

Framework for Indirect Potable Reuse in Nevada

2018 WATER SUMMIT

01/30/18

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- Bureaus:
 - Corrective Actions
 - Mining Regulation and Reclamation
 - Safe Drinking Water
 - **Water Pollution Control**
 - Water Quality Planning
 - Air Pollution Control
 - Air Quality Planning
 - Federal Facilities
 - Waste Management
 - Industrial Site Cleanup

Waters of the State

NRS 445A.415

All waters situated wholly or partly within or bordering upon this state, including but not limited to:

1. All streams, lakes, ponds, impounding reservoirs, marshes, water courses, waterways, wells, springs, irrigation systems and drainage systems; and
2. All bodies or accumulations of water, surface and underground, natural or artificial.

Bureau of Water Pollution Control

Permits

- Surface Water
 - WUS and non-WUS
- Groundwater

Discharges

- POTW
- Industrial
- Commercial

Nevada Reuse Program

- Began in mid 1980s
- Administered by NDEP
- Initially, only irrigation
- Regulations updated 1991, 2004 & 2016

Reuse Regulations

- NAC 445A.274 – 445A.280
- Secondary treatment required
- Coliform limits
- Buffer zones

Activated Sludge Process

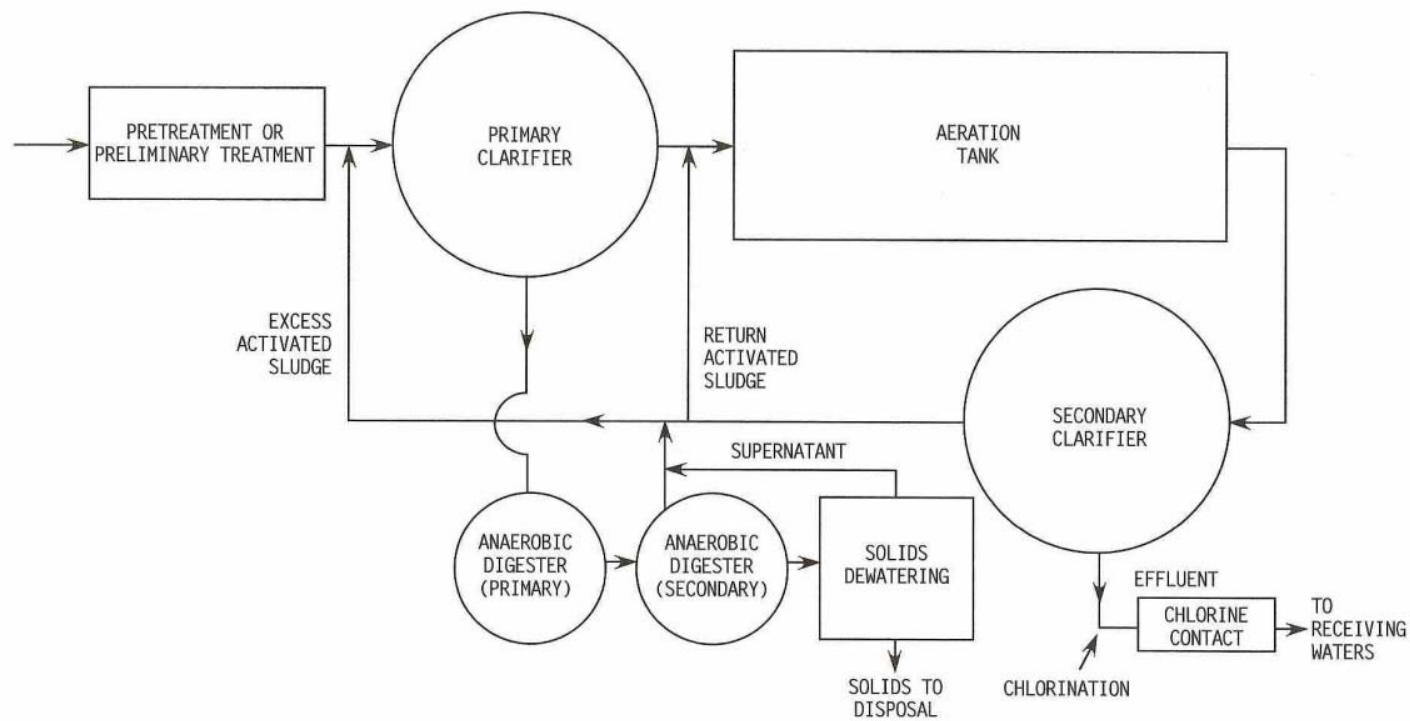


Fig. 8.4 Plan layout of a typical activated sludge plant

Preliminary Treatment

Screenings

- Remove rags, socks, towels, etc

Grit

- Remove rocks, egg shells, heavy stuff

Screening



Secondary Treatment

Activated Sludge

- Biological treatment using microorganisms
- Removes organics, nutrients, and “stabilizes” wastewater

Activated Sludge



Disinfection

- Ultraviolet light (UV)
- Sodium Hypochlorite (bleach)

Disinfection



Reuse Water Categories

NAC 445A.276

	Total Coliform	Fecal Coliform			
	c.f.u. or mpn/100 mL	c.f.u. or mpn/100 mL			
Reuse Category	A	B	C	D	E
Max. 30-day geometric mean	2.2	2.2	23	200	No Limit
Maximum daily number	23	23	240	400	No Limit

Category E Reclaimed Water

NAC 445A.276

Irrigation of agricultural land if:

- Public access to the area of use is prohibited; and
- A buffer zone of not less than 800 feet is maintained.

Category A Reclaimed Water

- Spray irrigation and impoundments even if human contact can reasonably be expected to occur.
- Snowmaking.
- Irrigation of food crops.
- Outdoor decorative water features.
- Commercial toilet and urinal flushing.
- Commercial window washing and pressure cleaning which occurs outdoors.

Water is Reused for Multiple Purposes



Golf Courses and Parks



Dust Control



Power Plants



Wetland Parks



Return Credit

Reuse Projects

- 50 Golf Courses

- 13 Agricultural

80% of total volume



Golf Course Irrigation



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Agricultural Reuse



Park Irrigation



Other Reuse Projects

- Cooling water
- Aggregate wash water
- Wetlands
- Dust control
- Boiler feed water
- Fire fighting



Unapproved Use



Cities Practicing 100% Reuse

- Carlin
- Minden-Gardnerville
- Wells
- Yerington
- Incline Village
- South Tahoe
- Caliente
- West Wendover
- Fernley

Water is a Resource

- Focused reclaimed water on irrigation and agriculture
- Better treatment more options



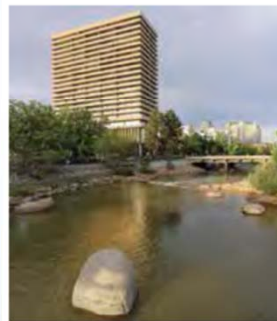
Nevada Drought Forum

December 2015



Nevada Drought Forum: Recommendations Report

Presented to Governor Brian Sandoval • December 2015



Improve Long-term Resilience

- Water Conservation
- Nevada Water Law
- Monitoring and Research Data
- Financial and Technical Assistance
- **Supply Augmentation and Long-Range Planning**
- Information Sharing and Outreach
- Drought Declarations/Emergency Action

Forum Supply Augmentation Recommendations

- Explore the feasibility of additional management measures that can help to expedite the recharge and recovery of impacted river, storage and groundwater systems.
- Explore possible changes to water reuse regulations in cases where reuse extends supplies.



NDEP Response

Water Reuse Steering Committee

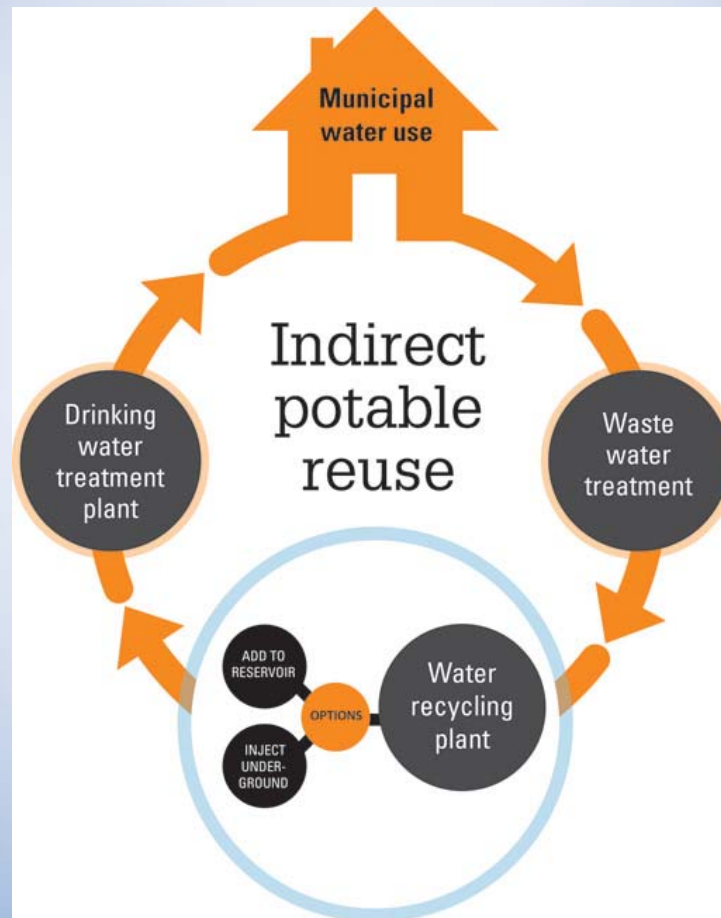
Members:

Public works officials and water purveyors
from urban and rural communities

Purpose:

Conduct a comprehensive review of the
Reuse Program water and identify areas of
needs

Indirect Potable Reuse



Indirect Potable Reuse (IPR)

- Discharge of reclaimed water into an aquifer for the purpose of augmentation or recharge of a drinking water source
- Reclaimed water travels through an environmental buffer before the reclaimed water is recovered into an extraction well for potable use

.

Planned vs Unplanned

- All water is reused
- 5% surface water is from WWTPs
- Septics

It is not important where the water came from, but what is done to treat it.

Public Health Concerns

Chemical Constituents

- Trace Organics
- Inorganics

Microbiological Constituents

- Bacteria
- Viruses
- Protozoa

IPR Water Quality Requirements

Category A+

- Primary Drinking Water Standards
- State secondary maximum contaminant levels
- 10 log Giardia and 10 log cryptosporidium reduction
99.99999999% reduction
- 12 log enteric virus reduction

IPR Discharge

- Spreading basin, or
 - Injection well
- and
- Environmental buffer

IPR Permit Application

- Public workshop documentation
- Engineering report
- Monitoring program for unregulated constituents
- Evidence the treatment system will meet the required standards
- Financial assurity
- Proof of approval from the district board of health

Unregulated Constituents

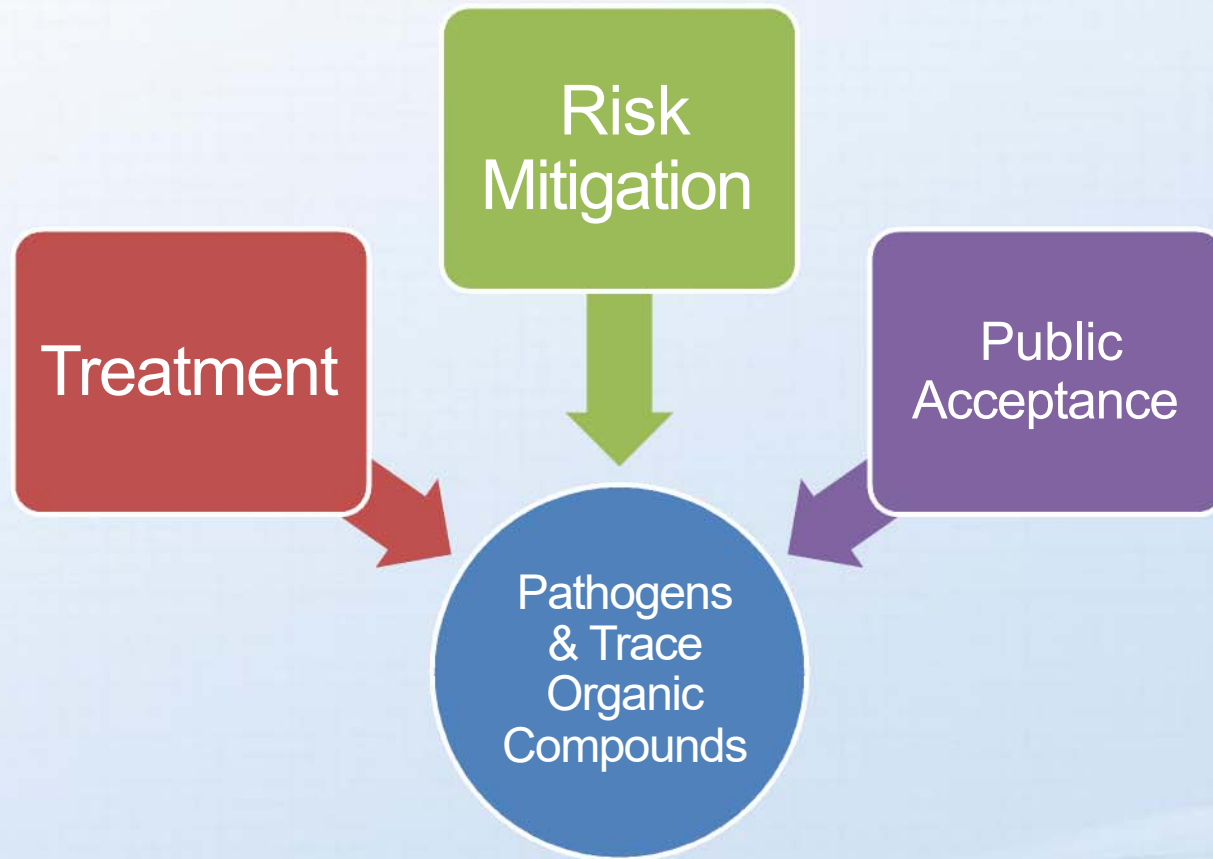
Category	Examples
Disinfection byproducts	Chloroform, Trihalomethanes
Household products and food additives	Flame retardents, Sucralose
Industrial	Methyl tertobutyl ether
Naturally occurring	Hormones (17 β -estradiol)
Personal care product ingredients	Fragrances, pigments, Sunscreen
Pesticides	Atrazine, Diuron, Lindane
Pharmaceuticals and metabolites	Analgesics, Antibacterials, Antibiotics, Betablockers, Oral contraceptives

Water Recycling Examples

- Orange Co., CA – managed aquifer recharge 1976
- Northern Virginia – reservoir augmentation 1978
- Scottsdale, AZ – managed aquifer recharge early 1990s
- Windhoek, Namibia – DPR 1968
- Veurne-Ambacht, Belgium – managed aquifer recharge 2002
- Singapore – reservoir augmentation 2003
- London, UK – upstream discharge to maintain Thames flow

What do you need to do to make

drinking water out of wastewater?



Where do we go from here?

- More reuse and water conservation
- Increased public acceptance.
- Discussion of potable projects?



Contact Info

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