Leachate Management Strategies: Marathon County, WI

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Introduction

- 6+ Years Solid Waste Experience
- Landfill Permitting, and Construction, Env. Compliance, LFG Design/O&M, and Leachate Management
- Presenter at WIRMC 2025 (PFAS focus)

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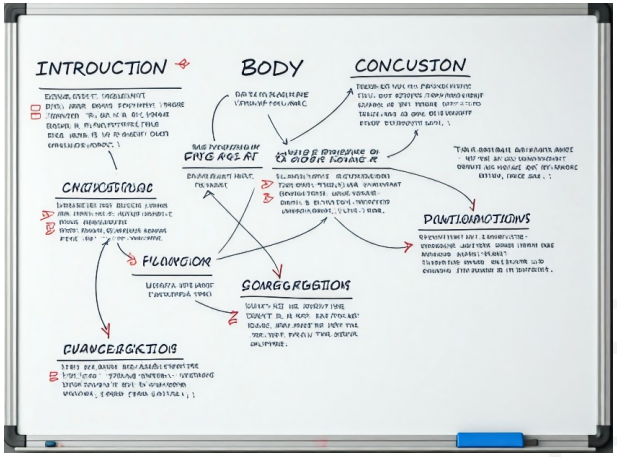
Presentation Outline

Part 1 – Regulatory Overview

Part 2 – Marathon County: Leachate and Regionalization



Federal Actions

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✓ Hazardous Substance Designation under CERCLA (April 2024)

✓ Drinking Water Standards (April 2024)

Effluent Limitations Guidelines (ELG) (Withdrawn January 2025; Ongoing)

- USEPA rulemaking intent: Effluent Limitations Guidelines (ELG a/k/a “Plan 15”)
  - — Landfill Study - approx. 3-5 years
  - — Rule Promulgation - approx. 1-2 years
  - — Implementation Schedule - approx. 3 years
  - — Systems operational - approx. 7-10 years (est. 2030-2033)

Biosolids

- ✓ Draft Risk Assessment (January 2025)
- National Sewage Sludge Survey (ongoing)

• Interim PFAS Destruction and Disposal Guidance

- Underground injection (UIC)
- Landfill
- Thermal treatment - including incineration

Current USEPA Guidance Policy

- Leverage NPDES permitting (USEPA, 2018)
- Delegate responsibility to States and Territories
  - Facility monitoring
  - Source reduction
  - Require permittees to
    - Eliminate or use substitutes where "*reasonable alternatives exist*"
    - Require BMPs w/r/t firefighting foams
    - Enhanced public notification and engagement
    - **Protect WWTP discharges & Biosolid applications**
      - **Pre-treatment Programs**
      - Source Control
      - Best Management Practices

Not an option for SW Industry

Wisconsin Approach

- Derive discharge requirements from Drinking Water standards
- Specify limits based on receiving water classification
  - Wisconsin - Chapters NR 102, 105, 106, 219, and other related regulations
  - Michigan - Rule #57
- Discharge reductions to WWTP
- Source Reduction

Where are we heading?

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EPA National Primary Drinking Water Standards			
PFAS		Maximum Contaminant Level Goal	Maximum Contaminant Level
PFOA		0	4.0 ppt
PFOS		0	4.0 ppt
PFNA		10 ppt	10 ppt
PFHxS		10 ppt	10 ppt
GenX		10 ppt	10 ppt
Mixture of 2 or more	PFNA	1 (unitless) Hazard Index	1 (unitless) Hazard Index
	PFHxS		
	GenX		
	PFBS		

$$Hazard\ Index = \frac{[GenX]}{10} + \frac{[PFBS]}{2{,}000} + \frac{[PFNA]}{10} + \frac{[PFHxS]}{9}$$

Hazard Index for Typical Leachate >>> 1

How are MSW Landfills affected?

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INDIRECT DISCHARGE (to WWTP)

- Industrial Pretreatment Program
- Local Limits Analysis
- Discharge criteria subject to WWTP headworks mass loading

DIRECT DISCHARGE (to SW or GW)

- NPDES permit
- Water Quality Values applicable to receiving waters
- State and local rulemaking

EFFLUENT LIMITATIONS

Regulated parameter	Maximum daily [1]	Maximum monthly avg. [1]
BOD	140	37
TSS	88	27
Ammonia (as N)	10	4.9
α-Terpineol	0.033	0.016
Benzoic acid	0.12	0.071
p-Cresol	0.025	0.014
Phenol	0.026	0.015
Zinc	0.20	0.11
pH	[2]	[2]

[1] Milligrams per liter (mg/L, ppm)
[2] Within the range 6 to 9.

Source: 40 CFR P445.20, RCRA Subtitle D Non-Hazardous Landfills

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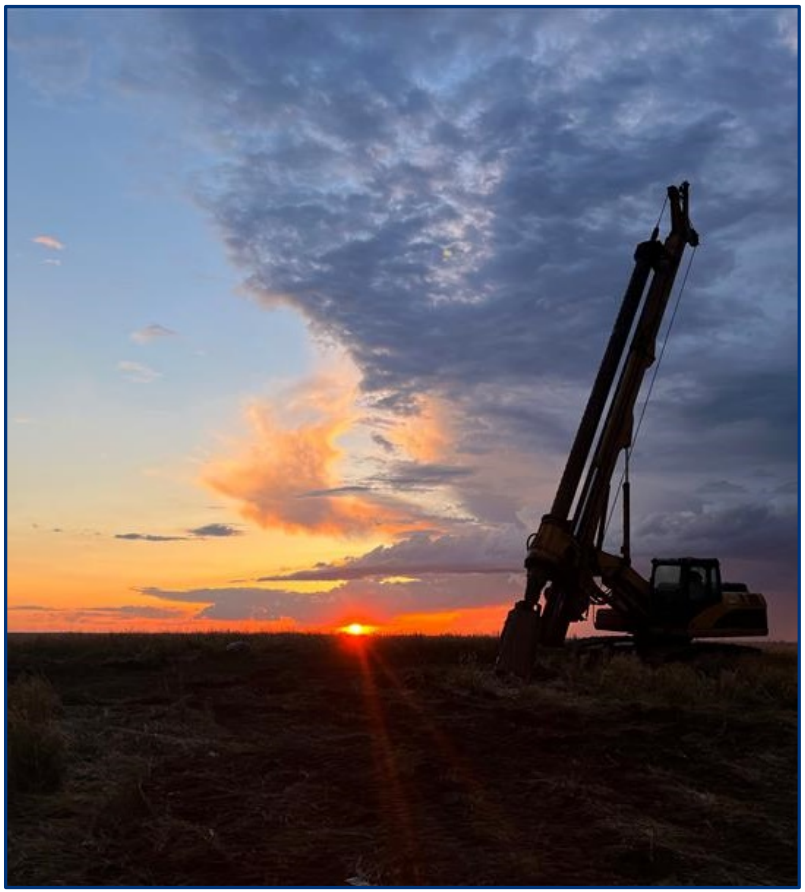
Background



- 120+ acres permitted, 85+ Constructed, 65+ acres closed, Multiple Landfills
- ~31,000 gpd total leachate generation (2024)
- Currently haul and discharge to POTW (under IPP)
- Need for on-site treatment
  - Impending PFAS requirements
  - No existing pre-treatment
  - Dwindling disposal options

Considerations

- Considered Technologies:
  - GAC with IX → POTW
  - GAC with FF → POTW
  - RO → Direct Discharge
- Advantages:
  - Re-use of existing infrastructure
    - Building with dual containment
    - Storage tanks
  - No off-site surface water discharge
- Disadvantages:
  - Separate leachate conveyance systems at each landfills
  - Remote location

Cost Considerations: Capital Costs

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Site Improvements

Forcemain Systems, Utilities, Basins, Storage/EQ tank, Buildings

Supporting Equipment

Pre- and Post-Treatment Equipment, Tanks, Pumps, Instrumentation, Controls

Engineering

Design, Permitting, Construction Management, Oversight and Documentation

Treatment Equipment

GAC/IX
GAC/FF
RO

Construction & Operation

Delivery, installation, testing, startup

Cost Considerations: Operations and Maintenance

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Staffing

- Part time
- Full time

Compliance and Process Sampling and Analytics

Electrical Demand

Cleaning, Maintenance, Repairs, & Disposal

- Equipment
- Media

Processing Chemicals and Materials

Residuals Management

- Waste materials
- Sewer Service Fees

Case Study – Cost Comparison

Cost	GAC/IX (POTW)	GAC/FF (POTW)	RO (Direct Discharge & Recirculation)
Capital Cost (Annual Debt Service)	$550,000	$693,000	$1,058,560
Operating Cost (Annual)	$3,235,000	$3,000,000	$1,045,000 JT0
Total	**$3,785,000**	**$3,693,000**	**$2,103,560**
Cost per Gallon	**$0.138**	**$0.135**	**$0.077**

Assumptions:
Period = 20 years
Interest Rate = 5.5%
Average Utilization = 75% (i.e., 75,000 gallons per day)

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JT0 Percentages of cost instead of numbers

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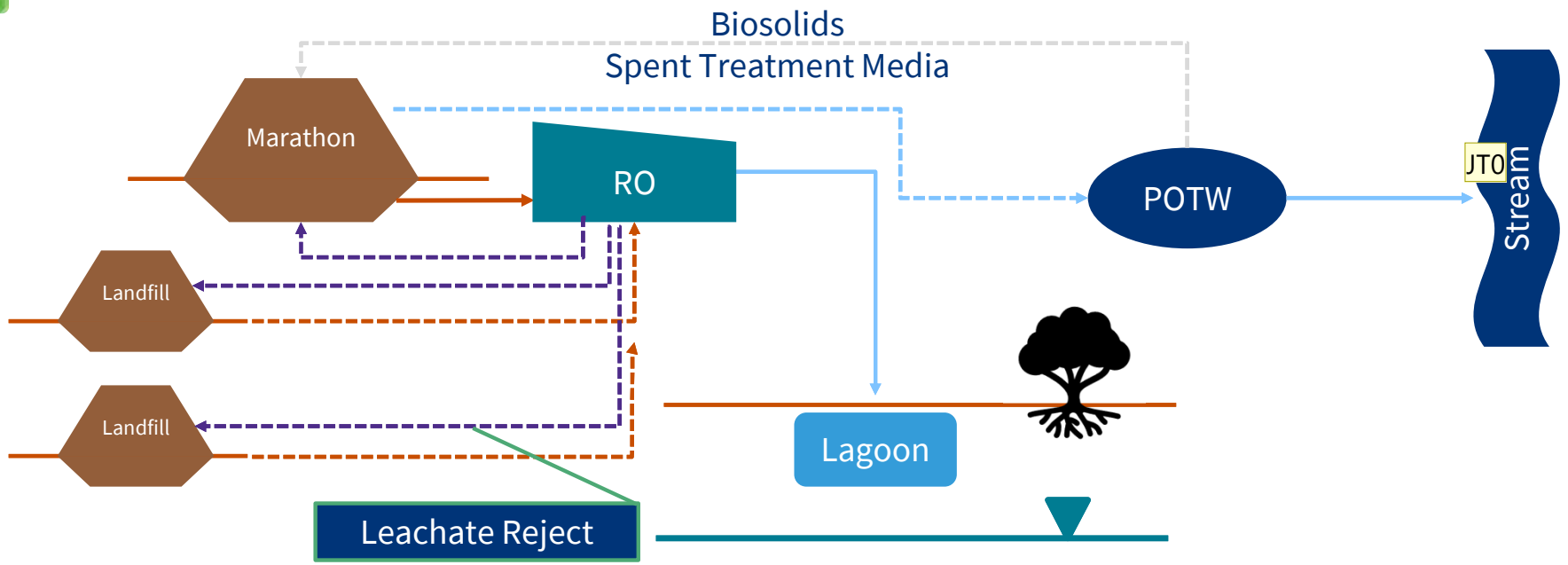
Conceptual Regional Leachate Management Solution



Parameter	Units	WPDES*	POTW
PFOS	ng/l	8	TBD
PFOA	ng/l	20 or 95	TBD

* WY-23-19

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JT0 Augment for other landfill leachate to marathon

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Thank you!