Coachella Valley Water Systems Assessments
Executive Summary ❖ March 2010

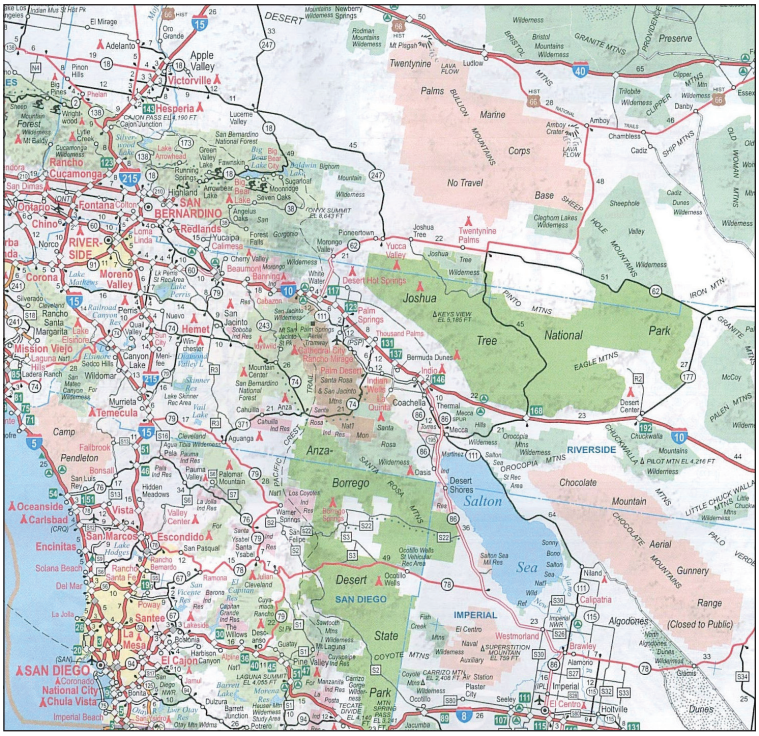
Introduction

Rural Community Assistance Corporation (RCAC) conducted four drinking water and wastewater system assessments on small water and wastewater systems located in the Coachella Valley. The intent of this report is to provide Poder Popular and its targeted communities with a comprehensive technical review and assessment of the drinking water and wastewater systems.

This report was prepared by RCAC on behalf of Poder Popular. RCAC employs certified water operators as technical assistance providers to assist rural utilities with a variety of issues, including regulatory compliance. RCAC is not an engineering organization, nor is it a regulatory agency. All findings within this report were based on the available data at the time of the assessments.

Regional History and Background

The Coachella Valley is a large valley landform within Riverside County of Southern California. Surrounded by the San Bernardino Mountains, Santa Rosa Mountains, San Jacinto Mountains and the Salton Sea, the Coachella Valley is an agricultural and recreational desert valley. This valley is part of the 14th largest metropolitan area in the United States, and is also known as the Inland Empire.



Within the Coachella Valley lies the city of Coachella. Coachella is a rural, agricultural, family-oriented community known as the "City of Eternal Sunshine." In 1876, the Southern Pacific Railroad built a rail siting in Coachella. In the 1880s, the indigenous Cahuilla tribe sold their land to the railroads for new lands further east. In the 1890s, hundreds of "traqueros" (Mexican and Mexican-American railroad track workers) settled along the tracks. In the 1950s, Coachella began to expand into its present range of approximately 32 square miles. This area contains large corporate year-round citrus and date palm farms. To this day, these farms remain the heart of the local economy.

According to a 2006 California State-funded economic survey, Coachella ranks the third lowest in average personal income for any California city. These tough economic conditions make it difficult for public drinking water systems in Coachella to comply with Federal, State, or local regulatory requirements. Many systems are not regulated or permitted.

Drinking Water Systems Overview

The four drinking water systems that were assessed by RCAC were all single water source, community systems located within mobile home parks. These are low-income, agricultural communities. Each community that was assessed had access to power and water. All four community drinking water systems will be generally described in the next few sections. For more detailed descriptions of each system, please refer to the survey reports included with this document. These survey reports contain system descriptions and lists evaluated deficiencies, with potential solutions and recommendations for each deficiency.

Drinking Water Source

The drinking water supplies at all four systems are groundwater systems, using pumps for extraction. Each community has a single water source with no backup supply for the entire community. Due to each community having populations of less than 10,000 people, all of the public drinking water systems would be considered small or very small systems. All qualify as Public Drinking Water System (PWS) as defined in the Safe Drinking Water Act (SDWA) and thus must conform to all applicable drinking water standards.

The well design for each community assessed varied. One issue observed was that none of the communities had well logs, preventing water system operators from having vital system information. An example of this would be, not knowing if a well has an annular sanitary seal that meets legal requirements. Many wells in agricultural communities have developed "ag wells" that do not have these seals, since agricultural wells are not required to have annular sanitary seals. However, often these "ag wells" eventually find themselves being used within a public water system. In a public water system well, the proper seal is important to prevent contamination from entering between the well casing and the bore hole, and subsequently entering the public water system.

Other common deficiencies found were that all wells lacked vents installed on the well cap. Vents allow the well casing to breath as the draw down air enters the casing, and as the recovered moist air is forced back out of the casing. Not having vents forces the breathing process to either take place through electrical conduits or bad seals. When moisture is expelled through these other means, a corrosive environment in the electrical control system can occur. This can damage electrical wires and controls leading to premature failure, expensive repair costs and a greater risk of contamination.

Not all wells were equipped with pressure-relief valves. These pressure-relief valves allow water to flow to the atmosphere should the pump not be able to move water out into the system. This condition usually occurs when a pump is pushing against a deadhead caused by a discharge valve being closed. *[Note that submersible pumps are water cooled and if water was not circulating around the pump motor, heat would build up, either causing pump fail or damage to the pump.]*

Most of these issues would be fairly easy to address, with the exception of the annual seal. Should an annular seal be determined to not be adequate, an engineer should be contacted to assist with correcting the situation.

Water Quality

One major problem noted during the assessments was the arsenic concentrations within the drinking water supply exceeded the maximum contamination limits (MCL) as determined in the Safe Drinking Water Act. The current MCL for arsenic is 10 parts per billion (ppb). Although the concentrations varied between communities, each community was out of compliance regarding arsenic concentrations. As a result, most of these systems are required to monitor quarterly. This increases the operational costs of the drinking water systems as the arsenic testing costs are high. More importantly, the public's health is at risk when this contaminated water supply is ingested for prolonged periods.

There are different solutions to lowering these high arsenic concentrations to acceptable levels. Arsenic can be treated by using chemicals and filters. These options are expensive and operating costs can be high. One way to lower operational costs is through regionalization, where these costs are minimized through economies of scale. Another solution is to have water delivered to the community and stored in tanks. This option may be the most cost effective solution for some of the communities.

Another alternative may be to blend, or mix drinking water that has lower or no arsenic concentrations, with the community's higher arsenic level ground water supply. With the proper blending calculation, a community may be able to create a blended water supply with an acceptable arsenic concentration. Each community is different and what works for one community may not necessarily work for another. It is important for the communities to include all costs, including ongoing operation and maintenance, associated with each option.

The major problem involving arsenic compliance for these low-income communities is the high costs associated with arsenic treatment. Technologies, although readily available, are extremely expensive. These (mainly agricultural) communities are too small and the income levels too low to be able to readily invest in these expensive technologies. One option to the capital expense issue could be through the use of low-interest loans, or possibly grants.

Drinking Water Treatment

While assessing the existing drinking water treatment in these communities, there were some commonalities. Continuous chlorine residuals were not maintained throughout any of the distribution systems. Groundwater, which was being used in all of the assessed communities, is typically free of bacteria when it is pumped from the ground. However, distribution systems and/or poorly constructed wells have the potential to allow contamination to enter the water supply. This raises the need for chlorine residuals in distribution systems.

Chlorine is a disinfectant that will continue to disinfect when present. Although water can stay free of bacteria in distribution systems without chlorine, the potential for contamination is much higher than a system that continuously chlorinates. Sodium hypochlorite, or calcium hypochlorite, are common chemicals used to achieve water system disinfection with in a public water system. The capital expense is normally several thousand dollars. Operator training on proper use is not difficult.

While some of the communities tested their water supply for bacteriological activity on a monthly basis, some of the communities did not. This is an important step in monitoring and maintaining the integrity of the drinking water system. When a program is set up to monitor the presence of bacteria in the drinking water supply, a Site Sampling Plan must be created to provide anyone who may need to collect the samples with the proper location to take the water sample. Site Sampling Plans are required for all public water systems.

Hydro-Pneumatic Tanks

Most of the assessed drinking water systems used hydro-pneumatic tanks to maintain the water distribution system's pressure. The tanks that were in use were operating properly during the time of the assessment. One of the common problems associated with these tanks was the lack of level indication. Hydro-pneumatic tanks are usually supplied with a sight tube that lets the operator know the water and air levels within some of the tanks. Additionally, most of the tanks did not have pressure relief valves. These valves protect pressurized tanks by allowing air to escape when the pressure in the tank gets too high. There are other means of keeping the water to air ratio correct. Two simple methods include:

1. Pouring warm water on the tank and feeling the side of the tank to determine the air/water interface. If there is too much water, then add more air.
2. Pay attention to over cycling of the pump. If the air cushion is low or the tank is water logged the pump will cycle on and off frequently to compensate for pressure drops in the system. If this occurs more air in required.

Distribution System

Piping

The piping within each distribution system was typically small PVC piping. Although the drinking water systems may have adequate water flow and system pressure under normal operating conditions, the systems would not be adequate to support enough water flow to fight fires. Furthermore, fire hydrants can only be installed onto four inch lines (minimum). System flushing is also important for several reasons: when a distribution system is unable to be (or simply is not) flushed, bio-films and other debris can accumulate in the piping. This decreases the water system's pumping efficiency and risks the water quality. Bio-films can harbor bacteria protecting them from system disinfection. Flushing programs should be in place for each distribution system.

Meters

All assessed water systems lacked metering. Meters provide water system managers with water quantity data. Having a master meter at the well head would indicate well production and provide data on the wells ability to continue to meet the communities demand or help determine if there is capacity to expand. Residential meters should be read monthly or bi-monthly. A consumption-based rate structure based on operating expenses and any needed reserves should be used so the water systems can recoup water production costs. A consumption-based rate structure also makes paying for water more equitable between community members. Those that use the most, pay more. This has a tendency to make residents conserve and fix household leaks. Household leaks are major contributor to septic system failure due to hydraulic overloading. Also, comparing total water sold against total water produced tells the water manager how much water is being lost. In some cases, this loss can be substantial due to leaks that don't surface or illegal taps. This data can be used to protect the quantity of the community's water resources into the future and help protect individual septic systems.

Hydrants

Most of the systems did not have the required four inch piping required to install fire hydrants. This leaves the communities vulnerable to fires. One community member noted that fires were common during the rainy season in Coachella's mobile home parks. This comment was made as a fire truck arrived to assess the damage created by a fire that took place the night before RCAC's site visit. Fire hydrants would minimize the damage created by such fires.

Cross Connections

While some of the community systems had backflow prevention devices installed in their distribution system, all of the systems lacked a formal Cross Connection Prevention Program. These programs, when implemented properly, can protect drinking water distribution systems from contamination caused by backflow.

Wastewater Systems

Each of the assessed communities used septic tanks to treat their wastewater. These septic tanks were, for the most part, well maintained and pumped on a regular basis. Some of the leach fields had excessive vegetation that needed to be cleared. Vegetation over leach fields can result in root intrusion in the piping that makes up the leach field. If the root intrusion continues, it can damage the pipe and prevent the leach fields from functioning properly. Parking or driving on leach fields should be prohibited since these activities can cause permanent damage.

Conclusion

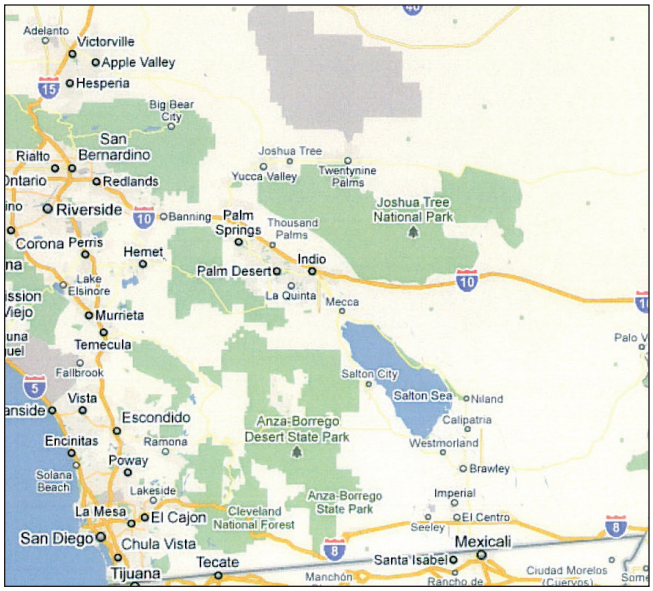
All of the public drinking water systems that were assessed had notable deficiencies that need to be addressed. Some of the deficiencies were major and some were minor. The noted deficiencies were listed at the end of each individual community assessment, along with potential solutions.

Many public water systems throughout the United State need improvement. Finding solutions to each problem will only lead to a better protected and healthier drinking water supply. The deficiencies and potential solutions listed in these reports are targeted items to be addressed by the communities' public water system operators and managers. The ability to complete these deficiencies are often limited by various constraints whether they are technical, managerial and/or financial. Whenever possible, outside assistance should be sought, since often times the issues are quite technical. Agencies, such as your local regulator and RCAC, can often assist getting a system back in compliance. It is the duty of each water system owner and manager to provide safe, reliable water at the best price to their customers.

D&D Oasis Mobile Home Park
76025 Pierce St. ❖ Thermal, CA 92274
Drinking Water Assessment Final Report ❖ January 20, 2010

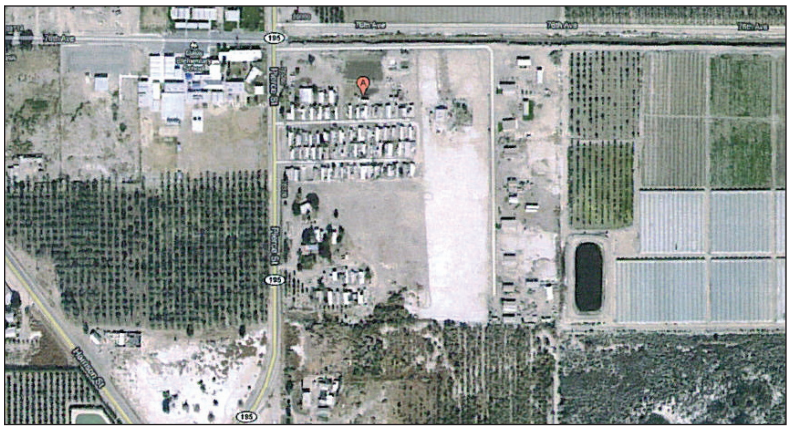
Introduction

On January 20, 2010 Rural Community Assistance Corporation (RCAC) technical assistance providers Lucy Castillo-Riley, Juan Carlos Guerreiro and Eagle Jones conducted a drinking water sanitary assessment for D&D Oasis Mobile Home Park in Thermal, located in the Coachella Valley region of California. RCAC was accompanied by Poder Popular representative Jose Huerta. Also in attendance were Martin Montano and Alex Montano from D&D Oasis Mobile Home Park.



The water system consists of one drinking water well, two hydro-pneumatic tanks and the distribution system. The community consists of 70 service connections that serve approximately 280 residents. The water system is regulated under the US Environmental Protection Agency, Region IX.

Coachella Valley and D&D Oasis Mobile Home Park Area Maps



Drinking Water Source

The drinking water supply for D&D Oasis Mobile Home Park is groundwater, using a submersible pump for extraction. This community has a single water source with no backup supply. The drinking water well was installed in 2005. This well replaces an old well that collapsed and is properly abandoned. The new water well is approximately 550 feet deep and is equipped with a five-horse power pump that sits at a depth of approximately 220 feet.

The well site is properly fenced.
The concrete pad is above flood level.

The well site is properly fenced, protecting the well site from vandalism. The well casing extends 18 inches above the ground level and is equipped with a concrete pad around the well casing, protecting the well from flooding that can contaminate the drinking water. There were no visual signs of chemicals, open dump sites, or abandoned vehicles that could pose a threat of potential sources of pollution. The well casing is properly sealed and vents properly screened to protect the well from outside contamination.

- **Drinking Water Source**: *No deficiencies noted*

Water Quality and Water Treatment

This water system has a history of arsenic concentrations that exceed the maximum contaminant level under the Safe Drinking Water Act. The arsenic contamination source in the water supply is caused by the local geology. Arsenic concentrations above the MCL are a widespread problem in the Coachella Valley region. Due to the elevated levels of arsenic in the drinking water supply, the system is required to monitor quarterly.

The last arsenic sample was collected in December 2009 and resulted in a total arsenic level of 63 parts per billion. Currently, the federal maximum contamination level for arsenic is 10 parts per billion. Customers are notified of arsenic levels on a quarterly basis and currently purchase bottled water for drinking.

The water system uses calcium hypochlorite for disinfection, and it is added by hand directly to the well and allowed to sit in the well overnight. The operator measures and adds one-half cup of chlorine to the water system approximately two times per week. The operator does not know if the chlorine added is approved for drinking water consumption and does not collect routine chlorine residual samples in the distribution system.

Samples are collected during the time of monthly bacteriological samples using a pool grade chlorine test kit. The water system is required to collect one bacteriological sample per month and was free from bacteriological contamination in 2009. The system uses a site sampling plan for collecting monthly bacteriological samples.

- **Water Quality and Water Treatment**: ***Deficiencies noted, potential solutions*** (see pages 5-6 of this report)

Hydro-Pneumatic Tanks

In 2002, the D&D Oasis Mobile Home Park Water System installed two steel hydro-pneumatic pressure tanks to provide adequate pressure to the distribution system. The total volume of water contained in the pressure tanks is approximately 5,000 gallons. The pressure is maintained between 20 and 50 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure. The pressure tanks are not equipped with level indicators.

Hydro-pneumatic tanks and pressure gauge at 26 psi

The tanks also do not have pressure relief valves. Pressure relief valves provide system protection against high pressure conditions. The tanks are equipped with drain valves, and where last drained and cleaned in 2008.

- **Hydro-Pneumatic System:** ***Deficiencies noted, potential solutions*** (see page 6 of this report); recommendation (see page 6 of this report)

Distribution System

Piping

The distribution system consists of approximately 1500 feet of two-inch PVC pipe that was installed in 2000. The operator has a map that depicts the general area and layout of the distribution system but does not have any "as-built" maps. The operator states that the lines are not adequately sized but are equipped with valves in appropriate locations.

The system maintains adequate pressure, has a problem with water leaks. Fortunately, the system did not experience any water outages in 2009. The distribution system is a branched system that has dead end lines. The operator incorporates a regular flushing program and flushes the lines every three months.

- **Piping**: ***Deficiencies noted, potential solutions*** (see page 6 of this report)

Water Meters

The water system is not equipped with any water meters and does not charge its customers for water.

PVC pipe (3/4 inch) water valve and service connection

Each home is served by a ¾ inch PVC water line and uses a ball valve to isolate each space.

- **Water Meters**: ***Deficiency noted, potential solution*** (see page 7 of this report); ***recommendation*** (see page 7 of this report)

Fire Hydrants

The D&D Oasis Mobile Home Park Water System is not equipped with fire hydrants, and is not able to install fire hydrants due to the inadequate size of the distribution system piping.

At the time of this inspection, one customer's home was destroyed by fire due to the lack of capacity to fight fires.

- **Fire Hydrants**: ***Deficiencies noted, potential solutions*** (see page 7 of this report)

Cross Connections

The water system uses check valves on each service line to each space and equips home owners with vacuum breakers for outside faucets. During the inspection possible cross connections where identified and the importance of eliminating cross connections were discussed with the operator.

- **Cross Connections**: ***Deficiency noted, potential solution*** (see page 7 of this report)

Wastewater System

D&D Mobile Home Park uses approximately 15 septic tanks that were been installed between 2000 and 2010. The septic tanks serve approximately five-to-seven homes per system, are maintained by pumping every two years, and by rotating the leach lines every six months.

- **Wastewater System**: ***No deficiencies; recommendation*** (see page 7 of this report)

Water System Deficiencies, Suggested Solutions and Recommendations

This section of the report is a comprehensive overview of the water system deficiencies recognized by RCAC staff. Each deficiency is accompanied by suggestions to address the problem. Each suggestion is accompanied by items to consider when choosing a potential solution.

Water Quality and Water Treatment

Arsenic Levels

Deficiency

- Arsenic levels above the Safe Drinking Water Act's maximum contamination limit, which are a threat to public health.

Potential Solutions

- Regionalization may allow the D&D Mobile Home Park to purchase water from a nearby source with lower arsenic contamination levels.
  - ➢ May be delivered by trucks or by pipe.
  - ➢ Depends on the availability of alternative water resources with acceptable arsenic levels.
  - ➢ May be the least expensive solution depending on transportation costs.
- Treatment is a technological means of removing the arsenic from the water source through various methods. This option involves significant technical, managerial and financial investments by the community to construct, operate, and maintain.
  - ➢ Certified staff to operate the facility
  - ➢ Staff to manage the facility
  - ➢ Equipment and supplies

  (This option gives the community more control over their water supply's availability and quality.)

Recommendations:

- ➢ Training park managers will be essential for successfully selecting a dependable arsenic removal system.
- ➢ Connecting to an adjacent water system that has better water quality may also be an option.
- ➢ Drilling a new well could be explored if an area or depth within the aquifer can be determined to be a better source.

Chlorine Usage

Deficiency

- The water supply wasn't being chlorinated continuously leaving the water supply vulnerable to contamination within the distribution system

Potential Solution

- Maintain a constant chlorine residual in the water supply

Deficiency

- It was unknown whether the type of chlorine being used to disinfect the drinking water was NSF approved. This may mean that the chlorine being used is not intended for human consumption.

Potential Solution

- When purchasing chlorine, ask the vendor for NSF-approved chlorine.

- The vendor may not know whether the chlorine is NSF approved
- An NSF label is placed on all chlorine containers that are NSF approved
- If the vendor does not have NSF approved chlorine, find an alternative vendor who does

**Note: NSF approval means that the chlorine is suitable for consumption, as is the case when used with drinking water.*

Hydro-Pneumatic Tank System

Deficiency

- The hydro-pneumatic system would be damaged if the pressure in the system reaches a level that is too high for the system to contain. This may lead to equipment damage.

Potential Solutions

- Install a pressure relief valve on the well cap, so excessive pressure would escape through the valve instead of damaging the system.
  - This may be an expensive solution that would require periodic testing to make sure the valve is operating properly
- Make sure an air compressor is available and the air to water ratio is monitored and is in an acceptable range

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Note: The tank pressure is maintained between 20 and 50 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure.

Recommendation: There are other means of keeping the water-to-air ratio correct. Two simple methods include:

1. Pouring warm water on the tank and feeling the side of the tank to determine the air/water interface. If there is too much water, then add more air.
2. Pay attention to over-cycling of the pump. If the air cushion is low or the tank is water logged, the pump will cycle on and off frequently to compensate for pressure drops in the system. If this occurs, more air is required.

Distribution System

Piping

Deficiency

- The size of the pipe is inadequate for fire protection and peak flows. Although the system pressure wasn't able to be measured, D&D staff reported a lack of substantial pressure at the far ends of the distribution system.

Potential Solution

- Increase the size of the pipe.

*All distribution system improvements should be designed by a qualified engineer

Deficiency

- The pipes leak leading to wasted water resources and increased pumping costs.

Potential Solution

- Detect and fix the leaks, or replace the piping in the distribution system
  - This process would be time consuming and costly, however, it's a vital move to improve the reliability and pumping costs of the drinking water supply. Replacing the piping may be the best long term solution, and address several deficiencies.

Water Meters

Deficiency

- The drinking water system does not have water meters. This limits the ability for water system managers and operators to collect essential data used for water quality and water quantity protection purposes. This also limits the ability to charge rates comparable to water usage.

Potential Solution

- Place a master meter at the well, a meter at each residence, and read monthly. Having a master meter at the well head would indicate well production and provide data on the wells ability to continue to meet the communities demand or help determine if there is capacity to expand.
  - ➢ This would be costly and labor intensive, but would greatly increase the capacity of the water system.
- The use of meters would also enable water system managers to match monthly water consumption with monthly water bills if needed to implement water conservation policy.

Recommendation: A consumption-based rate structure based on operating expenses and any needed reserves should be used so the water systems can recoup water production costs. A consumption-based rate structure also makes paying for water more equitable between community members. Those that use the most water, pay more. This has a tendency to make residents conserve and fix household leaks. Household leaks are major contributor to septic system failure due to hydraulic overloading. Also, comparing total water sold against total water produced tells the water manager how much water is being lost. In some cases this can be substantial due to leaks that don't surface or illegal taps.

Fire Hydrants

Deficiency

- Fire hydrants are not installed in the distribution system, limiting the community's ability to fight fires.
- The lack of fire hydrants limits the ability for operators to flush the distribution system.

Potential Solution

- Install fire hydrants at strategic locations throughout the distribution system to best meet the needs of a flushing program and fire protection program.
  - ➢ It is also recommended that a flushing program and a fire protection program are implemented.

**Note: Distribution system line must be of adequate size to support the needs of fire hydrants.*

Cross Connections

Deficiency

- The drinking water system has multiple cross connections throughout the system. These cross connections may lead to backflow conditions in the water system. Contaminated water may be introduced into the distribution system, mixing with the drinking water supply, and thus contaminating the drinking water supply.

Potential Solution

- Implement a backflow protection program and eliminate all cross connections.

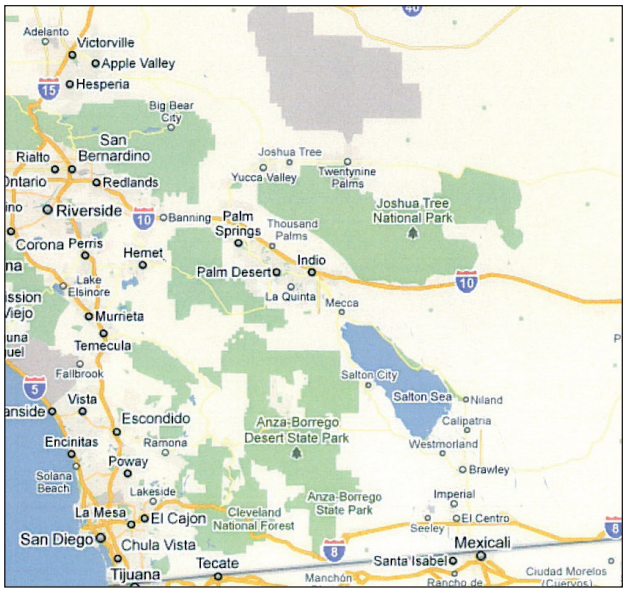
Wastewater System

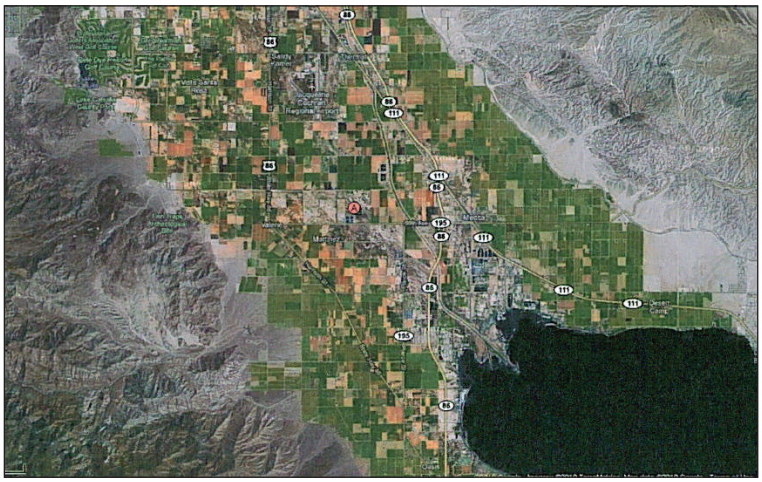
Recommendation: Parking or driving on leach fields should be prohibited since these activities can cause permanent damage.

Rancho Garcia Mobile Home Park
88-455 Avenue 66 ❖ Thermal, CA 92274
Drinking Water Assessment Final Report ❖ January 21, 2010

Introduction

On January 21, 2010, Rural Community Assistance Corporation technical assistance providers Lucy Castillo-Riley, Juan Carlos Guerreiro and Eagle Jones conducted a drinking water assessment for Rancho Garcia Mobile Home Park. RCAC was accompanied by Poder Popular representative Jose Huerta. Also in attendance from Rancho Garcia Mobile Home Park was Manuela Garcia. The water system consists of one drinking water well, one hydropneumatic tank and the distribution system. The community consists of 16 service connections serving approximately 70 residents, and is operating under a permit issued by Riverside County Public Health Department.





Coachella Valley and Rancho Garcia Mobile Home Park Area Maps

Drinking Water Source

The drinking water well was installed in approximately 1990, and at the time only served a few homes. Over time, the mobile home park expanded to the 16 connections being served today. The well dimensions are unknown but the five-horsepower well pump was replaced in 2008.

The well site is not fenced and is vulnerable to damage (vandalism) from passing vehicles from the nearby driveway. The well casing extends approximately 12 inches above the ground level and is equipped with a concrete pad. However, the concrete pad had visible cracks and was at the same elevation as the ground level, making it vulnerable to flooding or standing water.

There were no visual signs of chemicals, open dump sites, or abandoned vehicles that could pose a threat of potential sources of pollution. The well casing is properly sealed, but lacked a vent needed for the well to properly "breath" which eliminates vacuums that could introduce contamination. The well is equipped with sampling taps which allows system operators to collect samples directly from the well for quality analysis. The well also has a check valve which prevents the water from flowing back into the well from the distribution system. The well is missing meters which will be discussed further in the meter section of this report.

Blow off valves were not installed. These valves protect the pump from overheating in case the water leaving the pump is prevented from moving. When the pump is forced to operate without water flowing through it, it will over heat. Vents were also missing from the well. Vents allow wells to breath. As they drawdown, air enters the casing as they recover moist air is forced back out of the casing. Not having vents forces the breathing process to either take place through electrical conduits or bad seals. When moisture is expelled through these other means, a corrosive environment in the electrical control system can occur. This can damage electrical wires and controls leading to premature failure, expensive repair costs, and a greater risk of contamination.

- **Drinking Water Source**: ***Deficiencies noted, potential solutions*** (see page 6 of this report)

Well site is not fenced and is vulnerable to damage.

Water Quality

This water system has a history of arsenic concentrations that exceed the maximum contaminant level (MCL) allowed under the Safe Drinking Water Act. The arsenic contamination source in the water supply is caused by the local geology, and arsenic concentrations above the MCL are a widespread problem within the Coachella Valley region. Due to the elevated levels of arsenic in the drinking water supply, the system is required to monitor arsenic levels every six months.

The data from the last arsenic sample collected in the summer of 2009 was not available, but previous arsenic levels fluctuated between 14 and 15 parts per billion. The federal maximum contaminant level for arsenic is currently 10 parts per billion. Customers are notified of arsenic levels and currently purchase bottled water for drinking.

- **Water Quality**: ***Deficiencies noted, potential solutions*** (see page 5 of this report)

Drinking Water Treatment

The water system uses sodium hypochlorite for disinfection and is added by hand directly to the well under direction of the county. The type of chlorine used is a non-NSF approved liquid chlorine purchased at the local supermarket. Routine chlorine residual samples are not collected in the distribution system or collected during the time of monthly bacteriological samples. The water system is required to collect one bacteriological sample per month and has identified a trend of positive bacteriological samples once per year during the summer months. The system does not have a formal site sampling plan but is familiar with rotating sampling locations and with repeat sampling procedures.

- **Drinking Water Treatment**: ***Deficiencies noted, potential solutions*** (see page 5 of this report)

Hydro-Pneumatic Tank

The Rancho Garcia water system uses one steel hydro-pneumatic pressure tank installed in 1990's to provide adequate pressure to the distribution system. The total volume of water contained in the pressure tanks is approximately 1,500 gallons and is in fair condition. The pressure is maintained between 30 and 50 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure. The pressure tanks are not equipped with level indicators. The tanks are equipped with drain valves and where last drained and cleaned in 2008 during well pump replacement.

- **Hydro-Pneumatic Tank**: ***Deficiencies noted, potential solutions*** (see page 5-6 of this report)

Distribution System

Piping

The distribution system consists of PVC piping of unknown size and amount. The system owner has a map that depicts the general area and layout of the distribution system, but does not have any "as built" drawings. The maps were unavailable at the time of inspection. The distribution system is a branched system that is approximately 15-to-20 years old and is flushed once per month to maintain water quality. The operator states that the lines are not adequately sized, but are equipped with valves in appropriate locations. The system maintains adequate pressure, does not have a problem with water leaks, but does have period of water outages from major leaks or power outages.

- **Piping**: ***Deficiencies noted, potential solutions*** (see page 7-8 of this report)

Meters

The water system is not equipped with any water meters and does not charge its customers for water. Each home is served by a ¾ inch PVC water line and utilizes a combination of ball and gate valves to isolate each space.

- **Meters**: ***Deficiencies noted, potential solutions*** (see page 7-8 of this report); recommendations (see page 8 of this report)

Hydrants

The water system is not equipped with fire hydrants and is not able to install fire hydrants due to the inadequate size of the distribution system piping.

- **Hydrants**: ***Deficiencies noted, potential solutions*** (see page 8 of this report)

Cross Connections

The water system is equipped with a check valve at the well head and after the hydro pneumatic tank, during the inspection possible cross connections where identified and the importance of eliminating cross connections where discussed with the operator.

- **Cross Connections**: ***Deficiencies noted, potential solutions*** (see page 8 of this report)

Wastewater System

Rancho Garcia Mobile Home Park uses approximately six septic tanks that have been installed between 1990 2000. The septic tanks serve approximately 2-to-3 homes per system and are maintained by pumping every two years. The owners do not have maps and have noticed vegetation growth in some of the leach line areas. During the installation of the septic tanks and leach fields, the community used the county standard set back of 100 feet from the community drinking water well. The owners stated that a new community system is planning on being installed the summer of 2010.

- **Wastewater System**: No ***deficiencies noted, recommendation*** (see page 8 of this report)

Water System Deficiencies, Suggested Solutions and Recommendations

This section of the report is a comprehensive overview of the water system deficiencies recognized by RCAC staff. Each deficiency is accompanied by suggestions to address the problem. Each suggestion is accompanied by items to consider when choosing a potential solution.

Water Quality and Water Treatment

Arsenic Levels

Deficiency

- Arsenic levels above the Safe Drinking Water Act's maximum contamination limit, which are a threat to public health.

Potential Solutions

- Regionalization may allow the Rancho Garcia Mobile Home Park to purchase water from a nearby source with lower arsenic contamination levels.
  - ➢ May be delivered by trucks or by pipe.
  - ➢ Depends on the availability of alternative water resources with acceptable arsenic levels.
  - ➢ May be the least expensive solution depending on transportation costs.
- Treatment is a technological means of removing the arsenic from the water source through various methods. This option involves significant technical, managerial and financial investments by the community to construct, operate, and maintain.
  - ➢ Certified staff to operate the facility
  - ➢ Staff to manage the facility
  - ➢ Equipment and supplies

  (This option gives the community more control over their water supply's availability and quality.)

Recommendations:

- ➢ Training park managers will be essential for successfully selecting a dependable arsenic removal system.
- ➢ Connecting to an adjacent water system that has better water quality may also be an option.
- ➢ Drilling a new well could be explored if an area or depth within the aquifer can be determined to be a better source.

Chlorine Usage

Deficiency

- The drinking water supply isn't chlorinated enough leaving the system vulnerable to bacteriological contamination.

Potential Solution

- Implement a chlorination system where chlorine levels are held at an adequate level throughout the drinking water system. Refer to the water system's regulatory agency for appropriate chlorine levels.
- Make sure to use NSF approved chlorine.

**Note: NSF approval means that the chlorine is suitable for consumption, as is the case when used with drinking water.*

Deficiency

- The system isn't tested routinely for bacteriological activity, leaving people who consume the water vulnerable to illness caused by bacteria.

Potential Solution

- Implement a bacteriological activity monitoring program through the use of a Site Sampling Plan.

Drinking Water Source

Well

Deficiency

- The well and its equipment are not fenced in properly, leaving it vulnerable to damage. The well equipment could be damaged or adjusted without warning, threatening the community's water supply.

Potential Solution

- Have the barrier placed around the well and its equipment to protect it from vandalism and damage. This would better protect the community's water supply from being tampered with.

Deficiency

- The well pad had visible cracks and was at the same elevation as the ground level, making it vulnerable to flooding or standing water.

Potential Solution

- Have the well rehabilitated to get rid of all cracks and to have the pad one foot above ground level.

Deficiency

- The well cap lacked a vent needed for the well to properly "breath" as the well draws down and recovers. Without this vent the well will pull and push moist air through the electrical connection and may cause premature failure of electrical components by creating a corrosive environment.

Potential Solution

- Have a vent installed onto the well. This vent should be able to be angled downward (using and elbow type pipe) to prevent rainwater from entering the well. This vent should be two ventilation pipe diameters away from the ground to prevent surface water from entering the well. Additionally, the vent should be covered with a screen to prevent any large objects from entering the well.

Hydro-Pneumatic Tank System

Deficiency

- The water to air ratio in the hydro-pneumatic tank was unknown. This could lead to a low air level which could lead to system damage without air available to protect the system against water hammer.

Potential Solution

- Install a sight tube on the tank, or use any other available methods to determine the water to air ratio within the tank. If the air level is low, use an air compressor to add air.

Deficiency

- The hydro-pneumatic system would be damaged if the pressure in the system reaches a level that is too high for the system to contain. This may lead to equipment damage.

Potential Solutions

- Install a pressure relief valve on the well cap, so excessive pressure would escape through the valve instead of damaging the system.
  - ➢ This may be an expensive solution that would require periodic testing to make sure the valve is operating properly
- Make sure an air compressor is available and the air to water ratio is monitored and is in an acceptable range

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NOTE: The pressure is maintained between 20 and 60 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure.

Recommendation: There are other means of keeping the water-to-air ratio correct. Two simple methods include:

1. Pouring warm water on the tank and feeling the side of the tank to determine the air/water interface. If there is too much water, then add more air.
2. Pay attention to over-cycling of the pump. If the air cushion is low or the tank is water logged the pump will cycle on and off frequently to compensate for pressure drops in the system. If this occurs more air in required. Pressure relief valves were also missing. These valves protect the system against high pressure condition that may lead to system damage.

Distribution System

Piping

Deficiency

- Pipe size is unknown. In the case of pipes becoming damaged and in need of replacing, it is good to know the size of the pipe that needs to be replaced so the system can return to service in a timely manner.

Potential Solution

- Dig up a section of the distribution system to find out what size of pipe is installed. When the size is noted, the water system managers may find it beneficial to keep spare pipe on site in case a section of the pipe needs to be replaced.

Deficiency

- Water system isn't flushed periodically which may lead to access solids being left in the water system. This would reduced pumping efficiency and could potentially lead to poor water quality.

Potential Solution

- Implement a distribution system flushing program.

Meters

Deficiency

- The drinking water system doesn't have water meters. This limits the ability for water system managers and operators to collect essential data used for water quality and water quantity protection purposes. This also limits the ability to charge rates comparable to water usage.

Potential Solution

- Place a master meter at the well, a meter at each residence, and read monthly.
  - ➢ This would be costly and labor intensive, but would greatly increase the capacity of the water system.

- The use of meters would also enable water system managers to match monthly water consumption with monthly water bills if needed to implement water conservation policy.

Recommendation: Having a master meter at the well head would indicate well production and provide data on the wells ability to continue to meet the communities demand or help determine if there is capacity to expand. Residential meters read monthly or bi-monthly.

A consumption-based rate structure based on operating expenses and any needed reserves should be utilized so the water systems can recoup water production costs. A consumption-based rate structure also makes paying for water more equitable between community members. Those that use the most, pay more. This has a tendency to make residents conserve and fix household leaks. Household leaks are major contributor to septic system failure due to hydraulic overloading. Also, comparing total water sold against total water produced tells the water manager how much water is being lost. In some cases this can be substantial due to leaks that don't surface or illegal taps.

Fire Hydrants

Deficiency

- Fire hydrants are not installed in the distribution system, limiting the community's ability to fight fires.
- The lack of fire hydrants limits the ability for operators to flush the distribution system.

Potential Solution

- Install fire hydrants at strategic locations throughout the distribution system to best meet the needs of a flushing program and fire protection program.
    - ➢ It is also recommended that a flushing program and a fire protection program are implemented.

**Note: Distribution system line must be of adequate size to support the needs of fire hydrants.*

Cross Connections

Deficiency

- A cross connection program was not in place. This could lead to cross connections existing in the drinking water system, which could lead to drinking water contamination if a backflow condition occurs.

Potential Solution

- Implement a cross connection program.

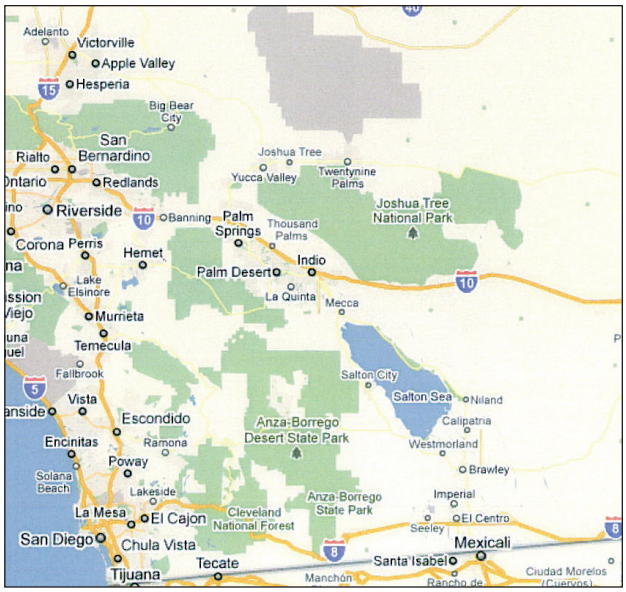
Wastewater System

Recommendation: Parking or driving on leach fields should be prohibited since these activities can cause permanent damage.

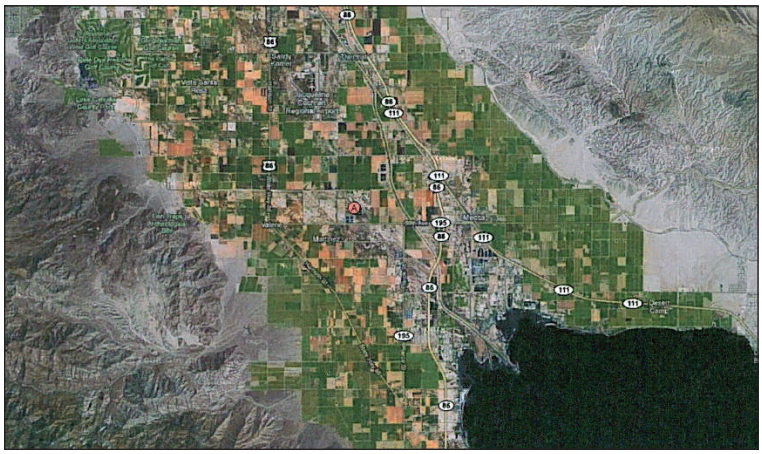
Santillanes Mobile Home Park
87-125 Avenue 66 ❖ Thermal, CA 92274
Drinking Water Assessment Final Report ❖ February 24, 2010

Introduction

On February 24, 2010, Rural Community Assistance Corporation (RCAC) technical assistance provider Eagle Jones conducted a drinking water and wastewater assessment for Santillanes Mobile Home Park in Thermal, California, in the Coachella Valley region. RCAC was accompanied by Poder Popular representative Jose Huerta. Also in attendance was Tony Santillanes from Santillanes Mobile Home Park.



The water system consists of one drinking water well, one hydro-pneumatic tank and the distribution system. The community consists of 12 service connections serving approximately 80 residents, and is operating without a permit. All water quality monitoring is performed by the Torres Martinez Tribe.



Coachella Valley and Santillanes Mobile Home Park Area Maps

Drinking Water Source

The drinking water well was installed in approximately 2005, and at the time only served a few homes. Over time, the mobile home park expanded to the existing 12 connections being served today. The well dimensions where unavailable at the time of the site visit. All records are maintained by the tribe.

The well site is fenced but not locked, and is vulnerable to damage (vandalism) from passing vehicles from the nearby park. The well casing extends approximately 12 inches above the ground level and is equipped with a concrete pad and protected from the weather.

There were no visual signs of chemicals, open dump sites or abandoned vehicles that could pose a threat of potential sources of pollution. The well casing is properly sealed and equipped with a vent. However, the vent was not properly screened which could introduce contamination into the well.

The well was equipped with sampling taps to provide the capacity to take water samples directly from the well. The well also had a check valve which prevents any water from flowing back into the well from the distribution system. Blow off valves were also installed which provide pump motor protection. *(Note: If the discharge water from a pump is prevented from entering the distribution system, the blow-off valve allows water to escape the well. This prevents water around the pump from heating up and causing damage to the pump and motor.)*

The well was also has a master meter to record the amount of water being produced from the well, and includes a sand separator to prevent sand from leaving the well and entering the distribution system.

The well site is fenced, but not locked, and is vulnerable to damage (vandalism).

Water Quality

The arsenic contamination source in the water supply is caused by the local geology. Arsenic concentrations above the MCL are a widespread problem within the Coachella Valley region. The water system is responsible for collecting and monitoring water quality contaminants, like arsenic, and providing that information to the customers in annual consumer confidence reports.

No drinking water data was available during the site visit. Any drinking water information will have to be collect from the tribe and will only consist of samples that were collected during time of pump installation.

- **Water Quality**: ***Deficiencies noted, potential solutions*** (see page 5-6 of this report)

Drinking Water Treatment

The water system does not currently provide continuous or adequate disinfection needed to protect drinking water from bacteria and water-borne disease. The water system is not collecting monthly bacteriological samples that measure for total and fecal coli formed in the distribution system.

Based on the size of the community, this water system is required to collect one bacteriological sample per month.

- **Drinking Water Treatment**: ***Deficiencies noted, potential solutions*** (see page 5-6 of this report)

Hydro-Pneumatic Tank

The Santillanes Mobile Home Park Water System uses one steel hydro-pneumatic pressure tank, installed in 2005, to provide adequate pressure to the distribution system. The total volume of water contained in the pressure tank is approximately 50 gallons and in good condition. The pressure is maintained between 20 and 60 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure. The pressure tank is not equipped with level indicators. The tank is equipped with drain valves but has not been drained since the initial installation date to 2005.

- **Hydro-Pneumatic Tank**: ***No deficiency noted, recommendation*** (see page 6 of this report)

Distribution System

Piping

The distribution system consists of two-PVC piping with ¾ inch service lines. The system owner has a map that depicts the general area and layout of the distribution system but does not have any "as built" maps. The maps were unavailable at the time of inspection.

PVC pipe (3/4 inch)

The distribution system is a branched system that is approximately five-to-ten years old, and is flushed on an annual basis to maintain water quality. The operator states that the lines are adequately sized and equipped with valves in appropriate locations. The system maintains adequate pressure. At the time of the visit the pressure at the well head was approximately 38 psi.

The water system does not have a problem with water leaks. However, since the well is a sole water source, the community will run out of water during periods of major leaks or power outages.

Water Meters

The water system is not equipped with any water meters and does not charge its customers for water.

Each home is served by a ¾ inch PVC water line and utilizes a combination of ball and gate valves to isolate each space.

- **Water Meters**: ***Deficiencies noted, potential solutions*** (see page x of this report); ***recommendations*** (see page 6of this report)

Ball and gate valve

Fire Hydrants

The water system is not equipped with fire hydrants, and is not able to install fire hydrants due to the inadequate size of the distribution system piping.

- **Fire Hydrants**: ***Deficiencies noted, potential solutions*** (see page 7 of this report).

Cross Connections

The water system is equipped with a check valve at the well head and after the hydro-pneumatic tank. During the inspection, RCAC discussed the importance of eliminating cross connections with the owner.

- **Cross Connections**: ***Deficiency noted, potential solutions*** (see page 7 of this report).

Wastewater System

Santillanes Mobile Home Park uses four septic tanks that were installed between 2005 and 2010. The largest septic tank has a capacity of 10,500 gallons, serves approximately eight homes, and discharges underground using six leach lines. The second largest septic tank has a capacity of 2,500 gallons, serves two homes, and discharges underground using four leach lines. The final two homes are served individually with a 1,200 gallon septic tank that discharge underground using four leach lines per tank.

The septic tanks are maintained by pumping every two to three years. The owner does have maps of the septic tanks and leach lines, and has not noticed any excess vegetation. The septic tanks and leach fields are located in areas where cars or other heavy equipment cannot damage them. The owner has provided home owner information regarding excess grease and proper septic tank management.

- **Wastewater System**: ***No deficiency noted, recommendation*** (see page 7 of this report).

Water System Deficiencies, Suggested Solutions and Recommendations

This section of the report is a comprehensive overview of the water system deficiencies recognized by RCAC staff. Each deficiency is accompanied by suggestions to address the problem. Each suggestion is accompanied by items to consider when choosing a potential solution.

Water Quality and Water Treatment

Arsenic Levels

Deficiency

- Arsenic levels above the Safe Drinking Water Act's maximum contamination limit, which are a threat to public health.

Potential Solutions

- Regionalization may allow the Santillanes Mobile Home Park to purchase water from a nearby source with lower arsenic contamination levels.
  - ➢ May be delivered by trucks or by pipe.
  - ➢ Depends on the availability of alternative water resources with acceptable arsenic levels.
  - ➢ May be the least expensive solution depending on transportation costs.
- Treatment is a technological means of removing the arsenic from the water source through various methods. This option involves significant technical, managerial and financial investments by the community to construct, operate, and maintain.
  - ➢ Certified staff to operate the facility
  - ➢ Staff to manage the facility
  - ➢ Equipment and supplies

  (This option gives the community more control over their water supply's availability and quality.)

Recommendations:

- ➢ Training park managers will be essential for successfully selecting a dependable arsenic removal system.
- ➢ Connecting to an adjacent water system that has better water quality may also be an option.
- ➢ Drilling a new well could be explored if an area or depth within the aquifer can be determined to be a better source.

Deficiency

- Lack of water quality data leaves the community, water system managers and regulators uninformed as to whether or not the water is suitable for human consumption.

Potential Solutions

- Implement a water quality monitoring program where a certified laboratory determines the contamination levels within the water.
- Once the contamination levels within the water are determined and the results are delivered to the utility, the utility should keep these records in a designated location for future reference.
  - ➢ This program may be costly; however, the public's health would be better protected by accurately determining what they are consuming.

Deficiency

- The drinking water supply is not chlorinated sufficiently, leaving the system vulnerable to bacteriological contamination.

Potential Solutions

- Implement a chlorination system where chlorine levels are held at an adequate level throughout the drinking water system. Refer to the water system's regulatory agency for appropriate chlorine levels.
- Use NSF approved chlorine.

**Note: NSF approval means that the chlorine is suitable for consumption, as is the case when used with drinking water.*

Deficiency

- The system is not tested for bacteriological activity, leaving people who consume the water vulnerable to illness caused by bacteria.

Potential Solution

- Implement a bacteriological activity monitoring program through the use of a Site Sampling Plan. (SSP templates are available upon request and can be found on the EPA website.)

Recommendation: The system owner/operator will require training on collecting monthly bacteriological samples, developing a formal site sampling plan, rotating sampling locations and repeat sampling procedures.

Hydro-Pneumatic Tank System

NOTE: The pressure is maintained between 20 and 60 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure.

Recommendation: There are other means of keeping the water-to-air ratio correct. Two simple methods include:

1. Pouring warm water on the tank and feeling the side of the tank to determine the air/water interface. If there is too much water, then add more air.
2. Pay attention to over-cycling of the pump. If the air cushion is low or the tank is water logged the pump will cycle on and off frequently to compensate for pressure drops in the system. If this occurs more air in required. Pressure relief valves were also missing. These valves protect the system against high pressure condition that may lead to system damage.

Distribution System

Water Meters

Deficiency

- The water system lacks water meters

Potential Solution

- Install a master meter at the well head and a meter at each service connection.
  - ➢ These meters will allow the water system managers and operators to account for the water resources being used by the community.

  Monitoring a community's water usage will help the utility better respond to unusual amounts of water demand and help identify unusual amounts of water demand caused by cracks of breaks in the water system's piping.

Deficiency

- The water manager's do not directly charge their customers for the amount of water each residents uses. This may lead to excessive water demand putting a strain on water resources.

Potential Solution

- Install meters at each service connection and charge the user according to the quantity of water they use.

Recommendation: Having a master meter at the well head would indicate well production and provide data on the wells ability to continue to meet the communities demand or help determine if there is capacity to expand. Residential meters should be read monthly or bi-monthly.

A consumption-based rate structure based on operating expenses and any needed reserves should be utilized so the water systems can recoup water production costs. A consumption-based rate structure also makes paying for water more equitable between community members. Those that use the most, pay more. This has a tendency to make residents conserve and fix household leaks. Household leaks are major contributor to septic system failure due to hydraulic overloading. Also, comparing total water sold against total water produced tells the water manager how much water is being lost. In some cases this can be substantial due to leaks that don't surface or illegal taps.

Fire Hydrants

Deficiency

- The water system does not have fire hydrants installed due to the inadequate pipe size throughout the distribution system. This leaves the community unable to respond adequately in the event of a fire.

Potential Solution

- Increase the pipe size to meet the size requirements of fire hydrants.

*All distribution system improvements should be designed by a qualified engineer

Cross Connections

Deficiency

- The water system lacks a cross connection control program. This may lead to the existence of cross connections, and increase the potential for backflow conditions. Contaminated water may be introduced into the distribution system, mixing with the drinking water supply, and contaminating the drinking water supply.

Potential Solution

- Implement a backflow protection program and eliminate all cross connections.

Wastewater System

Recommendation: Parking or driving on leach fields should be prohibited since these activities can cause permanent damage.

St. Anthony Mobile Home Park
67-075 Highway 111 ❖ Mecca, CA 92254
Drinking Water Assessment Final Report ❖ January 21, 2010

Introduction

On January 21, 2010 the Rural Community Assistance Corporation (RCAC) technical assistance providers Lucy Castillo-Riley, Juan Carlos Guerreiro, and Eagle Jones conducted a drinking water and wastewater system assessment at the St. Anthony Mobile Home Park in Mecca, CA, which is located in the Coachella Valley. RCAC was accompanied by Poder Popular representative Jose Huerta.

At the time of the survey, there was no park staff to meet with the RCAC technical assistance providers. However, as the initial inspection of the water system began, RCAC was met by Sergio Carranza, who served as a representative for the operation and management of the mobile home park. Sergio was unavailable for the inspection of the water system but agreed to a follow-up meeting with RCAC to complete the assessment.

The mobile home park community consists of 96 service connections serving approximately 700 residents. It operates under a permit issued by Riverside County Public Health Department.

Coachella Valley and St. Anthony Mobile Home Park Area Maps

The water system consists of one drinking water well, one hydro-pneumatic tank, and a grid/branch style distribution system. In addition, there are four centralized drinking water tanks that are filled by hauling water using various trucking services located in the Coachella Valley. This provides the residents with a safe supply of drinking water, rather than the tap water that exceeds the maximum contaminant level (MCL) for arsenic.

Drinking Water Source

The drinking water supply at St. Anthony Mobile Home Park is groundwater and it uses a submersible pump for extraction. Since the community's population is less than 10,000 people, the water system is considered a small system, or very small system. This drinking water system qualifies as a Public Drinking Water System (PWS) as defined in the Safe Drinking Water Act (SDWA) and thus must conform to all applicable drinking water standards.

St. Anthony has a single-source drinking water system with no backup supply for the entire community. The drinking water well installation and construction details are unknown; however, the well drillers log is on file with Coachella Valley Water District. This well drillers log would contain vital information, such as whether or not the annular seal meets legal requirements. Many wells in agricultural communities have developed "ag wells" without these seals since they are not required in that application. Often these wells eventually find themselves being used in a public water system.

A visual inspection of the well surface features indicates a basic construction consisting of a 12-inch casing that is reported to extend approximately 600 feet into the aquifer. Well production is unknown, since there is no master water meter at the wellhead. A master meter accounts for all of the water leaving a well. It was reported that the five-horsepower well pump and motor were replaced in 2009.

The well site is poorly fenced and is vulnerable to vandalism.

The well site is poorly fenced but receives some protection from contamination due to its isolation and distance from passing vehicles and any solid waste. A poorly fenced well site is vulnerable to vandalism. The well site itself, along with many of the homes, are located in low parts of the valley which makes the well vulnerable to flash flooding.

The well casing extends approximately 12 inches above the cement pad and is properly sealed at the pad/casing interface. The well driller's log should be consulted to assure the proper annular sanitary seal extends down the length of the casing and meets county or state regulations. It should be noted that wells that were designed for agricultural use do not have these seals and are subject to contamination. Ag wells should not be used as a potable water source. Should the annular seal be determined to be inadequate, an engineer should be contacted to assist with correcting the situation.

The well cap lacked a vent needed for the well to properly "breathe" as the well draws down and recovers. Without this vent the well will pull and push moist air through the electrical connection and may cause premature failure of electrical components by creating a corrosive environ-

ment. In addition, contamination could be introduced through this same connection. The well was equipped with a sampling tap which allow for water samples to be taken directly from the well. The well also had a check valve which prevents any water in the discharge line from flowing back into the well. The well did not have a pressure-relief valve which protects the pump from over-heating if it is ever left pumping against a closed valve. Note that submersible pumps are water-cooled and if water was not circulating around the pump motor, heat would build up, either causing pump fail or damage to the pump.

- **Drinking Water Source:** ***Deficiencies noted, potential solutions*** (see page 7 of this report)

Water Quality

This water system has a history of arsenic concentrations that exceed the MCL established under the Safe Drinking Water Act. The arsenic contamination source in the water supply is likely caused by local geology. Arsenic concentrations above the MCL are a widespread problem within the Coachella Valley region. Due to the elevated levels of arsenic in the drinking water supply, the system is required to monitor arsenic levels on a six month monitoring cycle.

The data from the last arsenic sample collected in the summer of 2004 indicated an arsenic level of 20 parts per billion. The federal maximum contaminant level for arsenic is 10 parts per billion. It is unknown if the residents were notified of arsenic levels, but the residents are aware of the arsenic contamination. The park management currently purchases and hauls water to a centralized point in the community where residents can collect drinking water for drinking and cooking purposes.

There are no procedures for disinfection or sampling for bacteriological contamination of the drinking water tanks.

There currently is no defined maintenance program for maintaining sanitary conditions of the centralized drinking water tanks. The tanks are cleaned periodically and filled approximately every couple of days. There are no procedures for disinfection or sampling for bacteriological contamination of the tanks.

- **Water Quality:** ***Deficiencies noted, potential solutions*** (see page 6-7 of this report)

Drinking Water Treatment

At the follow up meeting with Sergio Carranza, it was not known if the water system provided disinfection either in batch (added in intervals) or continuous. A chlorine residual between 0.2 parts per million and 4 parts per million is necessary to provide a drinking water distribution system with adequate protection against microbiological activity. Sodium hypochlorite and calcium hypochlorite are commonly used chemicals for disinfection within public water systems. The mobile home park does have a certified operator who collects monthly bacteriological samples, but the operator was unavailable to assist with the assessment. The water system is required to collect one bacteriological sample per month. These routine samples are collected at the well head and do not follow any specific site sampling plan and do not assess water quality within the distribution system.

The St. Anthony water system has tried to address the arsenic issues in the past by purchasing an arsenic filtration system. Unfortunately the type of system selected for the removal of arsenic was inadequate, leading to the eventual failure of the filtration system.

- **Drinking Water Treatment:** ***Deficiencies noted, potential solutions*** (see page 6-7 of this report)

Hydro-Pneumatic Tank

The St. Anthony water system uses one steel hydro-pneumatic pressure tank. The installation date is unknown. The hydro-pneumatic tank is designed to provide adequate pressure to the distribution system without causing the pump to cycle continuously. The total volume of the pressure tank is approximately 3,000 gallons and is old, but in fair condition. The pressure is maintained between 40 to 60 psi. The system requires the operator to bring in an air compressor to recharge tank pressure. The tank does not have a level indicator to indicate the amount water/air ratio. The tank is equipped with a pressure relief valve. This valve protects the water distribution system from damage due to high pressure situations. The tank is also equipped with a drain valve which allows the tank to be drained for maintenance or repairs. The last date of tank maintenance or cleaning is unknown.

- **Hydro-Pneumatic Tank:** ***Deficiency noted, potential solution*** (see page 8 of this report); ***recommendation*** (see page 8 of this report)

Distribution System

Piping

The distribution system consists of PVC piping of unknown size and was thought to have approximately 6,000 feet of distribution pipe. There were no known maps of the distribution system available. It was estimated that age of the system is near 30 years old.

The distribution system layout, based on the description, was a gridded/branched system. A flushing program was not administered at the time of the assessment. Public water systems administer flushing programs to routinely clean pipes of debris that accumulate over time. Lines were said to not be adequately sized and were not equipped with valves in appropriate locations. The system maintains adequate pressure, does not have a problem with water leaks, but does have periods of water outages from major leaks or power outages.

- **Piping:** ***Deficiencies noted, potential solutions*** (see page 8 of this report)

Cross Connections

The water system is equipped with a check valve at the well head and after the hydro pneumatic tank. During the inspection possible cross connections were identified and the importance of eliminating cross connections where discussed with the manager.

- **Cross Connections:** ***Deficiency noted, potential solution*** (see page 8 of this report)

Meters

The water system is not equipped with any water meters and does not charge its customers for water.

- **Meters:** ***Deficiency noted, potential solution*** (see page 9 of this report); ***recommendation*** (see page 9 of this report)

Hydrants

The water system is said to have four hydrants but upon assessment of the system only one hydrant was visible. The hydrant is a small, 4 inch by 2 ½ inch wharf style hydrant, typically used for flushing purposes only. Due to the inadequate size of the distribution system piping, it is likely that the hydrants flow would be inadequate to fight fires.

Wastewater System

St. Anthony Mobile Home Park utilizes a centralized septic tank, sewer lift station, in conjunction with a lagoon wastewater disposal system. The system was installed in the 1970's and has been maintained on a reactive basis only. The wastewater treatment system is scheduled to be disconnected due to the construction of a new sewer collection system from the City of Mecca that will serve the community beginning in 2010.

Water System Deficiencies, Suggested Solutions and Recommendations

This section of the report is a comprehensive overview of the water system deficiencies recognized by RCAC staff. Each deficiency is accompanied by suggestions to address the problem. Each suggestion is accompanied by items to consider when choosing a potential solution.

Water Quality and Water Treatment

Arsenic Levels

Deficiency

- Arsenic levels above the Safe Drinking Water Act's maximum contamination limit, which are a threat to public health.

Potential Solutions

- Regionalization may allow the St. Anthony Mobile Home Park to purchase water from a nearby source with lower arsenic contamination levels.
  - ➢ May be delivered by trucks or by pipe.
  - ➢ Depends on the availability of alternative water resources with acceptable arsenic levels.
  - ➢ May be the least expensive solution depending on transportation costs.
- Treatment is a technological means of removing the arsenic from the water source through various methods. This option involves significant technical, managerial and financial investments by the community to construct, operate, and maintain.
  - ➢ Certified staff to operate the facility
  - ➢ Staff to manage the facility
  - ➢ Equipment and supplies

  (This option gives the community more control over their water supply's availability and quality.)

Recommendations:

- ➢ Training park managers will be essential for successfully selecting a dependable arsenic removal system.
- ➢ Connecting to an adjacent water system that has better water quality may also be an option.
- ➢ Drilling a new well could be explored if an area or depth within the aquifer can be determined to be a better source.

Deficiency

- Lack of water quality data leaves the community, water system managers and regulators uninformed as to whether or not the water is suitable for human consumption.

Potential Solutions

- Implement a water quality monitoring program where a certified laboratory determines the contamination levels within the water.
- Once the contamination levels within the water are determined and the results are delivered to the utility, the utility should keep these records in a designated location for future reference.
  - ➢ This program may be costly; however, the public's health would be better protected by accurately determining what they are consuming.

Deficiency

- The drinking water supply is not chlorinated sufficiently, leaving the system vulnerable to bacteriological contamination.

Potential Solutions

- Implement a chlorination system where chlorine levels are held at an adequate level throughout the drinking water system. Refer to the water system's regulatory agency for appropriate chlorine levels.
- Use NSF approved chlorine.

**Note: NSF approval means that the chlorine is suitable for consumption, as is the case when used with drinking water.*

Water Source

Well

Deficiency

- A well driller's log is not in the possession of the water system operators. This leaves system operators unaware of whether the well has an annular sanitary seal that meets regulatory requirements. This could make the well susceptible to contamination through surface water infiltration.

Potential Solution

- Obtain a copy of the well driller's log from the Coachella Valley Water District. Look to see if an annular sanitary seal exists and meets regulatory requirements.

Deficiency

- The well and its equipment are not fenced in properly, leaving it vulnerable to vandalism or damage. The well equipment could be damaged or adjusted without warning, threatening the community's water supply.

Potential Solution

- Have the barrier replaced or repaired around the well and its equipment to protect it from vandalism and damage. This would better protect the community's water supply from being tampered with.

Deficiency

- The well cap lacked a vent needed for the well to properly "breathe" as the well draws down and recovers. Without this vent the well will pull and push moist air through the electrical connection and may cause premature failure of electrical components by creating a corrosive environment.

Potential Solution

- Have a vent installed onto the well. This vent should be able to be angled downward (using and elbow type pipe) to prevent rainwater from entering the well. This vent should be two ventilation pipe diameters away from the ground to prevent surface water from entering the well. Additionally, the vent should be covered with a screen to prevent any large objects from entering the well.

Deficiency

- The well is not equipped with a blow-off valve. This makes the well pump vulnerable to overheating as the water would remain stagnant and heat up if the pump was working against a closed discharge valve.

Potential Solution

- Have a blow-off valve installed at the well.

Hydro-Pneumatic Tank System

Deficiency

- The water-to-air ratio in the hydro-pneumatic tank was unknown. This could lead to a low air level, which could lead to system damage without air available to protect the system against water hammer.

Potential Solution

- Install a sight tube on the tank, or use any other available methods to determine the water to air ratio within the tank. If the air level is low, use an air compressor to add air.

NOTE: The pressure is maintained between 20 and 60 pounds per square inch (psi), and requires the operator to bring in an air compressor to recharge vessel pressure.

Recommendation: There are other means of keeping the water-to-air ratio correct. Two simple methods include:

1. Pouring warm water on the tank and feeling the side of the tank to determine the air/water interface. If there is too much water, then add more air.
2. Pay attention to over-cycling of the pump. If the air cushion is low or the tank is water logged the pump will cycle on and off frequently to compensate for pressure drops in the system. If this occurs more air in required. Pressure relief valves were also missing. These valves protect the system against high pressure condition that may lead to system damage.

Distribution System

Piping

Deficiency

- Pipe size is unknown. In the case of pipes becoming damaged and in need of replacing, it is good to know the size of the pipe that needs to be replaced so the system can return to service in a timely manner.

Potential Solution

- Dig up a section of the distribution system to find out what size of pipe is installed. When the size is noted, the water system managers may find it beneficial to keep spare pipe on site in case a section of the pipe needs to be replaced.

Deficiency

- Water system is not flushed periodically, which may lead to access solids being left in the water system. This can reduce pumping efficiency and could potentially lead to poor water quality.

Potential Solution

- Implement a distribution system flushing program.

Cross Connections

Deficiency

- A cross connection program was not in place. This could lead to cross connections existing in the drinking water system, which could lead to drinking water contamination if a backflow condition occurs.

Potential Solution

- Implement a cross connection program.

Water Meters

Deficiency

- The drinking water system does not have water meters. This limits the ability for water system managers and operators to collect essential data used for water quality and water quantity protection purposes. This also limits the ability to charge rates comparable to water usage.

Potential Solution

- Place a master meter at the well, a meter at each residence, and read monthly.
  - ➢ This would be costly and labor intensive, but would greatly increase the capacity of the water system.
- The use of meters would also enable water system managers to match monthly water consumption with monthly water bills if needed to implement water conservation policy.

Recommendation: Having a master meter at the well head would indicate well production and provide data on the wells ability to continue to meet the communities demand or help determine if there is capacity to expand. Residential meters should be read monthly or bi-monthly.

A consumption-based rate structure based on operating expenses and any needed reserves should be utilized so the water systems can recoup water production costs. A consumption-based rate structure also makes paying for water more equitable between community members. Those that use the most, pay more. This has a tendency to make residents conserve and fix household leaks. Household leaks are major contributor to septic system failure due to hydraulic overloading. Also, comparing total water sold against total water produced tells the water manager how much water is being lost. In some cases this can be substantial due to leaks that don't surface or illegal taps.