

Rocky Mountain Water Reuse Workshop

August 14, 2014



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Agenda

- Camp Sanitary Wastewater A Brief History
- The Case for On-Site Treatment & Reuse
- Typical System Designs
- Piceance Basin Project
 - History
 - Plant Design & Operation
 - Remote Monitoring
 - Water Reuse





Remote Workforce Camps

- Safe, Comfortable Workforce Housing
 10 to 5,000+ residents
- Critical in Remote Locations

 CO, UT, ND, SD, MT, WY, TX, LA
 Northern Canada
- Sanitary Wastewater
 - always an issue (\$ and aesthetics)
- Passive On-Site Treatment (septic)
 - not good for populations >25
 - site remediation (\$)



Remote Workforce Camps

- Hauling to Offsite Location (POTW, lagoon)
 - expensive
 - traffic safety issues; air pollution
 - truck availability/ delays (weather)
 - receiver capacity issues
- Active On-Site Treatment
 - permitting required
 - O&M required
 - cost effective
 - potential for water reuse
 - re-useable asset; mobile



Sanitary Wastewater Plant







Typical Waste Treatment Performance

Parameter	Unit	Influent	Effluent
BOD5	mg/L	300 - 500	< 10
TSS	mg/L	200 - 400	< 10
Total Nitrogen	mg/L	50 - 70	< 5
Total Coliform	cfu/100 ml		< 200
Total Phosphorus	mg/L		< 0.5

Effluent is suitable for discharge, non-potable reuse such as dust suppression, low pressure boiler feed, cooling, fire suppression, process water





Remote Camp Systems









Mobility is Important









Remote Village – 5,000 Residents









Remote Locations

- Locations: Afghanistan to Tuktoyatuk.
- Climate: from deserts +50°C, to arctic at -50°C



Piceance Basin Project

- Large O&G exploration/ production company
- Central camp & satellite drill sites (25 to 100 pp)
- On-site treatment and reuse
- Mobility critical drill sites move (12-24 hr s/u)





Piceance Basin Project

- In operation since March 2010; year round
- About 4 to 5 "moves" per year
- O&M services; remote monitoring/ alarming





Remote Monitoring

- Automated Alerts sent to on-site operators if plant goes into Alarm during off hours
- Capability for remote access to plant control systems and programming to allow for efficient troubleshooting assistance and programming changes







Sanitary Wastewater Plant







Water Reuse

- Effluent Quality Guarantee: 10 mg/L BOD/ TSS
- Actual Effluent: <2 mg/L BOD/ TSS; Fecal <ND
- Category 3 reclaim water per state regulations
- Effluent tested daily; daily and monthly reports reviewed by county EHO
- Split samples; 3rd party state-certified labs
- Monitoring and enforcement are critical
- Dust suppression, down hole drilling

Permit also allows irrigation, fire protection, concrete mixing

Permitting

- Plant permits under Individual Sewage Disposal System Act (ISDS)
- Endorsed by COGCC
- Applies to plants <2000 gpd
- Very similar to other states: TX: OSSF (5000 gpd) NM: LWDP (2000 gpd)
- Administered at county level (EHO); COGCC
- Approval to move systems within the county
- Garfield and Rio Blanco counties



>2000 gpd goes to state level; NPDES permit

- Remote and arid locations that haul in fresh water
 West Texas; Alaska
- Purple pipe: Flushing; 30% volume savings

- *Extreme* purple pipe:
 - Non-potable sinks & showers
 - Additional treatment required



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