report proposes to install an impermeable liner in the reservoir which would mitigate all leakage. This improvement is also considered a top priority and the WWDC has also commenced the process of appropriating funds for the rehabilitation of Atlantic Rim Reservoir. The WWDC has requested money from the legislature in the amount of $4,000,000 for the project. Of this, $2,680,000 will be in grant form and the remaining $1,320,000, or 33% of the total funding package, will be a
loan at 4% interest over 30 years. The funds include appropriations for the main pipeline replacement and the booster station as well as replacement/remediation of the existing line to be used as a transmission line from the booster station to Atlantic Rim Reservoir. This project comes as a substantial savings compared to decommissioning Atlantic Rim Reservoir and constructing a new reservoir, which was estimated at $16,500,000.

3) **Investigate the Cemetery and Prison Wells for Irrigation Use and Develop a Water Source and Raw Water Storage Reservoir Operational Plan** - The addition of a raw water irrigation system sourced by two non-potable wells located within City limits would reduce the demand and associated costs of the water treatment plant. Costs were developed for the investigation of the wells, the preparation of a Water Source and Raw Water Storage Operational Plan, and for connecting the wells to the cemetery and nearby parks. The budget for the investigation of the wells and the development of an Operational Plan is $115,000 and the total cost to connect the wells for irrigating said facilities is $712,524. The investigation of the wells and development of the operational plan should be completed by the year 2011.

4) **Paint the Tank Farm Tanks** - The interior and exterior coatings of the Tank Farm Tanks are due for replacement. The hospital tank and the Painted Hills Tank have been recently completed. The coating will protect the tanks from corrosion both on the interior and from weathering on the exterior. The cost to repaint both of the tanks is estimated at $2,059,401. The tanks should be painted by the year 2013.

5) **Install Second Looping Line to North East Rawlins Distribution Area** - The northeastern section of Rawlins is currently fed from a 16-inch main that runs east from the Painted Hills Tank. The only additional connection to the area is a single 6-inch main. In the event of a failure in the primary connection, the area would suffer significantly. The improvement consists of installing an additional 12-inch main that connects the area along Inverness Boulevard. The cost of the project is estimated at $366,757. This cost assumes that a portion of the project cost can be borne by the developer of the proposed subdivision between Higley Boulevard, and Harshman Street. The cost will be higher if the City must install the entire pipeline without cooperation from a developer. This line should be completed by the year 2013.

6) **Install Interconnect and PRV Across Pressure Zones at Intersection of 15th Street and Spruce Street** - The system modeling effort identified a low pressure condition that can occur during certain parts of the day in the eastern part of town. This improvement essentially constructs a 12-inch pipeline that serves as an interconnection between the high and low pressure zones. The estimated cost of the improvement is $386,205. This improvement should be implemented by the year 2015.

7) **Install Booster Pumps at Miller Hill Vault** - The Nugget wells have decreased in production over time. By installing a booster station downstream of the three wells, the back pressure imposed on the wells will be reduced and will increase production. The estimated cost for adding booster pumps to the Miller Hill Vault is estimated at $475,848. This improvement should be completed by the year 2018.

8) **Install Raw Water Lines to Cemetery and Prison Wells** - This improvement is a follow-up to the investigation of the cemetery and penitentiary wells described previously. If the wells prove sufficient and are economic to bring into production, then it is recommended to construct the necessary infrastructure to provide raw water to the cemetery and nearby parks. This improvement consists of the construction of two small well houses, the installation of well pumps, pipelines connecting to the facilities to be irrigated, and raw water isolation equipment.
The estimated cost to install the required infrastructure is $712,524. This improvement should be implemented by the year 2018.

9) **Install Screens on the Inlet of the Water Treatment Plant** - The water treatment plant must backwash their diatomaceous earth (DE) filters periodically to maintain filter efficiency. It is recommended to install screens on the inlet works of the Plant to increase the DE filter cycle times. The cost to conduct the study and install the screens will be approximately $100,000. This improvement should be implemented by the year 2020.

10) **Construct Raw Water Pipeline and Booster Station From the North Platte River Pipeline For Irrigation** - An alternative to utilizing the cemetery and penitentiary wells for irrigation purposes would be to utilize water from the North Platte River Pipeline. This improvement consists of installing a small booster station near the proposed connection to the North Platte River Pipeline and approximately 2.5 miles of pipeline. This improvement should be considered as an alternative or supplement to the use of the cemetery and penitentiary wells. At this time, it appears that the use of the cemetery and penitentiary wells is a more cost-effective option and therefore this improvement is not recommended at this time. The estimated cost to install the required infrastructure to irrigate the parks and cemetery with water from the North Platte River is $858,521.

### 8 OPERATIONAL IMPROVEMENTS

Overall the City of Rawlins does an excellent job running their system. Their priority is to use the water from Sage Creek Basin which has the highest quality and lowest cost to use. The City is using raw water from the North Platte River to irrigate the new golf course which is the cheapest means of providing irrigation water to that facility. There are only a few small recommended modifications.

1) **Increase use of the Nugget Wells** - In view of the benchmarks established during the development of the Platte River Recovery Implementation Program, a program for use of the wells should be developed in conjunction with the State Engineer’s Office to make the best use of the wells. It may mean using the wells in the non-irrigation season to avoid exceeding the benchmarks established for the non-irrigations season to get the credit for the groundwater accretions to the North Platte River. The depletions and benchmarks are complicated and development of a program of usage with the State Engineer’s Office would be the best way to approach this issue.

2) **Develop Reservoir Operation Plan** - A reservoir operation plan should be developed to keep the water in Rawlins Reservoir as fresh as possible. Also, aside from the North Platte River depletions and benchmarks, it was determined that if Peaking Reservoir is kept full at May 1 of each year, even with the record low flow from the Sage Creek Basin, the City can meet the future demand through pumping of the North Platte River. The City should try to make sure that the combined storage of Peaking and Atlantic Rim Reservoirs meets or exceeds the storage capacity of Peaking Reservoir on May 1 of each year.

3) **Reconfigure Tank Farm Inlet and Outlet Piping** - The inlet and outlet piping at the Tank Farm tanks should be reconfigured so they do not function in parallel. The piping needs to be re-arranged so that water will flow into one tank, then into the next tank prior to going into town. This will require very little piping and help assure a good turnover in the two tanks.
4) **SCADA System Training** - The water treatment plant personnel should receive additional training on their SCADA system so the can better access the data being collected.

5) **Activate In-Town Wells** - Consideration should be given to re-activating the penitentiary and cemetery wells in the future. This will alleviate some of the demand from the water treatment plant during the summer months and help keep the City below the benchmarks established in the Platte River Recovery Implementation Program.

9 **MANAGERIAL IMPROVEMENTS**

The economics and management practices of the water system were reviewed to identify practices that can be improved. The goals are to ensure that the Water Department provides fair water rates to the City subscribers while generating the revenues to operate the system in a fiscally sustainable manner including funding for preventative maintenance and future improvements. While the Rawlins system is in sound financial condition, there are improvements that can be made in the approach Rawlins uses in water accounting and budgeting for the system. Those are discussed in the following sections.

1) **Water Accounting** - Rawlins currently produces an unacceptably high amount of nonrevenue water, water that is filtered and treated by the water plant but does not go through a meter for billing or other accounted-for use such as watering of city parks. Currently the city is accounting for only 69% of its produced water, 552 million gallons of the 805 million produced. Rawlins needs to improve its water accounting practices. An acceptable system loss percentage is generally considered to be 10% or less. Rawlins is at 31%.

Raw water losses are of less concern than is produced water because its cost to the city is significantly lower and there is less the City can do that will cost effectively reduce those losses. Leakage from the reservoirs and evaporation losses are normal. Measures are being planned to cost effectively reduce some of those losses.

2) **Water Rates** - Rawlins present system of charging for water service is generating sufficient revenues to meet present needs. Out-of town users are charged a slightly higher water use rate than are in-town users. The cost of produced water is $2.50 per thousand gallons based on City cost data. This should be the rate charged for any usage. Base rates will have to increase several-fold for Rawlins to meet financial obligations if the recommended system improvements are to be made. If the City is to make the identified improvements and the system is to remain fully self-supporting, base water rates are forecast that need to be approximately $190 per month plus the $2.50 per thousand gallon water use charge in just nine years, 2018.

If the City makes the identified improvements and the present funding assistance programs are used to their fullest, base water rates are forecast that need to be $75.40 plus the $2.50 per thousand gallon water use charge by 2018.

3) **Budgeting** - Rawlins’ historical practices in budgeting for the water system can be characterized as overstating forecast revenues and understating forecast expenses. It is recommended that each upcoming year’s budget be based on the year-to-date expenses and revenues rather than on the last year’s budget as is now being done. This will result in a tighter, but more realistic water department budget. Also, during the budgeting process, the draft budget needs to show actual reserves in the water account. Present practice is to show as “Beginning Balance” a significantly smaller number that is sufficient to force a balanced budget.