STATE OF NEVADA
OPERATIONS TRAINING AND ASSISTANCE PROGRAM
FINAL REPORT – June 30, 2012

Austin

New facilities are now in use including two line ponds that are married to two rapid infiltration basins. Discharges are now taking place to the disposal basins. An influent bar screen is also in place followed by a Parshall flume. Monitoring equipment for the flume is now transmitted to the SCADA system.

The biggest challenge for Austin will be the amount of real estate that has to be maintained. Even the access road is many miles long with enhancements, gullies, drainage issues, damp areas, snow access and limited access by a series of gates. More time is needed to get access to the plant than is needed to operate and maintain the treatment plant. The county road department may have some responsibility or help as needed or requested.

The plant site covers about 7-10 acres and will need continual effort for weed and erosion control. The old pond is now dry and needs to be properly abandoned with solids disposal to an approved site after testing. Weeds are now growing in the disposal basin and will need some type of effort annually to maintain the basin.

Lab testing of the plant effluent and monitoring well shows that the facility is in compliance. The only major issue is a failed gate seal at the transfer box between ponds one and two. A seal failed allowing the lead pond to drain partially to one of the disposal basins.

The single downgradient monitoring well is now equipped with a stationary pump for ease in sampling.

Beatty

Beatty was visited numerous times during the 2011/2012 contract period. The facilities were upgraded to meet lined pond requirements with a few other facility changes. The new pond location required additional pumping to access the site. A vacuum-prime Smith and Loveless lift station was chosen along with standby power. No issues have been noted with pumping but corrosion of the metal surfaces may occur.

After just a few years, we are beginning to see some coating failure on the lift station base that sits on top of the wetwell. The base is metal with an epoxy coating.

The Circuit Rider has been advising the staff as to ways to eliminate the damp conditions inside the wetwell which allows condensation to collect on the underside of the wetwell cover plate. If this continues, we will have a surface failure that will be nearly impossible to restore. Much of the piping inside the wetwell is also not protected which will become an issue over time.

The ponds and headworks appear to be performing well with minimal aeration. The distance between the ponds is minimal and may cause issues if valve failures occur. We may find it more advantageous to replace intersecting transfer lines between ponds with shallow structures closer to the pond surface and abandoned the existing lines in place. It is not possible to replace valves put so deep in the center berms.

Beatty population has dropped to around 500 connections which is about 30-40% of the high when Barrick was on site. The cost of monitoring such a complicated water and sewer system moving forward will greatly impact the rates. Sampling and testing procedures are being following and the staff is well trained and dedicated to the tasks required.

Proper reporting seems to be an issue. Understanding the calculation of percentage of removal needs to be explained. Beatty also needs to be shown how to build graphs in Excel for their annual report.

The system operator was still a Grade One/OIT as of the beginning of 2012.

Boulder City

Boulder City has an unusual treatment system comprised of both activated sludge and pond treatment. Influent sewage is now screened and then enters a complete mix basin with sufficient aeration to provide a complete mix configuration. Headworks screening was added since the last visit and was greatly needed. Aerators are the donut-type which can clog easily greatly increasing maintenance requirements and manpower. Aeration is also diminished when debris buildup reduces aeration. Effluent from the basins is valved to additional earthen basins that allow settling of solids and sufficient mechanical aeration to help treat the aerobic upper layer. This minimal aeration promotes algae growth which supplements the dissolved oxygen needs.

Effluent is chlorinated and discharged to flow naturally in an open desert area. It is a very simple system. Maintenance consists of draining the settling basins every few years and collecting the solids for disposal.

The utility uses a contractor to do much of the work when cleaning a pond. A self-priming pump sucks solids from a nearly drained pond while a fire hose pushes the solids toward the pump. Two ponds (one on each side) are cleaned each year.

The only other real work required is maintenance of the aerators and chlorination equipment.

There is some real savings available by tying the chlorine feed pump to the Milltronics effluent flow meter. Currently, chlorine is added at the same rate 24/7. This bedroom community sees real flow variations that would allow a thirty percent or greater reduction in chlorine use if paced with the influent flow meter.

The facility requires very little maintenance on a daily basis. Money is tight with not much time available for a higher maintenance facility.

Reuse may come in the future but is limited in scope due to the minimal treatment.

Caliente

The Caliente wastewater treatment system was redone in the late 80's with successful plant operations to date. Over the years, we have reduced aeration in the four primary cells to just one or two aerators total.

The State had concerns that the minimal aeration could cause heavy solids buildup due to simple settling. Two or three years ago the basins were measured and the solids accumulation was minimal. It may be time to check all ponds as before.

Caliente's sewage is weak but some major collection line rehabilitation over the years coupled with a lower and/or controlled water table has shown some increase in strength through decreased inflow. It is the low sewage strength that allows all four treatment ponds to operate with minimal mechanical aeration by delaying treatment to adjacent primary ponds.

Caliente has always struggled with effluent reuse and pumping over the years; this year will be no different. This has been a dry year with spring coming early. Efforts are underway to apply effluent to the reuse site. The ability to maintain a viable crop may suffer if weather is delayed in the fall.

Both effluent reuse pumps were properly pulled, inspected and maintained. We have been able to gravity flow to the reuse fields when the storage reservoirs are full which keeps both effluent storage basins in check if pumps fail. We are not able to pull the basins down but levels can be kept well below a safe freeboard level.

Caliente has gone to great effort to maintain and improve the pond berms, roadways and center dividers. This was not easy considering the height of the berms and the steep slopes.

Aerators were pulled and maintained prior to the summer season. We have also experienced dirty power which has caused aerator and pump issues.

Sampling and testing are being done properly with samples transported to Las Vegas each month.

The city of Caliente is using DMRs provided by the Circuit Rider program. Some minimal training may be required on quarterly reporting.

Caliente now has a wastewater operator that is properly certified.

Ely

Ely was given much attention during the recent Circuit Rider years. A change in operations staff for water and sewer allowed us to make significant changes to the treatment facility and collection system. "Shovel-ready" funds were used to provide the facility with four lined ponds for bypass capability and lagooning of waste biosolids as needed. The first two recently lined ponds (two and three) still need the installation of mechanical aerators. Everything is in place to install the floating aspirated aerators but the operator would like to go through each one since they were in use for many years prior.

In recent years, the nitrate values at the effluent disposal site rose near or above the groundwater limit. Improvements to the activated sludge aeration system have allowed effective nutrient removal when coupled with controls modification. Nitrate values are now under control with the facility in compliance. The future will dictate installation of a fixed aeration system since the submersible jet aerators have proven to be less reliable over time. A spare aerator pump is now available after removal from the digester during the upgrades.

An inspection of all treatment basins should proceed in the near future. The four lined polishing ponds will allow the facility to be drained once the aerators are installed on the first two lined ponds.

The treatment plant was built with drain capability but only now is there the ability to stay in compliance for up to sixty days while bypassing the entire treatment facilities. Draining the plant for inspection cannot take place without supplemental aeration in the lined basins.

Ron has been wasting to the first pond (2) during recent failures of the waste pump and centrifuge. Additionally the digester aeration system was upgraded and waste solids were sent to the polishing ponds during that effort.

Solids have been floating up in the polishing pond in recent months due to spring activation. All ponds in Nevada have been doing poorly due to the early spring weather. Ponds will do better in the future as older solids incorporated with newly added solids.

There is a minor issue with reporting. MSL numbers are available for reporting but numbers are not consistent.

The Circuit Rider also provided assistance to the onsite operator on building how to build the quality assurance plan for his wastewater treatment laboratory.

Recent improvements to the facility are too numerous to mention but a few are listed below.

1. Centrifuge operational upgrades/repairs – reducing the run time by 60-80%.
2. Polymer supplier change, a reduced polymer dose and lower purchase price.
3. Reduction in lab expenses and manpower.
4. Clarifier improvements/performance by reducing RAS rate and better management of wasting. RAS flows are no longer continuous.
5. Aeration improvements allowing full treatment—increased treatment capacity, nitrogen removal and reduced power consumption.
6. Wasting improvements allowing for better use of centrifuge and manpower.
7. Flow meter calibration reducing recorded flow by over 25%.
8. Overall reduction in operation expense by as much as 20%.

9. New aeration equipment for the digestion should reduce odors and allow for less solids to process.

Eureka

This system has not experienced much change in recent years. Mining activity is increasing and has put pressure on housing. New housing is under construction coupled with a new sewer interceptor to the plant site. The new housing that was never occupied may also see a legal resolution that will provide additional sewage flows through the new sewer interceptor. This will have an impact on plant flows going forward. At this time, the facility is very lightly loaded and can easily receive additional flows without many or any improvements. Effluent disposal was upgraded many years ago but discharge to the site has never occurred. Neither of the primary ponds is in full use failing to fill sufficiently to export flow to any of the disposal basins during the summer months.

The plant is remotely located and without power. Influent flows are measured with a low voltage system. The older meter has been replaced with a much better unit.

The plant is visited routinely by a dedicated staff of operators.

Fernley

Fernley is a three-train system consisting of two ponds each. All ponds are lined and quite deep.

The operator appears to have a good handle on the best operating strategy for the facility. Mechanical aeration is employed and mostly at night when most beneficial. The primary ponds in each of the three trains seem to be under some duress (under aerated) and may not be able to fully benefit from algae production of beneficial oxygen during all seasons. Samples were collected by the Circuit Rider during some of the peak load demands of spring/summer activation. The Circuit Rider is in full agreement that it is not always necessary to achieve high quality in the primary pond. Some delayed treatment held over and achieved in the secondary pond can meet discharge limits and keep power costs under control. Over-treating the primary pond can cause an algae bloom in the secondary pond raising BOD, TSS and pH values above discharge limits. Prior testing revealed that the effluent from all three trains was elevated near or above the limit. The combined effluent values would depend somewhat on the time the samples were collected as well as the time of year

Aeration does not always improve treatment due to corresponding temperature changes. Aeration is mostly needed at night as cool nighttime temperature can reduce treatment. Additional mixing can bring solids to the surface requiring aerobic treatment.

Dissolved oxygen values were taken and compared with Fernley's own test equipment. Results for both meters were within range and with the older Fernley equipment; they were able to measure oxygen values that were useful for plant management. The newer type meter is advantageous in that it requires less effort, operator time and "spot on" accuracy.

Operator attention to the facilities is excellent especially given the current economic conditions. Jay is the lead operator and has hired some good support staff.

Gabbs

Gabbs has always been a difficult plant to operate properly. The facility is currently operating with basins receiving flow in series without the use of any of the disposal basins.

The primary pond is somewhat overloaded with odors and floating solids. The site is remote and these conditions may not be of great concern as they can be seasonal in nature.

It may be possible to split the influent flow at the meter box, although the structure was not designed for effective flow control. In addition, keeping two primary basins at full operating levels at current flows could be a challenge.

The plant site covers a large area with a large somewhat sparsely loaded collection system that supports the town. Flushing the collection system is a must given the long and sometimes flat sewer interceptors that connect upper and lower Gabbs.

Weed control can also be a challenge with large land areas.

Operator turnover and support staff has always been an issue. The lead operator lives in Pahrump and site visits are infrequent. There is a full time operator on site with many other jobs he must perform.

Gerlach

We made two trips to the Gerlach facility in 2012. With the plant closing in Empire there is less impact than one would assume since few people from Empire live in Gerlach. The impact came from

the school closing and the teacher housing that was provided. The school will close with the loss of a few housing units but the impact will not be significant either to flows or utility revenues. Empire may reopen as housing for a local mine but would not necessarily allow the status of the school to change. Gerlach now has around one hundred connections for water and sewer. Given that treatment is provided for both, it is difficult to support these services with such few customers.

Office staff has been difficult to retain with much turnover in recent years. Raises are needed for the staff but no funds are available.

The treatment facility construction for liner installation has been completed on all primary ponds. A new large primary pond was added in conjunction with the new school which will now close.

The town's single lift station servicing just a few homes has been replaced. Sewage drops into the wetwell some distance above the operating level. This allows gases to release moisture and saturate the wetwell. Metal surfaces will suffer under these conditions. We have discussed options to pipe the influent down at or below the operating level inside the wetwell. This could be done at little cost and done with in-house labor.

We also noted that the electrical conduits were not properly sealed and could allow gases to enter the electrical panel. At a minimum, putty needs to be added to seal gases out of the panel.

Goldfield

Plant improvements now provide ponds lined with HDPE. This has been a major improvement since berm integrity is resolved and most weed problems become a thing of the past. Lining the ponds now does allow some minimal amount of effluent to reach the disposal basins during the winter months.

Mining activity may eventually increase sewage flows for better plant utilization.

Flow monitoring and collection system maintenance are the major areas requiring labor and expenditures going forward. Disposal basins should receive some attention annually to deter weeds.

Hawthorne

The Hawthorne wastewater system was upgraded around concerns with the high groundwater nitrates and the need for a lined pond, which is now mandatory for raw sewage. An advanced integrated pond (AIP) system was chosen as the main component for the facility upgrades. If nitrate pollution had a role in the treatment alternative chosen, it may have little impact on effluent nitrogen

concentration. I recently sampled Tonopah's AIP facility at the effluent. Nitrate values were somewhat less than normal raw sewage (18 mg/l NO3-N) but total nitrogen was in the forties. The new facility may do little to reduce groundwater nitrates. I don't know if it was ever determined if the base was a major contributor to the nitrates by way of explosive handling.

With the system up and running for a few years, there are few indications that the facility improvements are beginning to bear fruit. Advanced pond systems rely on a store of solids which remove BOD under anaerobic conditions. There is no clear consensus as to how much nitrogen removal can be accomplished with this type of treatment. My understanding is that we will see no more than a twenty percent reduction in effluent total nitrogen values.

Future visits to the facility will require concentration on the management of the AIP system. Frequent testing of the influent pond BOD removal efficiency is a must. In addition, monitoring of the solids depth will allow us to see if we are retaining the proper amount of solids to achieve treatment. Removal of solids may also become an issue to be addressed.

Indian Springs -NDOC

Indian Springs Southern Desert Correctional Center comprises of two independent pond systems of various size and depths. Each system has one primary pond and one secondary pond. The raw sewage is fed intermittently to each treatment train and then rotated on a monthly basis.

The older shallow ponds have accumulated a few feet of solids and removal is recommended at this time. NDEP has given verbal approval to allow solids removed from the primary pond to be dried in one or two of the effluent disposal basins. The dried solids would be trucked to an appropriate disposal site after passing paint filter and metals testing. Our recommendation is to keep the primary basin in service and siphon and/or pump the solids off the pond bottom. Given the weighted ballast tubes placed frequently throughout the pond, it would be difficult to dry in place and then remove the solids by mechanical means. To be effective, it may require a combination of pumping and siphoning to the lower disposal basins for the greatest success. We would hope to capture upwards of sixty percent of the total solids inventory through the removal process. The headworks mechanical screen grinder was just replaced and will help to reduce debris entering the ponds. Solids removal may or may not work and the amount of debris may be a determining factor in that success.

The State of Nevada has entered into a contract with a company whose sole purpose is to reduce overall energy consumption by all means possible. This effort led to the installation of Solarbee mixers in all ponds; cost savings comes from turning off the existing mechanical aerators.

It has been noted that pond color and clarity has deteriorated since the installation of the Solarbees. Since Solarbees are mixers and not true aerators; the ponds must rely on algae to produce oxygen. Mixing can be employed to bring lower oxygen water nearer the pond surface or to ensure adequate mixing, less short-circuiting and better contact with the applied wastewater. Use of the mixers alone will not meet all treatment requirements.

It appears that some use of the mechanical aerators is warranted to ensure that the symbiotic relationship between oxygen producing algae and aerobic bacteria is maintained at all times.

McGill

Improvements to the sewage collection system included the abandonment of one of the two sewage lift stations. Now all but a few homes require assistance to access the gravity sewer. With the sewer replacement, all of McGill's sewage facilities are in good shape and should provide up to forty years without any major capital outlay.

The treatment pond divider curtain is now approaching twenty-five years of age and ice cover has streaked the exposed portion. Replacement will be required within five years at considerable expense. Aerators may also require some replacement as they are also twenty-five years old.

The pond is operated as a facultative pond with aspirated aerators that mix fairly shallow. The ponds are not heavily loaded but it is time to check for solids accumulation and plan a future date for removal.

Other than spring activation following heavy ice formation in the winter, the ponds always have an excellent color and clarity. The headworks screening removed most floatables—leaving very little daily pond maintenance.

The five disposal basins have a monthly dosing cycle that shows very little standing water at dosing. Since the basins are only dosed about twice a year, weed growth and percolation rates are not much of a concern. Most maintenance at the site consists of weed control on the berms and aerator maintenance.

Monitoring wells do not represent proper groundwater conditions. The heavy dosing of a corresponding disposal basin can elevate monitoring well nitrates above the limit.

The long time operator retired a couple of years ago and his new hire/replacement lacks experience. Robbie is the lead operator with many years of hands on experience.

Mesquite

Mesquite is one of the best built and maintained mechanical plants in Nevada. Recent upgrades complete all present and future needs of the community. Much of the plant capacity is not needed allowing the original oxidation basin to be drained and mothballed. It may be some time before the entire facility is in operation.

Bill Tanner has been the lead operator since before Mesquite became independent from Clark County. The utility has always run a lean work crew. Bill is well aware that additional training and experienced staff will be needed moving forward.

The new facilities may have the added benefit of reducing the need for equipment repair/replacement for the near future permitting corresponding reductions in manpower. Bill and the lead operator are approaching retirement and the experience gap may also impact the facility over the next five years. As the system ages, additional manpower will be a must to properly meet all system needs.

Pahrump

Utilities, Inc. operates two major treatment works and a small package plant in Pahrump, Nevada. The main facility has gone through major upgrades from the original package plant. The original facility is now used for flow equalization and an aerobic digester. Treatment now employs two sequential batch reactors, effluent flow equalization and UV disinfection followed by chlorination. The system is well managed and operated by the staff. Housekeeping is also excellent.

Problems (not operator caused) with the facility are numerous and complicated. The major compliance problem relates to intermittent poor settling and corresponding high effluent TSS values. Small amounts of ferric chloride continue to be added to the influent to reduce hydrogen sulfide and some septic conditions which could be the catalyst for the filamentous organisms but the dose is small. The book is still out as to whether this is the reason for the recent effluent improvements.

Chlorine has been and is still being fed into the influent entering the SBR's to control settling by breaking down filaments

Utilities, Inc. has hired a firm that identified the odor source as hydrogen sulfide. Sensors have been placed throughout the golf course plant to locate the source of H2S. Information will be downloaded from the sensors and evaluated.

The main metal cover for the influent equalization basin (EQ) is scheduled for replacement due to heavy corrosion and potential structural failure.

During the last field trip, I was looking at what could be done to pump directly to the SBR influent lift station and bypass the EQ tank. If this were done, the majority of the raw sewage would never end up in the EQ. Bill runs the two reactors so that they are filling on a constant basis. With this plan, only what was in excess of the pumped inlet to the SBR would overflow the wetwell and reside in the EQ basin. This would require major changes and the engineering of piping and valves but could reduce the release of the H2S and the extra detention time would allow the sewage to degrade further.

We believe that one of the big issues causing poor plant performance is the very short batch cycles. As programmed, the system allows a six-hour cycle which does not give sufficient time for anoxic feed, aeration, settling and decant function. We would much rather see eight-hour cycles or longer.

We will probably have to go back to the manufacturer to get the programming changed. Additional changes to the program are also warranted and can be discussed going forward.

Effluent chlorination is also a concern. Chlorine dosages are almost toxic at the current rate. We have recommended that they consider using the effluent equalization basin as a contact basin. The issue appears to hinge on whether they can seal up the floating decanter sufficiently to stop solids losses even when they are not decanting. Another way to get around solids getting into the tank would be to place a 2-3 inch bypass line on the main effluent line and bypass that flow stored in the decant line prior to opening the main decanter valve to flow to the effluent tank. Using the effluent tank for chlorination could reduce the dose to less than 5.0 mg/l since the effluent could be held for many hours prior to starting the pump discharge to the golf course.

The second SBR facility (also operated by Utilities, Inc.) was very lightly loaded which was much different than many of the issues seen at the main plant. Effluent chlorination did have the same

issue of excessive chlorination. The effluent wetwell/holding basin (again) would be perfect for a chlorine contact basin.

At this time, the small package plant is causing the most effort to meet discharge compliance. The plant is an upflow clarifier system and the RAS flow is mixed with the raw sewage for denitrification. Flows are very low and plant control is difficult due to the cyclic nature of the system. Bill has installed a VFD on the influent pump station to pace the flow and stabilize plant performance. Even with the changes, the plant has spotty performance.

Panaca

The new pond treatment system is on line and providing good treatment. Treatment should be greatly enhanced with the additional pond depths and added detention times. The third pond which never had but a few feet of depth can now provide treatment and storage for batch dosing to the three disposal basins.

The effluent disposal basins are designed to be dosed on one-day cycles and then rotated to another basin. The twenty-four hour dosing should drop the third pond by as much as three feet and allow 7-10 days of storage between dosing of basins. We may find that mounding of effluent just beneath the three basins from frequent dosing may occur. The disposal site can accommodate additional basins with few improvements or piping changes. The land is not owned by the Farmstead Association but it has little utility for the owner. A fourth basin would double the disposal capacity of the basins.

The new sewage lift station is a good design with only one issue. Both pumps are equipped with ball check valves that appear to be too light for the application. A heavier ball would seat prior to reversal of flow in the line. Currently, there is some water hammer which over time may result in a pipe failure.

Pioche

Pioche recently upgraded the three lagoons by lining each of the ponds. Both of the fixed aerators in the small first pond were replaced with new floating blower assisted aspirated units. Pioche receives septage during the summer and aeration is a good addition in the smaller inlet pond that receives all of the septage. Only one aerator is required to run and is set to cycle throughout the day.

Treatment in the three lined ponds is excellent with the exception of periods when poor or severe weather persists which can impact the ponds at the high elevation. The two secondary ponds can ice

over during the winter. Both secondary ponds are now able to stay full which was never the case without the HDPE liners. The added detention time has also improved treatment prior to disposal at the large percolation pond. The disposal pond receives flows continuously. It may be possible to modify. The plant allows intermittent discharge to the basin and reduces weed growth.

Monitoring wells were added to the site but were not drilled to groundwater. Monitoring wells are located near the treatment ponds, though the depth to groundwater may restrict the need for nitrate compliance at the disposal basin.

Flow monitoring is provided by a Marsh-McBirney meter on the inlet to the first pond. The meter was recently calibrated by the contractor's representative.

The sewage collection system dates back to the fifties or sixties; manholes are made of red brick. Due to the steep terrain and rapid flow in the collection system, it appears that much of the underground system is in good shape. The pipe is comprised of vitrified clay sections.

The system is well operated and maintained.

Spring Creek

The Spring Creek facility employs a small package wastewater treatment plant in the commercial area at the far end of the service district. The system is not heavily loaded but requires some attention and operator understanding for efficient operation and maintenance.

The system employs the standard aeration basin and clarifier. The need for nitrogen removal means the system also employs an anoxic basin and mechanical mixer. Plant operation has not always been easy. This is mostly due to heavy foam accumulation and occasional high effluent nitrates. Wasting of the solids is also difficult and time consuming.

The Circuit Rider has been working with the operator for training and plant management. Utilities, Inc. operations staff greatly appreciates the help and have a much better understanding of the system. A recent addition to the process has been increasing the decant water from the three new arsenic treatment plants. This is an NDEP approved method but changes in the arsenic plant decan water has adversely affected the plant performance. If the quality does not improve, they will be forced to stop receiving waste.

Tonopah

The town of Tonopah upgraded their system a number of years ago and is seeing improvements in effluent quality and power savings through decreased mechanical aeration requirements.

The State training and assistance program (aka Circuit Rider) has been testing all ponds monthly for BOD, CBOD, TSS and pH at no cost to the utility. This has allowed us to monitor pond performance and aeration requirements over an extended period. Recent testing for nitrogen has shown some reductions but not more than 25%.

The overall depth of settled solids in the advanced pond was measured last year by the Circuit Rider. Solids depths are now sufficient to expect pond BOD removal trends to demonstrate how well the system will perform over the foreseeable future. Solids accumulation should now allow mining of some solids to the disposal basins. This will be done this summer and analysis on the solids will help to determine system performance.

In prior years, aerator run times appeared to be concentrated at night during the spring and early summer. This spring pond performance appears to show a great improvement with minimal aeration. This mode of operation seems to be less of a function of how well the advanced pond performs, instead showing the delayed activation of settled algae solids that exert a demand during the warmer periods of early spring.

The Circuit Rider is working with the plant operator to find a practical way to reduce organic solids capture in the new rock trap at the head of the plant. Tonopah's older collection system can bring in materials that can damage the mechanical screen and cause it to become inoperative. We needed to find a way to protect the screen from long term damage but organic solids are settling in the chamber. A coarse air system may be the answer--allowing organics to be scoured from the tank, thereby reducing service intervals.

Samples will continue to be taken to confirm AIP performance. Waste solids should become significant in quantity once balance is established.

Wells

Wells long time operator is no longer employed with the City and the existing staff has taken the lead operator position.

Most of the facility has experienced little change over the years. The system was upgraded in the 1980's. Some major mechanical equipment has been replaced and other parts of the system may be reaching its useful life expectancy in the coming years.

For many years the effluent reuse fields were inundated with too much application requiring maximum use of both fields and irrigation pivots; lining of some older collection lines and abandonment of others has reduced flows sufficiently to only operate a single pivot. Since both pivots were replaced in recent years, the lower usage will allow many years without additional expense. Pumping equipment for effluent reuse is aging but may get extended use through less time in use going forward.

Treatment is provided by two larger treatment ponds. The lead pond has a single aerator. The future will dictate that one or both ponds will be lined with HDPE. The site is well represented by monitoring wells which would indicate any issues with nitrates prior to sealing the site

Compliance can be spotty for BOD since Wells is at a high elevation and is famous for severe winter weather. Ice covers the ponds during most of the winter leaving the remainder of the year to catch up on treatment.

Storage reservoirs are not allowed as credit for treatment but it is impossible to dismiss the impact on effluent quality improvements prior to application on the reuse fields.

Understanding of the permit and required reporting is a bit of a problem.

The system has a new certified operator; the focus for this community should be to get him trained.

Winnemucca

Winnemucca wastewater system is "treading water" with few improvements. They are right on the edge of spending time and capital for future planning, system improvements, pumping equipment, aerator improvements and many other items that will be identified moving forward. The big issue will be nitrogen and/or phosphorus impact on this stretch of the Humboldt River.

As currently operating, there is minimal aeration and much of the equipment in use is very inefficient. Solarbees are in place in all ponds but the need for mixing is questionable given the complete lack of short circuiting, with the exception of the last square-shaped pond.

Winnemucca ponds are remotely located. Odors generated on the primary pond dissipate quickly and are of little concern. Overall the system has plenty of capacity and meets effluent limits as currently required. As far as the plant is constructed, the main issues circle around the headworks, influent pumping, safety and the general age of the facilities.

Influent pumps are protected with channel grinders which stop larger material from fouling the solids handling pumps. These two grinders are nearly new and appear to be 100% effective for their intended use. The influent pumps can be a nightmare. Pumps and ball check valves are not accessible from below. We recently replaced one of the three pumps. This requires a lot of effort in a small area where a standby pump is part of the temporary fix. Replacement of the influent pump is not one of our favorite tasks but it pales in comparison to trying to work on the ball check valves. This was done a number of years ago and should last for the foreseeable future.

Influent flows are pumped to a weir vault on the south end of pond one. Flows are then split between ponds one and three with pond one receiving the bulk of the flow. Most of the aeration is concentrated in these two ponds. We have been operating for some time with a recycle pump from pond five to the inlet end of pond one. This change has allowed pond one to completely change in performance and achieve a green color without the normal odors associated with overloading.

With this change last year and over the winter, we saw excellent performance with minimal mechanical aeration. This spring was not as good but we saw a reduction in beneficial algae for and infestation of Daphnia. Daphnia rapidly depletes the algae with the results of less treatment taking place.

All ponds are earthen with rip-rap on all sides. Weed control is a major issue for berms and roadways.

Winnemucca is required to show improvements over the next few years. Managements is looking closely as to how to best move forward starting with some type of preliminary engineering. If we stay by the river and phosphorus limits are imposed in addition to nitrogen removal, an alternate site may be advantageous. The river also has flooding issues that have been repeated many times over the years. Flooding or damage to the main trunk line leading to the plant is also a concern. There is one site near the plant where the interceptor line must be continually protected by heavy rip-rap.

Plans are underway to visit the Ely State Prison fixed-film treatment plant. This type of treatment may match up well with the existing Winnemucca system. If phosphorus removal is required in the

Humboldt River during the summer, treated effluent can be exported off site to irrigation reuse or disposal basins. Winters months may allow use of existing disposal basins for effective nitrogen removal. All of these objectives can be part of a fixed-film system. Solids treatment and storage of excess biological floc can be kept in one or more of the deep treatment ponds.

The monitoring wells can be an issue; they are not properly located or constructed to meet all present design standards for placement.

Yerington

After years of trying to operate the full treatment plant with minimal aeration (due to low sewage flows), someone finally decided to mothball half of the facility. The system consists of two identical flow trains which can be easily bypassed at the inlet weir box.

Each of the primary ponds is equipped with four high power use aerators. The utility was operating only two of these in each basin in an effort to save power. It is imperative that at least two of the four aerators are operating to ensure proper suspension of biological floc. The basins were designed to provide a complete mix configuration. Without floc formation, the basins are too small to operate as facultative ponds and solids buildup in the pond bottom would greatly influence seasonal variations.

The utility had many problems with the effluent magnetic flow meter but that has been resolved for many years. Plant flows are still low enough to employ gravity flow to the effluent disposal site. The system is equipped with two submersible pumps which come on line if the effluent wetwell depth increases above current operating levels.

Both collection system lift stations are operating properly. The main lift station was revamped to utilize submersible pumps. This has been a great success in that the older drywell pumps were subject to additional maintenance and inspection. The wetwell was also improved for better access and less potential for corrosion.

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