

Water Lines



Featured Facility:

City of North Las Vegas Wastewater Reclamation Facility

By: Bob Foerster, NvRWA



The Water Reclamation Facility (WRF) is a state-of-the-art facility using submerged membrane bioreactor technology to produce extremely clear reclaimable water. When placed online, the 25 million-gallons-day capacity plant was the largest of its kind in North America and one of the largest in the world. Currently it is the third largest MBR treating wastewater in the world. Advanced nutrient removal is used for the removal of phosphorous and nitrogen before discharging the highly treated wastewater to the Sloan Channel. Disinfection is accomplished using sodium hypochlorite. This is

followed by dechlorination using sodium bisulfite.

In January 2004, the City Council authorized an in-depth analysis on wastewater treatment options for the North Las Vegas. In October 2004, the City Council directed staff to pursue construction of a wastewater reclamation facility and authorized the city manager to pursue a site for the facility. The proposed Wastewater Reclamation Facility and all associated infrastructure cost about \$321.3 million

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and was funded with bond proceeds and capital reserves.

Construction of this facility was substantially completed in August 2011. The Water Reclamation Facility is up and running since June, 2011 with an average daily flow of 17 MGD. This is about 90 percent of the wastewater produced in North Las Vegas. The facility allows independence from the City of Las Vegas and Clark County Water Reclamation District wastewater treatment rates and provides North Las Vegas the ability to maximize efficiencies of operations and water resources.

Highly trained personnel operate and maintain the facility 24 hours a day, 365 days a year through an extensive computerized operational system. Staffing is lean -- 22 workers altogether. Operators who are on call have take-home computers and cell phones. Remote monitoring required a large investment in both cyber security and modern physical security.

The WRF came online at a time North Las Vegas was grappling with the Great Recession and implementing a vast reduction in force. Still, the city needed all new staff to get the plant operational. The plant operations and maintenance staff was built up from staff leaving other city departments. The new staff rose to the challenge. All of the operators earned certifications within six months. They also each passed the Grade II exam on the first try, and now some are waiting to gain the experience needed

to apply for Grade III certifications. Maintenance staff got off to an excellent start, implementing a computerized maintenance management program from the beginning. The lab does all of the process control analyses and is in the process of certifying to carry out the conventional testing, such as BOD, COD, fecal coliform, and TSS, in-house. Permit compliance work currently is sent to a certified lab.

The A²/OTM process, a combination of oxidation and anaerobic cycles, is used for simultaneous nitrogen and phosphorus removal. Mixed liquor is separated on the membrane system, (GE Zenon) and the permeate is disinfected. The end result of this treatment process is a facility that discharges reclaimed water with parameters at or below the laboratory detection limits for most constituents of concern.

Permeate turbidity is monitored; experience has shown that biofilms quickly plug any small breach if a membrane is compromised. Unlike drinking water applications, integrity testing is not required, but can be initiated by isolating a cassette to identify the faulty module. The membranes are regularly cleaned. Regular, automated maintenance cleaning is done using a clean-in-place three times a week, the cycle being twice with sodium hypochlorite and once with citric acid. Twice a year, a recovery cleaning is called for, involving draining the basin, removing sludge, filling with permeate and adding a high concentration of sodium hypochlorite, soaking 24 hours, and rinsing. The procedure is repeated using citric acid.

Nitrification and Denitrification has been very successful with the A²/OTM process, producing effluent having less than 5 ppm inorganic nitrogen and ammonia at the detection limit. Phosphorus results are similar in cool water conditions, but removal requires chemical treatment during very warm water conditions. Discharge permit requirements (TMDL) allow 35 pounds phosphorus per day during March through October, which works out to approximately 0.23 ppm. Experience and research at the North Las Vegas facility has been that when water temperatures are around 28 °C, the conditions select for glycogen accumulating organisms, as opposed to the phosphorus

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Work It! Q & A

Answers to the “Work It!” questions are on page 8.

1. When chlorine demand has been met, each additional ppm of chlorine added to the water will result in:
A. Additional disinfection byproducts B. More destruction of organic molecules in the water
C. One ppm of Oxygen Depletion D. One ppm of free available chlorine residual
2. Which NSF / ANSI designation is the standard applicable to drinking water treatment chemicals?
A. NSF 50 B. NSF 60 C. NSF 61 D. NFS 62
3. Drinking water disinfection using ozone is much more effective than chlorine for which group of pathogens?
A. fungi B. protozoa C. bacteria D. green algae
4. A new 14-inch line is 16,600 feet long and is to be disinfected by the continuous feed method, and the operator wants to dose at 14 ppm to be sure at least 10 ppm is present after 24 hours. The pipe has been flushed and is to be filled at a rate of 225 gpm. What should be the rotometer setting on the chlorinator, in lbs Cl₂ /day ?
A. 32 ppd B. 38 ppd C. 15 ppd D. 120 ppd
5. One possible benefit of water conservation is:
A. Decreased wastewater flows, although with higher BOD per unit of volume
B. Decreased revenue due to less volume sold
C. Increased salt content in customer landscaping soils
D. Difficulty in convincing customers that a new source of supply is needed
6. Calculate the theoretical detention time in hours, for the following basin: 200 ft wide, 300 ft long, 70% full with a sidewall height of 20 feet, when the rate of flow is 3 MGD?
A. 6 ¾ hours B. 2.1 days C. 3 days D. 3.6 days

Work It! Is prepared by the NvRWA, you can contact them at 775-841-4222.

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accumulating organisms more common during cooler conditions. Each August through early October, biological phosphorus uptake falls off, and ferric chloride is needed to chemically remove phosphorus compounds.

Sludge removed at the bioreactors is settled, then dewatered using gravity belt thickeners followed by centrifuges. This process sequence has been very successful, producing biosolids with 22 – 23 percent solids.

Extensive training has paid off by quickly bringing inexperienced staff up to speed, successfully operating and maintaining a highly automated, state-of-the-art plant. Training was done in-house, and using resources such as the College of Southern Nevada and NWEA.

Thanks to Water Reclamation Facility Administrator Dave Commons for providing photos and information on the facility.



Answers to the Work It! questions

1. d 2. b 3. b 4. b 5. a 6. b

NOTES:

No. 2

NSF 50 Pool, Spa, and Recreational Water Products

NSF 60 Drinking Water Treatment Chemicals

NSF 61 Drinking Water System Components

NSF 62 Drinking Water Distillation Systems

No. 4

$$225 \text{ gal/min} \times 1,440 \text{ min/day} \times 1 \text{ MG} / 1,000,000 \text{ gal} = 0.324 \text{ MGD}$$

$$\text{Lbs/day chemical} = \text{dose, mg/l} \times 8.34 \times \text{MGD}$$

$$\text{Lbs/day chemical} = \text{dose, 14 mg/l} \times 8.34 \times 0.324 \text{ MGD}$$

$$\text{Lbs/day chemical} = 37.8$$

No. 5

$$200 \text{ ft} \times 300 \text{ ft} \times (20 \text{ ft} \times 70\%) \times 7.48 \text{ gallons / ft}^3 = 6,283,200 \text{ gallons or } 6.2832 \text{ MG}$$

$$6.2832 \text{ MG} \times 1 \text{ Day/3 MG} = 2.09 \text{ days}$$

Wastewater Exam dates for 2012 & 2013:

Exam date - 3/15/13 Deadline - 2/21/13 ; NvRWA Conference (testing in Reno only)

Exam date - 3/21/13 Deadline - 2/21/13

Exam date - 6/20/13 Deadline - 5/20/13

Exam date - 9/19/13 Deadline - 8/19/13

Exam date - 12/19/13 Deadline - 11/19/13

Change of Mailing Address Requested

Operator Certification Administrators have noted that a number of certificates are being returned to the State, because Operators have not updated their mailing addresses after moving. Operators are asked to promptly notify the State when they have changed addresses.

Please contact Nan Paulson at 775-687-9447 or npaulson@ndep.nv.gov

Updates and Announcements

2014 Priority List Solicitation Letters

Nevada Division of Environmental Protection (NDEP) is in the process of preparing the State Fiscal Year 2014 Priority Lists for projects to be funded from the NDEP, Drinking Water State Revolving Fund (DWSRF) and Clean Water State Revolving Fund (CWSRF). **Only projects on the DWSRF and CWSRF Priority Lists are eligible to apply for funding from these programs.** The 2014 Priority List Solicitation Letter went out in December. If you are interested in applying for a Drinking Water and/or a Clean Water Project loan a Pre-Application must be submitted to NDEP. In order to be included in the 2014 Priority List (s) Pre-Applications and/or written letters requesting to remain on the list must be submitted by February 15, 2013. Keep in mind that although the lists are ranked and your project might be low on the list, NDEP gives preference to projects ready to proceed.

For additional information on the Clean Water State Revolving Loan Fund or to download additional copies of the loan pre-application or for a copy of the letter, visit our website

<http://ndep.nv.gov/bffwp/srlf01.htm> or the Drinking Water State Revolving Loan Fund website

<http://ndep.nv.gov/bffwp/dwsrf1.htm>. Please do not hesitate to call me at (775) 687-9489 or email ddobson@ndep.nv.gov or Michelle Stamates at (775) 687-9331 or email mstamate@ndep.nv.gov, if you have any questions or need to know which of your projects are on the 2013 Priority List.

Water Operators: Contact Hours & CEUs

Obtaining Contact Hours and Continuing Education Units (CEUs) is a crucial requirement for every Water Operator that works in the State.

Education programs provide Water Operators the opportunity to improve their understanding of the Drinking Water Industry. For example, Water Operators can choose to enter the areas of Water Distribution, Water Treatment, Water Quality, Backflow, Management, etc. It also allows Water Operators to further develop their skill levels. By improving their skills, they will be better prepared to provide and protect safe drinking water for everyone. In addition, they will become more familiar with new developments in their field as technology and regulations change.

When Water Operators are looking for continuing education options, they should check the NDEP Bureau of Safe Drinking Water's Calendar of Events for approved contact hour classes for certification renewal. The NDEP requires Grade 3 and Grade 4 operators to take courses from International Association of Education Training (IACET) authorized providers or accredited colleges.

Wastewater Operators Certified



The following wastewater professionals passed their Wastewater Treatment, Laboratory, Collection, Industrial Waste Inspector, and Nevada Plant Maintenance exam in Sept & Dec 2012.

WASTEWATER TREATMENT GRADES

Grade 1: Donald Ahlstrand, R.J. Clendenen, Shannon Gutierrez, Peter Lumos, Steve Shaffer, Paul Shapiro

Grade 2: Peter Baratti, Robert Wallace

NEVADA WASTEWATER QUALITY ANALYST

Grade 1: Anna Bell

NEVADA COLLECTION

Grade 2: Peter Baratti, Thomas Taflin

Grade 3: Alex Macri

NEVADA PLANT MAINTENANCE

Grade 1: Steven Abernathy, Erick Searfoss

Grade 2: Donald Ahlstrand, Matthew Sunseri

Grade 3: Dave Brant

Water Operators Certified



The following water professionals passed their Water Treatment and Water Distribution exams in June 2012.

Water Distribution Grades:

Grade 1: Adam Carver, Fred Crosby, Stephen Hughes, Jamin Lynn Hunter, Phil Johnson, Daniel Krznarich, Juan Leon, Juan Moreno, Dave Pardew, James Poulsen, Edmund Quaglieri, Adam Roney, Jack Sell, Mason Stratton, Cynthia Turiczek

Grade 2: Galen Benn, Gabriel Corral, Robert Cummings, Mathew Gleason, Corbin McFarlane, Larry Proctor, Shawn Walker, Tommy Winans

Grade 3: Ryan Kolda, Kenneth Rock, Jason Smith, Joseph Westerlund, Brian Wight

Grade 4: Joseph Arnold, Michael Boney, Kenneth Rock

Water Treatment Grades:

Grade 1: Robert Capehart, Oswald Henke, Jamin Lynn Hunter, Cameron Klug, Daniel Krznarich, Roger Marshall, Edmund Quaglieri, Adam Roney, Isaac Steed, John Stock, Cynthia Turiczek

Grade 2: Elizabeth Henasey, Clarence Howard, Matthew Martesen, Jeff Wohlgemuth

Grade 3: Christopher Maes

TRAINING CALENDAR

Check out ongoing Training from RCAC at:
<http://www.rcac.org>

Ongoing On Site - Various Management, Board, Wastewater and Water Topics, at your request - NvRWA, <http://www.nvrwa.org/>
Contact: Bob Foerster at 775-841-4222

Upon Request: Instructor-Lead CSUSac Courses: Distribution or Treatment, 6 - 8 weekly trngs. Contact NvRWA for details and to schedule. Gain the approved post-secondary training while preparing for your exams. Also offering water and wastewater classes powered by SunCoast Learning Systems. Water Courses have been approved for recertification hours. Visit the NvRWA web page and select the SunCoast Learning target: <http://www.nvrwa.org/>
Contact: Bob Foerster at 775-841-4222

*send us your email address to get on the announcement list.

NDEP Bureau of Safe Drinking Water - training calendar for approved classes:
<http://ndep.nv.gov/dwo/main/calendar.html>

Nevada Section of the American Water Works Association. Visit the web site www.ca-nv-awwa.org for many more education opportunities

American Water College -
<http://americanwatercollege.org/>

Montana Water Center -
<http://watercenter.montana.edu/training/ob2005/default.htm>

Office of Water Programs at the California State University, Sacramento -
<http://www.owp.csus.edu/courses/catalog.php>

Nevada Water Environment Association (NWEA) has an approved course list on their website and they also grant blanket approval for training from the following organizations:

Nevada Water Environment Association -
<http://nvwea.org/certification/training-opportunities>

California State University - Sacramento (Ken Kerri) Correspondence Courses -

<http://www.owp.csus.edu/courses/catalog.php>

Nevada Rural Water Association Annual Conference - <http://www.nvrwa.org/>

Tri-State Seminar On-the-River -
<http://www.tristateseminar.com/>

Water & Wastewater Education and Training -
<http://wwet.org/>

Water Environment Federation – www.wef.org

The NWEA has an online training calendar that can be found on the NWEA website at <http://nvwea.org/certification/training-calendar>

Please visit our website at <http://nvwea.org/> to view other helpful information about NWEA.

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STATE OF NEVADA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF FINANCIAL ASSISTANCE
901 SOUTH STEWART STREET SUITE 4001
CARSON CITY NV 89701
RETURN SERVICE REQUESTED

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Water Lines

Winter 2012

NV Water and Wastewater Operator's Forum Members:	Training Contacts
<p>Bob Foerster, Chair 775-841-4222 NvRWA - nvrwa@pyramid.net</p> <p>Harvey Johnson, Chair 775-832-1289 Incline Village GID - Harvey_johnson@ivgid.org</p> <p>John Hulett 775-954-4612 Washoe Co Water Resources - Hulett@washoecounty.us</p> <p>Cameron McKay, 775-588-3548 Kingsbury GID - cam@kgid.org</p> <p>Dale Johnson 775-738-6816 Elko Co Public Works - djohnson@elkocountynv.net</p> <p>Dave Johnson 702-567-2051 Southern NV Water Authority - dave.johnson@snwa.com</p> <p>Lynn Forsberg 775-738-6816 Elko County Public Works - lforsberg@elkocountynv.net</p> <p>Tom Georgi 702-822-8026 Las Vegas Valley Water Dist - Thomas.Georgi@lvvwd.com</p> <p>Mike Ariztia 775-673-2220 Sun Valley GID - mariztia@svgid.com</p>	<p><i>University of NV, Reno - CABNR & Cooperative Extension</i> UNR videoconference classes for water system operators and managers are available in most communities. Call Crystel Montecinos at: 775-240-1396 or email at: xtelle@aol.com</p> <p><i>Community College of Southern Nevada Wastewater Water Technology Program www.cleanwaterteam.com</i> LeAnna Risso at 702-668-8487 or LRiso@cleanwaterteam.com</p> <p><i>WWET Training in Clark County - www.wwet.org</i> Training for water treatment and distribution system operators, wastewater treatment and collection system operators, and other professionals in these fields. Contact Jeff Butler 702-258-3296</p> <p><i>State of Nevada Water Certification Exams</i> Exam applications and fees are due to the State Bureau of Safe Drinking Water 45 days before exam dates. A proctor will contact examinees to schedule testing. Contact: Ron Penrose at 775-834-8017 for information about the exam dates. Additional information call: 775-687-9527 or http://ndep.nv.gov/bsdw/cert_home.htm</p> <p><i>Nevada Water Environment Association - www.nvwea.org</i> Jennifer McMartin (775)465-2045 or jenniferm@nvwea.org</p> <p><i>Nevada Rural Water Association</i> Please send requests for training to www.nvrwa.org or contact staff directly at 775-841-4222</p>