Sewage Discharge Options for Wyoming Municipal Systems

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Surface Discharge Requirements

- WYPDES Permits Start with Clean Water Act Defaults

Biochemical Oxygen Demand (BOD)

30-45-90 mg/l, (*monthly avg, weekly avg, daily max)*
85 % Removal

Total Suspended Solids

30-45-90 - or -
100-150-300 for lagoon systems
85% Removal *(mechanical plants)*

pH*

6.5-9.0 Standard Units *(actual ELG is 6.0 – 9.0)*

Well operated lagoons can dependably meet these standards

Discharge to Low Flow Streams

- If you have the misfortune to discharge to a low flow stream with a trout:
  - Ammonia standards of less than 2 ppm apply.
  - No chlorine residuals are allowed.
- Year round ammonia reduction to less than 10 ppm is with simple lagoon technology is not feasible.

Future ???

Revised Ammonia Criteria

Nutrient Criteria

No Mixing Zone for Pathogens

Pharmaceuticals

EPA Nutrient Criteria*

Total Phosphorus	-	10 – 55 ppb
Total Nitrogen	-	0.22 – 0.90 mg/L
Chlorophyll A	-	1.78 – 4.85 ppb
Turbidity	-	1.93 – 5.13 NTU

- *These are reference numbers for Ecoregion III rivers & streams.*

- Rainwater starts at 0.25 mg/l (lightning oxidizes atmospheric nitrogen to eventually form nitrates) . Powerplants and internal combustion engines can increase nitrates in rainwater.
- WY groundwater unaffected by human activity ranges 1.0 to 2.5 ppm

Wyoming Nutrient Limits

Wyoming has not yet adopted numeric criteria for Nutrients, but will be forced to do so in next 5-10 years by EPA.

Like to do so on a site specific basis where nutrient enrichment has been identified as a problem.

Wastewater Treatment Construction Plans

- 15 of 20 top priorities on the FY2011 Intended Use Plan for SRF Grants and Loans are updates of existing lagoon systems.
- WWTPs are typically updated every 35 years with components lasting 60 or more years.
- Municipalities and engineers are forced to guess what unwritten rules might require when designing an updated WWTP.

Solving the Design Dilemma

- Building a plant to address EPA proposed nutrient limits is somewhere between very expensive and impossible.
- Enhanced lagoon systems can match mechanical plant performance for less construction cost and with far lower operating costs.
- Non-surface discharging wastewater systems can safely operate with far less stringent treatment requirements.
- In Wyoming most non-surface discharging systems require storing winter time (6 months) flow.

Non-Discharging Options

1. Maintenance and Landscaping of WWTP Grounds
    1. Exempt from Chapter 21 Wastewater Reuse Permitting
2. Infiltration Basins
    1. Requires extensive hydrogeological study to demonstrate that will not change Class of Use of groundwater.
    2. Requires periodic maintenance to maintain infiltration rates.
    3. Has advantage of restoring aquifer levels.

Non-Discharging Options (Cont.)

1. Storage and Irrigation of Public Recreational Areas
    1. Requires high level of treatment and secondary disinfection.
    2. Requires winter storage.
    3. Requires early and careful public education
    4. Conserves water, as generally replaces use of potable water.
2. Agricultural Irrigation:
    1. Existing systems provide adequate treatment.
    2. Requires winter storage
    3. Requires dedicated agricultural lands.

GREAT NEWS!

WASTEWATER REUSE

Qualifies as Green Project Reserve which means you can get 100% SRF principal forgiveness (a grant)

BAD NEWS FOR ELECTED OFFICIALS!

- All Non-Discharging Options Require More Land.
- In the grand scheme of things, land anywhere in Wyoming except Jackson is actually inexpensive compared to the other options.
- Acquiring land is always politically difficult.
  - Condemnation Procedures are extremely unpopular.
  - At the local level, paying more than the going market rate for land is unpopular with everyone not involved in the transaction.

BUY THE FARM!

- If your community is considering agricultural irrigation as a solution, buy the farm.
- Lease arrangements always fail sooner or later.
- Owning the farm and cash renting will maximize the return to the municipality.
- Utilizing custom farmers will maximize the flexibility of management of the wastewater reuse.

Operating Examples

- Maintenance and Landscaping of WWTP Grounds
  - Chugwater
- Infiltration Basins
  - Lingle
- Storage and Irrigation of Public Recreational Areas
  - Cheyenne 4 mgd, cementeries, soccer fields, golf courses, but not enough to be non-discharging.
- Agricultural Irrigation
  - Wheatland (stores up to 300 af), irrigates 315 acres of hay and corn.