MISSOURI
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NATURAL RESOURCES

2020 Engineering Workshop Presentations

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Wastewater Engineering

Introduction

John Rustige, PE

Wastewater Engineering Unit

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Morning

- 9:00 - Introduction and Regulatory Update
- 9:15 - Antidegradation *Review, Nutrients and Upcoming Changes*
- 10:15 - **Break**
- 10:30 - Facility Plan, *How to Expedite Your Permit*
- 11:15 – Financial Assistance Center Information
  Clean Water SRF, Regionalization Incentive Grant, SCEAP
- 12:15 – **Lunch**

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Afternoon

- 1:00 - Innovative Technologies, *Process Overview & Status of New Technologies*
- 1:30 - Collection Systems, *Successful Permitting Techniques*
- 2:00 - **Break**
- 2:15 - Changes in Construction Permitting & Jurisdictional Review
- 3:00 - Question & Answer Session / Discussion
- 3:45 - **Adjourn**

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Vacant
Engineering Section

Tamara Wilson
SOSA

Cindy LePage
Construction Permits

John Rustige
Wastewater Engineering

Cailie Carlile
Environmental Engineer III

Andy Appelbaum
Environmental Engineer III

Leasue Meyers
Environmental Engineer II

Lei Hou
Environmental Engineer III

Mohammad Mohammad
Environmental Engineer II

Aaron Sawyer
Environmental Engineer II

Steve Hamm
Environmental engineer III

Ellen Modglin
Environmental Engineer II

Bern Johnson
Environmental Engineer II

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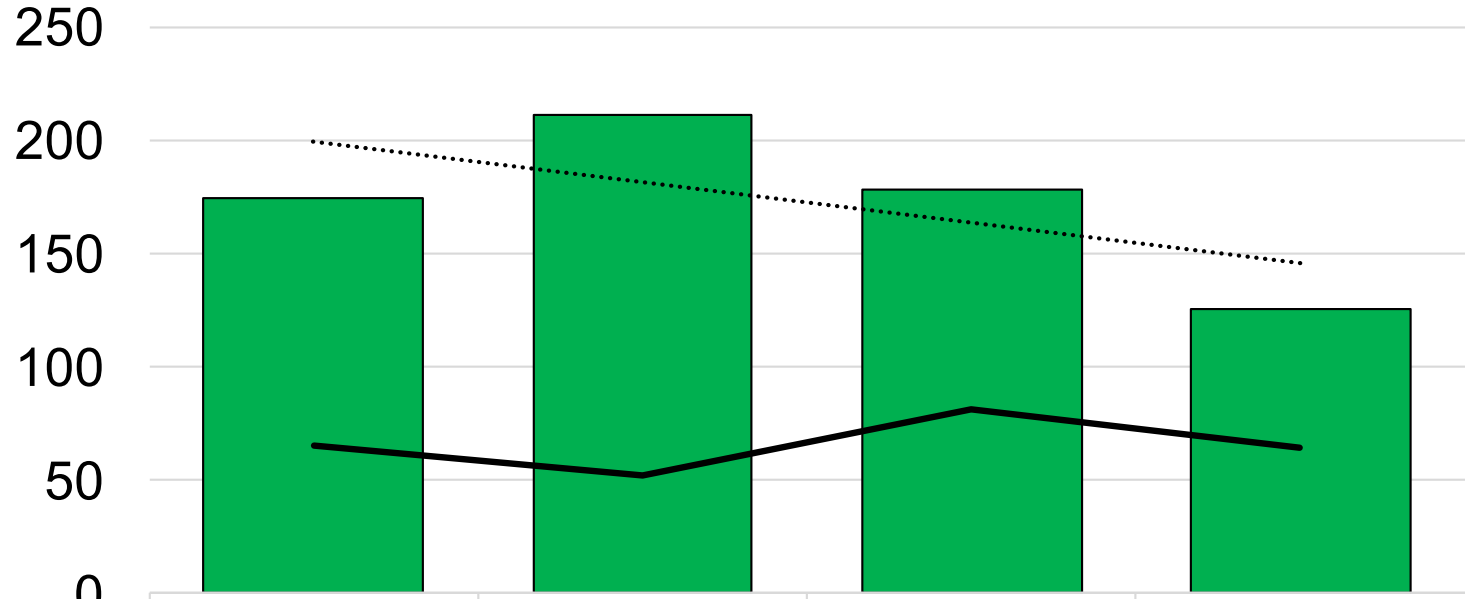
Wastewater Construction Permits



	2016	2017	2018	2019
Average Days	**175**	**211**	**178**	**126**
Permits Issued	**65**	**52**	**81**	**64**

Average Days
Permits Issued
Linear (Average Days)

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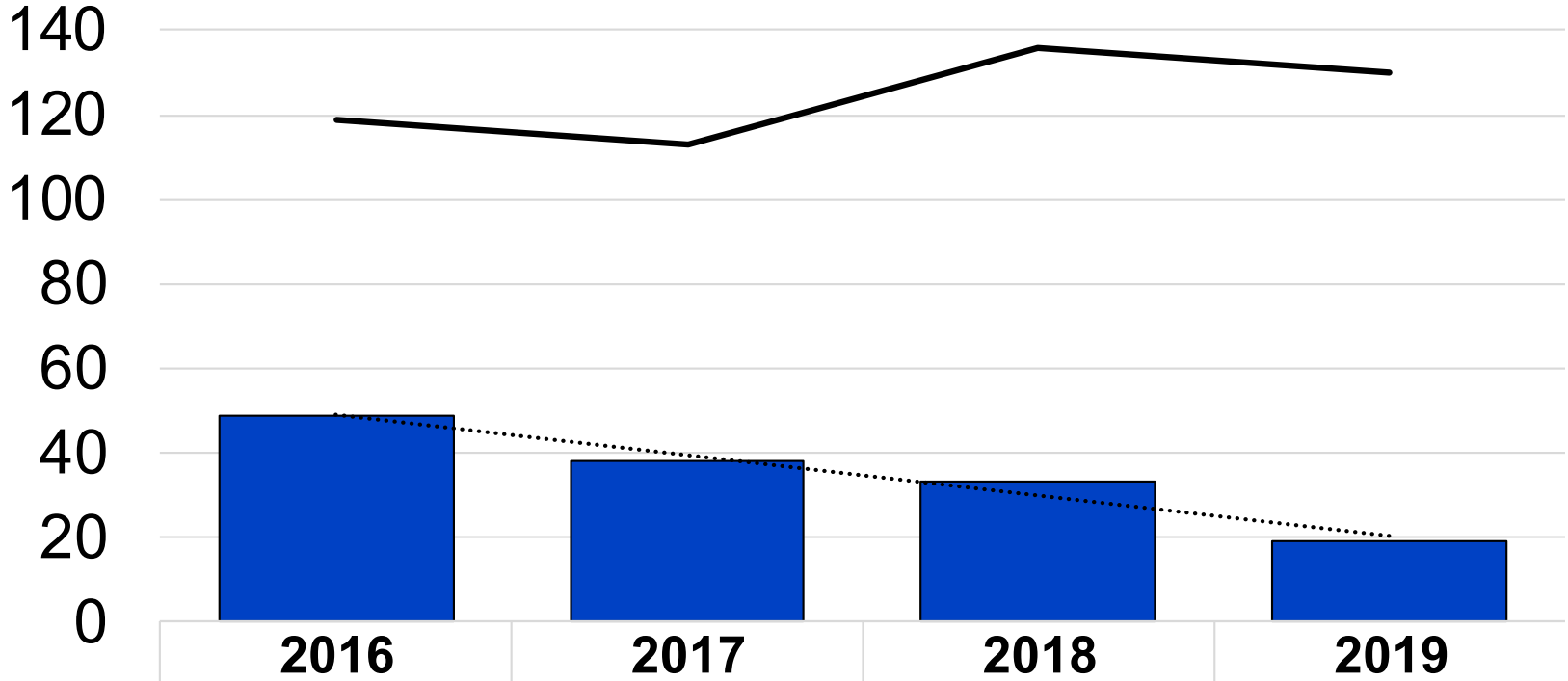
Sewer Extension Permits



	2016	2017	2018	2019
Average Days	**49**	**38**	**33**	**19**
Permits Issued	**119**	**113**	**136**	**130**

Average Days
Permits Issued
Linear (Average Days)

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Changes to Water Quality Standards

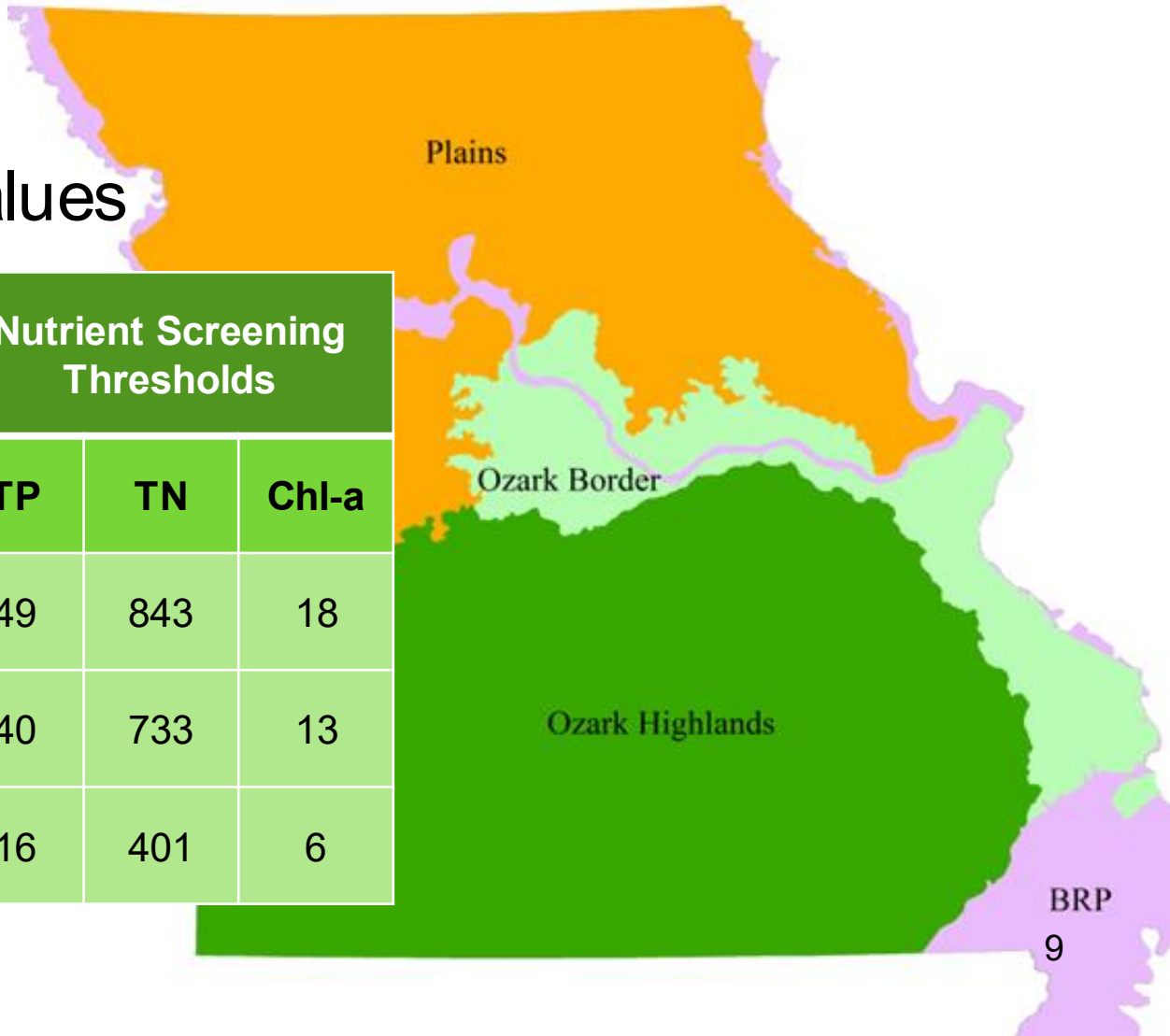
- Nutrients
- Hardness
- Multiple Discharger Variance

- Set of Aquatic Life Criteria

Missouri Numeric Nutrient Criteria for Lakes

Lake Ecoregion Values (µg/L)

Lake Ecoregion	Chl-a Response Impairment Thresholds	Nutrient Screening Thresholds		
		TP	TN	Chl-a
Plains	30	49	843	18
Ozark Border	22	40	733	13
Ozark Highlands	15	16	401	6



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Hardness

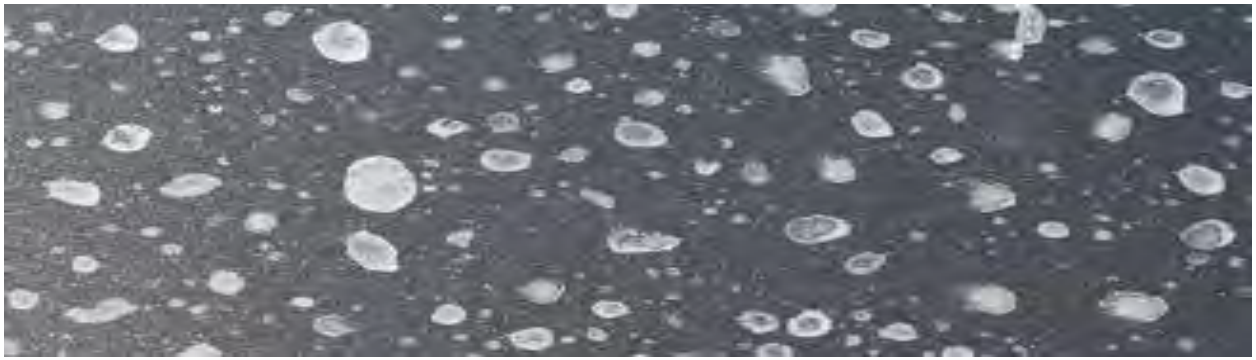
Revised from 25th to 50th Percentile

for

Using Site Specific In-Stream Data

and

New Eco-Regional Hardness Data



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Multiple Discharger Variance

- Minor POTWs
- Multi-celled Facultative Lagoons
- Properly Sized and Well Functioning
- Community is Economically Challenged to Meet Ammonia Limits
  - Decreasing Population
  - Typically <60,000 GPD

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Changes to Water Quality Standards

- Nutrients
- Hardness
- Multiple Discharger Variance
- **Set of Aquatic Life Criteria**

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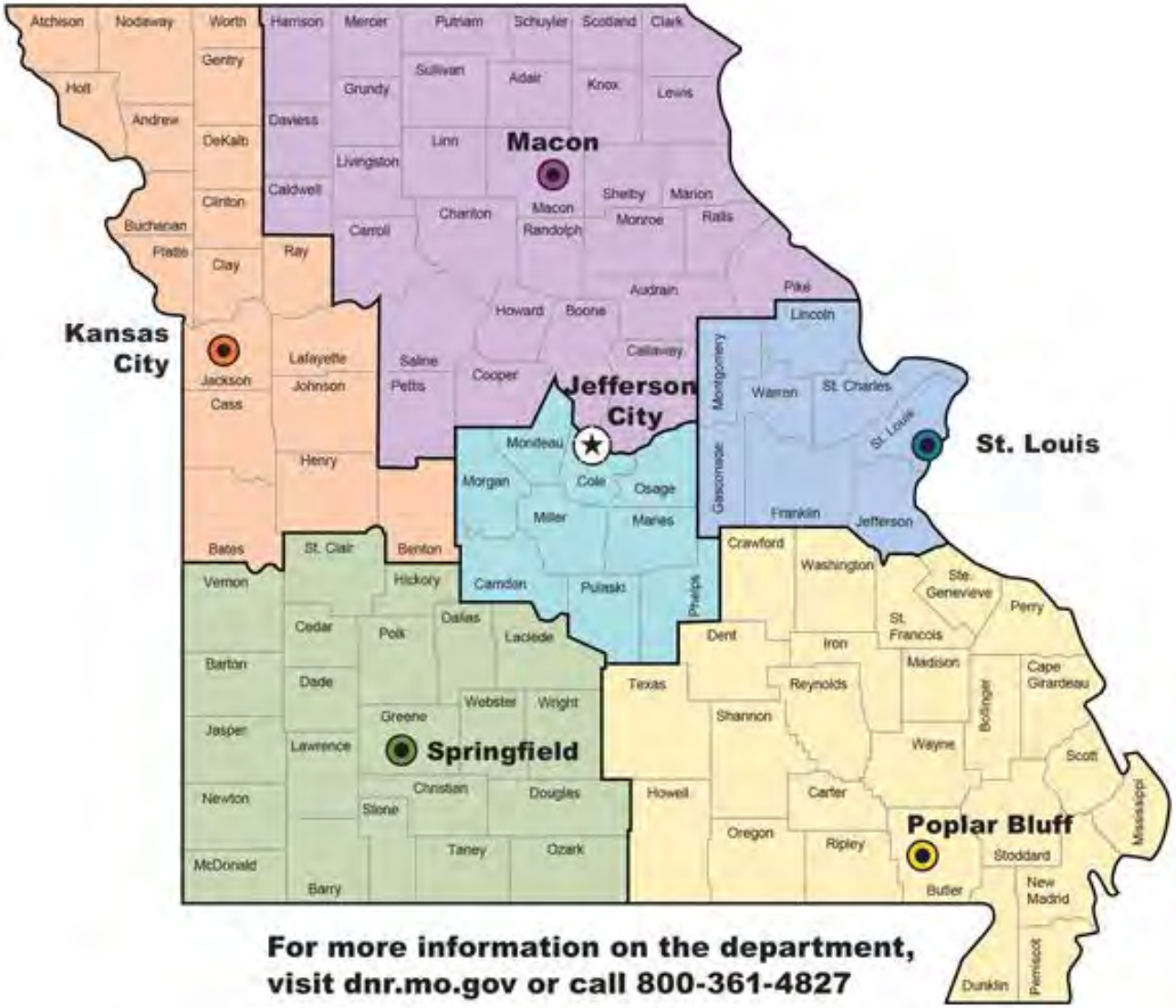
Central Field Office



For more information on the department, visit dnr.mo.gov or call 800-361-4827

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On the Near Horizon

- Antidegradation Revision
- Regionalization & Consolidation
- New Ammonia Limit Derivation
  - https://dnr.mo.gov/env/wpp/permits/docs/2019-TotalAmmoniaNitrogenCriteriaImplementationGuidance.pdf

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Ammonia Limit Derivation

More Direct Alignment with Water Quality Criteria

New Defaults: pH & Temperature by Ecoregion

Optional Use of Site Specific Receiving Water Data

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Water Quality and Antidegradation Reviews (WQAR)

Aaron Sawyer
Water Protection Program
Engineering Section
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What is Antidegradation?

Protecting and maintaining existing water quality (EWQ) in all waters of the state.

Prohibits degradation of Tier III (outstanding quality) waters. Effluent limits are established in operating permits with the appropriate waste load allocation for Tier I (impaired) waters.

Ensures a **limited** lowering of water quality for Tier II waters; therefore, corresponding effluent limits are established in operating permits.

Water quality may be lowered after a determination of necessity of degradation to EWQ based on justification of economic and social importance for Tier II waters.

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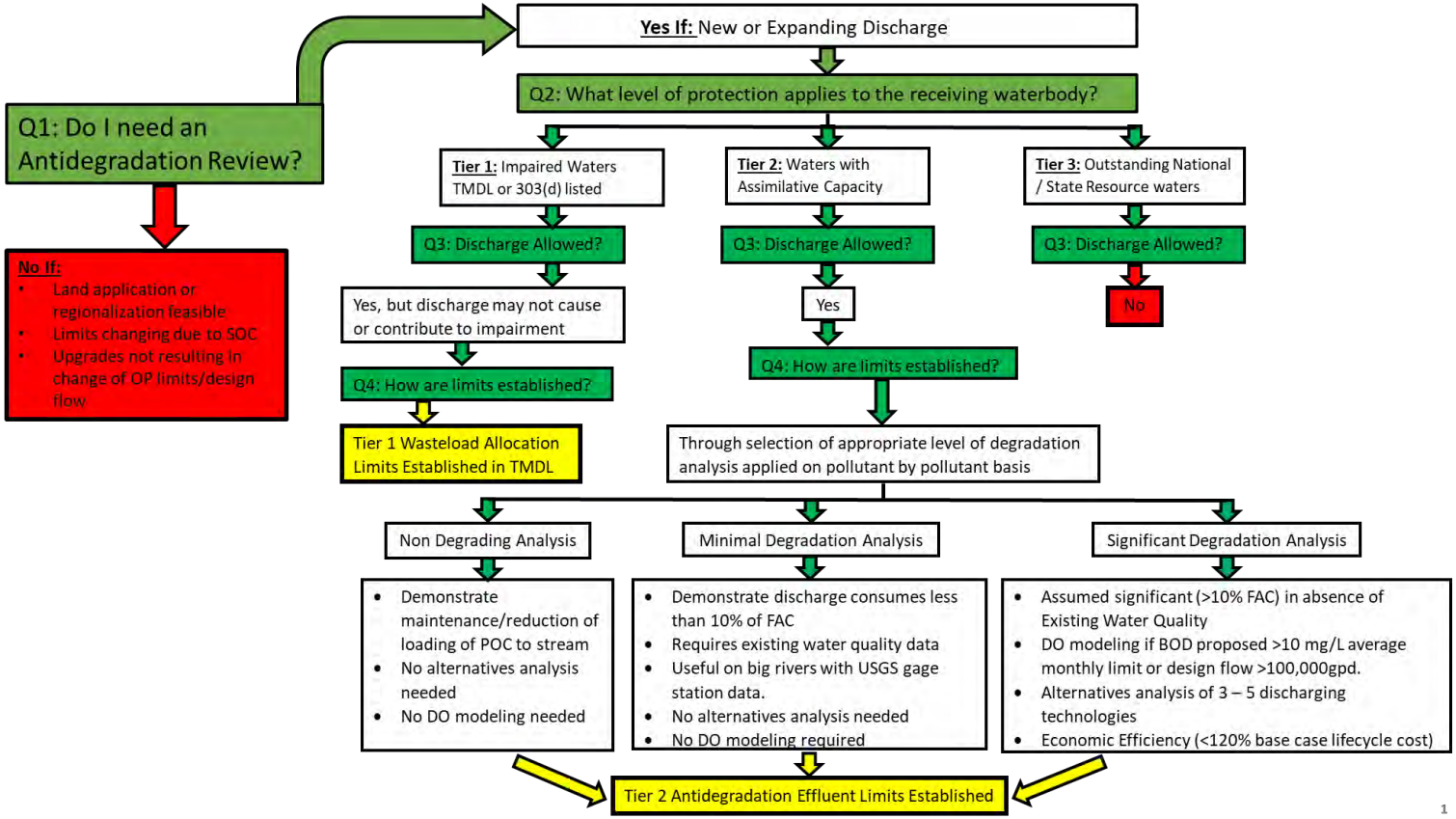
Antidegradation Path Determination



This chart is available at:
https://dnr.mo.gov/env/wpp/permits/docs/AntidegredradationPathDetermination.pdf

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Tips, Tricks, and Suggestions

1. What are some of the pinch points we see during the review process?

2. Changes to the General Antidegradation review.

3. Method for determining if POC can be evaluated as non-degrading

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1. Pinch Points

- Where Tier 1 pollutant review is required contact Antidegradation Unit before formal submittal. Watershed Protection Section will be asked to assist determining "cause or contribute."

- When filling out application do not put "see report" instead of providing answer

- Submit a formal report along with the application

- If significant adjustment to proposal occurs during the antideg review other aspects of report may also need to be adjusted as a result (ie. basecase, cost analysis).

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1. Pinch Points

- When is DO modeling required
- Developing and Identifying Tier 2, Significantly Degrading alternatives analysis, effluent limits (PELs).
- Lake Nutrient Criteria applicable?
- Using the wrong data for non-degrading calculations
- **The AIP**

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Are Lake Nutrient Criteria Applicable?

- Lakes greater than 10 acres
- Streams within the watershed of the lake
- Limits assigned for TP

- Excludes lakes in the Big River Floodplain Eco Regions (oxbow lakes)

- More detail coming from John later

When is DO an issue and modeling required?

- Effluent discharge must achieve, at a minimum, 5.0 mg/L, for most waterbodies, by the time the effluent enters classified waters
  - Serves as a baseline for antidegradation alternatives analysis
- Only applicable to Significantly Degrading projects and streams. No Modeling for Lakes.
- DO modeling not required when proposed BOD limits are less than or equal to 10 mg/L monthly average and 15 mg/L weekly average. Typically 10/15 mg/L is economically efficient.
- New facilities >100,000 gpd need to perform DO modeling

Establishing Effluent Limits for Significantly Degrading Projects

- **How to establish the base case technology.**
  - Lowest life-cycle cost that is capable of achieving water quality based effluent limits.

Base Case Technology

Discharging Alternatives	POC WQS (Ammonia)	Cost Ratio @ WQS	0.8 / 2.1 2.3 / 6.0	.6 / 1.7 2.1 / 5.6
Technology #1	S: 1.4 / 3.6 W: 2.9 / 7.5	$55,000 1 : 1	$65,000 1 : 1.18	$69,000 1 : 1.25
Technology #2	S: 1.4 / 3.6 W: 2.9 / 7.5	$60,000 1 : 1.09	$66,000 1 : 1.20	$73,000 1 : 1.32
Technology #3	S: 1.4 / 3.6 W: 2.9 / 7.5	$65,000 1 : 1.18	$85,000 1 : 1.55	
Technology #4	S: 1.4 / 3.6 W: 2.9 / 7.5			$107,000 1 : 1.95

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Establishing Effluent Limits for a Significantly Degrading project

Economically efficient (<120%) and more protective than WQS

Possibly economically efficient technology (~120%)

Discharging Alternatives	POC WQS (Ammonia)	Cost Ratio @ WQS	0.8 / 2.1 2.3 / 6.0	.6 / 1.7 2.1 / 5.6
Technology #1	S: 1.4 / 3.6 W: 2.9 / 7.5	$55,000 1 : 1	$65,000 1 : 1.18	$69,000 1 : 1.25
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Technology #4	S: 1.4 / 3.6 W: 2.9 / 7.5	—	—	$107,000 1 : 1.95

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2. The General Antideg

- Applicability increased from previous presentation
  - Flow limit raised from 10,000 gpd to 50,000 gpd
- Includes limits for Streams and Lakes
- Pairs with general operating permit for facilities less than 50,000 gpd for privately owned facilities. MOGD not used for POTW
- Consultants need to address social and economic necessity, regionalization, and no discharge alternatives
  - New Regionalization mapping tool available on DNR website.
  - https://modnr.maps.arcgis.com/apps/MapSeries/index.html?appid=89e9a2310cee4fae9f7a27b1b2e83397

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Fast Track for Reviews of Facilities with Design Flow Less Than 50,000 gpd

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WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

ANTIDEGRADATION REVIEW SUBMITTAL
VOLUNTARY TIER 2 – SIGNIFICANT DEGRADATION FOR DOMESTIC WASTEWATER FACILITIES WITH DESIGN FLOW LESS THAN 50,000 GALLONS PER DAY

- Applicable to domestic wastewater
- Achievable effluent limits
- **Discharging alternatives analysis is not needed from the consultant as it has been conducted by the Department**

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General Antideg Limits

EFFLUENT LIMITS – OUTFALLS TO LAKES					
Pollutant of Concern*		Units	Daily Maximum	Weekly Average	Monthly Average
BOD_5		MG/L		15	10
TSS		MG/L		20	15
pH		SU	6.5– 9.0		6.5 – 9.0
Ammonia as N Summer		MG/L	3.6		1.4
Ammonia as N Winter		MG/L	7.5		2.9
Total Phosphorus****		MG/L	*		0.5
Escherichia coli (*E. coli*)		#/100ML	630***		126
EFFLUENT LIMITS – ALL OTHER OUTFALLS					
BOD_5		mg/L		15	10
TSS		mg/L		15	10
pH		SU	6.5– 9.0		6.5 – 9.0
Ammonia as N Summer		mg/L	1.7		0.6
Ammonia as N Winter		mg/L	5.6		2.1
Total Phosphorus****		mg/L	*		0.5
Escherichia coli (*E. coli*)	WBC(A) AND WBC (B)	#/100 ML	630***		126
	Losing Stream**	#/100 ML	126***		Monitoring only

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3. Non-Degrading Path

- For existing facilities this should be the first path evaluated for the facility.
- Can apply to Tier 1 or Tier 2 POCs in a waterbody
- Calculation uses existing permitted design flow and concentrations to determine mass loading
- No discharging alternatives analysis or demonstration of social and economic necessity required
- Still required to evaluate Regionalization and No discharge alternatives
- Submit natural heritage review

  https://naturalheritagereview.mdc.mo.gov/
- Geohydrologic evaluation may be required if footprint of facility is significantly changing, known area with karst features, etc.

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Non-degrading Demonstration for Ammonia

Current / proposed design flow = 0.0096 / 0.0188 MGD

Current/New effluent limit = 4.6 mg/L / **???**

Mass conversion = 8.34 lbs/MGD

Existing Load=(0.0096 MGD)*(4.6 mg/L)*(8.34)=0.368 lbs/day

$$\text{New effluent limit} = \frac{\text{Existing Load}}{(\text{proposed flow} * \text{conversion})}$$

New Effluent Limit = 0.368 lbs/day / (0.0188*8.34) = 2.3 mg/L

2.3 mg/L represents the highest effluent concentration that can be proposed by the applicant to be eligible for non-degrading analysis for ammonia.

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A Brief History and Facts

- Federal Requirement: 40 CFR section (§)131.12.
- State Regulation: 10 CSR 20-7.031(3)
- Antidegradation Implementation Policy (AIP) for Missouri became effective in 2008
  - https://dnr.mo.gov/env/wpp/permits/antideg-implementation.htm
  - Previously the Department conducted water quality review sheets

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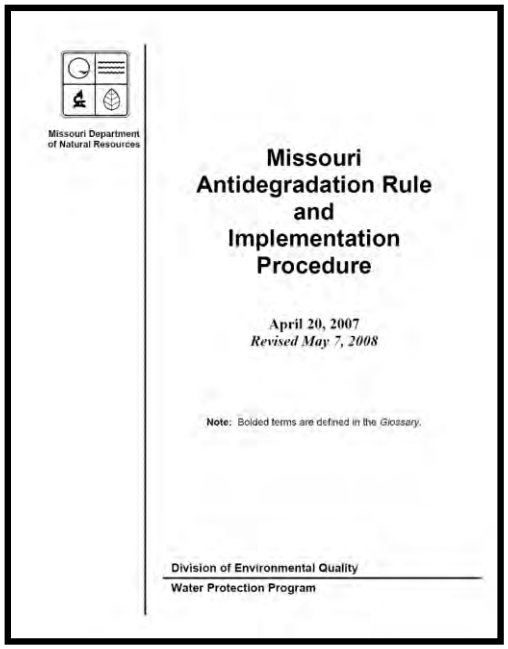
Antidegradation Implementation Procedure

…Revisions in Process…

John Rustige
Engineering Section

Engineering Workshops – Spring 2020



Missouri Department of Natural Resources

Missouri
Antidegradation Rule
and
Implementation
Procedure

April 20, 2007
Revised May 7, 2008

Note: Bolded terms are defined in the *Glossary*.

Division of Environmental Quality
Water Protection Program

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Topics

- Goals of the Revision
- Suggested Revisions
- Feedback / Next Steps

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Workgroup Goals

- Address situations not originally addressed in the AIP
- Incorporate practices that have proven to be helpful
- Clarify & simplify language
- Improve and streamline the process (applicants and reviewers)
- Gather input to rewrite the AIP and take to the CWC for approval and submittal to EPA as an element of water quality standards

Non-Degrading Calculations

- Based on pollutant loads
  - "…EWQ shall include the levels of pollutants already permitted to be discharged at maximum design flow."
  - "project (sic) that would not result in degradation of water quality as characterized by the EWQ assessment."
- Special case: Effluent dominated streams

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Stormwater

- Stormwater Pollution Prevention Plan (SWPPP)
  - Alternatives analysis of best management practices to determine the most reasonable and cost-efficient, while ensuring the highest statutory and regulatory requirements are met.
  - Analysis should include practices designed to be
    - 1) non-degrading,
    - 2) less degrading, or
    - 3) degrading water quality.
  - Needs to include why “no discharge” and “ no exposure” are not feasible.

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Public Notice

- Currently: With OP or in newspaper
- Propose: Internet
- Red Tape Revision in 10 CSR 10-6.010(5)(M)2. allows CP to be issued after PN of Antideg
- Helps delink OP process from CP process

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Eliminate Minimally Degrading Path

- Infrequently used exemption
- Applicants choose to conduct Alternatives Analysis instead of collecting in-stream data
- Only available in large rivers
- Adds considerable complexity to document
- Strange outcomes / inconsistent with intent of Antidegradation
- Alternatives analysis less burdensome than envisioned

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Chemical Additives

pH Adjustments: acids or bases
Disinfection: Chlorine
Dechlorination: Sulfites
Settling: flocculants and coagulants
Bacterial Action: enzymes, nutrient solutions and surfactants
Bacterial Growth: alkalinity and carbon
Phosphorus Removal: alum and ferric chloride

FACTSHEET: https://dnr.mo.gov/pubs/pub2653.htm

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Nutrients

- Tier 3 waters
- Waters without nutrient water quality standards
- Non-degrading approach for nutrients (Tier 2 & Tier 1)
- Tier 2 water with nutrient water quality standards

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Tier 2 Waters

General Effluent Concentration Ranges for Less Degrading Options				
	Chemical Addition and Settling	Chemical Addition and Filtration	Biological Nutrient Removal	Enhanced Nutrient Removal
Total Phosphorus	1.0 mg/L	0.5 mg/L	0.5 – 3.0 mg/L	0.2 – 0.5 mg/L
Total Nitrogen	20 mg/L	20 mg/L	6 – 10 mg/L	4 – 6 mg/L

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Nutrients

- Tier 3 waters
- Waters without nutrient water quality standards
- Non-degrading approach for nutrients (Tier 2 & Tier 1)
- Tier 2 water with nutrient water quality standards
- Tier 1 review

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Effluent Limits

- **Federal Requirement: 40 CFR section (§)131.12.**
  - Protect designated uses
  - Maintain existing water quality
  - Alternatives analysis
  - State is responsible for developing policy
- **State Requirements:**

10 CSR 20-7.015(9)(A)5.

(9)(A). "Establishing effluent limitations. Unless a formal variance from water quality standards have been approved by the Clean Water Commission and the U.S. EPA, **operating permits issued under 10 CSR 20-6.010(7) shall include, if applicable, the most protective limits set forth as follows:"**

- (9)(A)5. **"Effluent limits that are developed through the antidegradation review process,** provided there is reasonable potential to exceed these limits; and…"

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Effluent Limits

- 10 CSR 20-7.031(3)(B)
  - "Tier Two. For all waters of the state, if existing water quality is better than applicable water quality criteria established in these rules, that existing quality shall be fully maintained and protected….Any preliminary decision by the department to allow a **limited lowering of water quality** will be stated as such in a public notice…"

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Effluent Limits

- Types of limits to be included in AIP revision:
  - **WQBEL**
    - Antidegradation
      - **PEL** (alternatives analysis based)
      - **NDEL** (based on mass calculations)
  - **TBEL**
    - **ELG**
    - Case by case technology (other industries)
  - **FSR** (pH, phosphorus, temperature, etc.)

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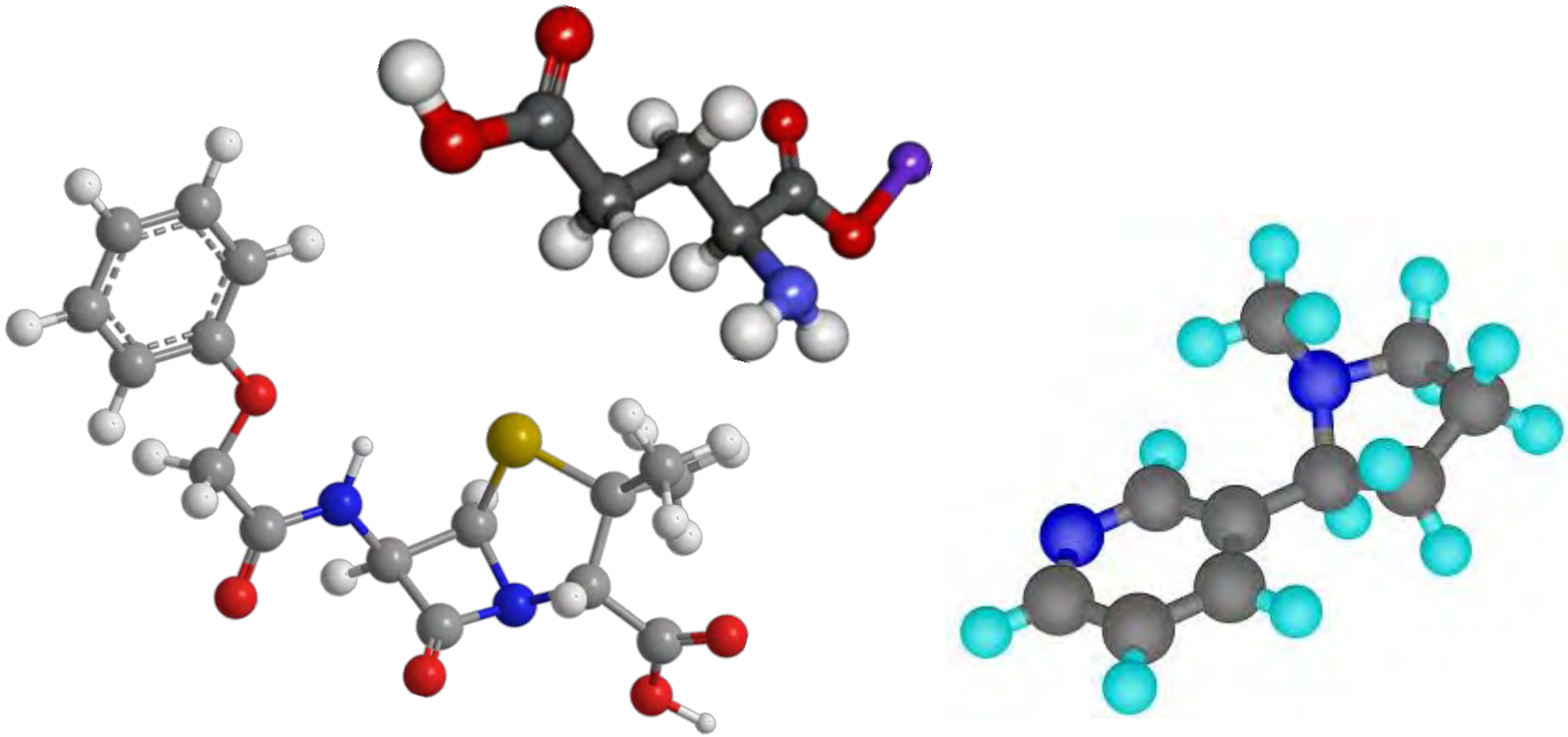
Pollutants That Do Not Have Water Quality Criteria



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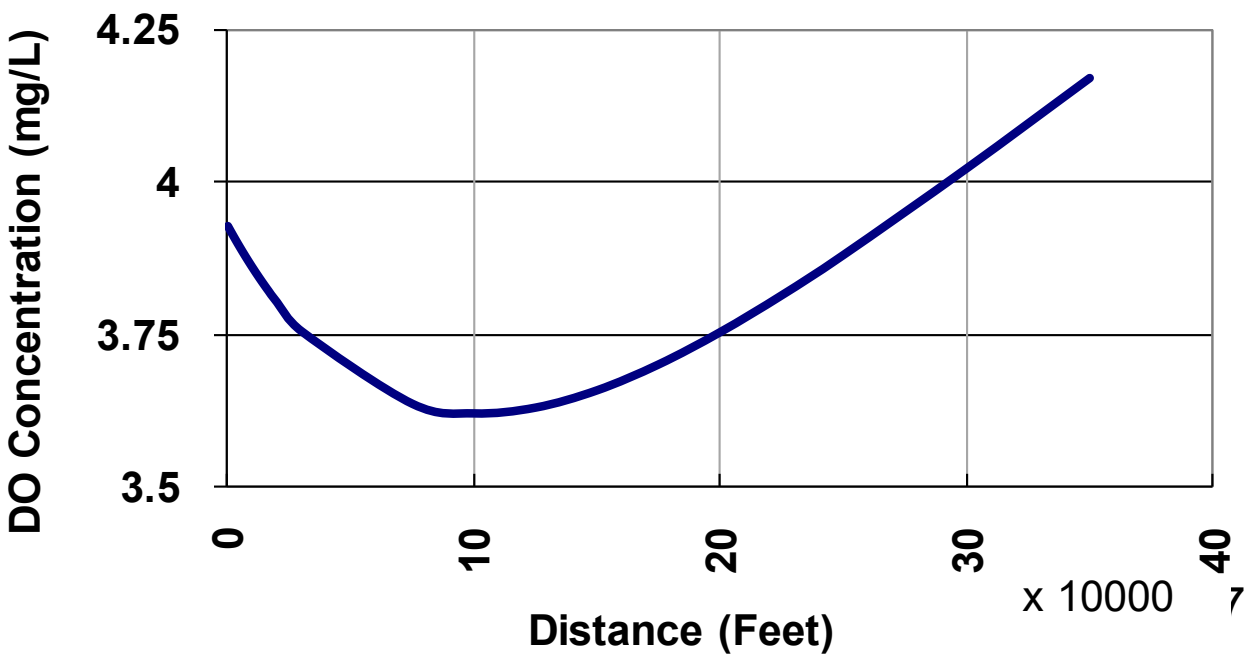
Dissolved Oxygen Modeling

- When is modeling *required*?
  - **Significant** Degradation **with** BOD greater than 10/15
- Modeling approaches should be added to the AIP.



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Bacteria

- Disinfection systems are designed to kill or inactivate *E. Coli*
- Whole Body Contact A
  - Daily Max: 620 colonies/100 mL
  - Monthly average: 126 colonies/100 mL
- Compliance still based on the geomean

Metal Salts For Phosphorus Removal

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Miscellaneous Organization

- Applicability Section
- Section to AIP addressing common POCs.
- AIP needs to include discussion of feasibility of no discharge alternatives and non-degrading POC
- Include section discussing the selection of new and innovative technologies
- Include requirement that site specific translator studies and modeling is to be done before submittal of antidegradation report
- Include requirements for natural heritage/geohydrologic evaluations

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Outcome that can be Predetermined

- Propose adding a section or paragraph to address:
  - Outfall relocations to improve mixing considerations
  - Allow the alternatives analysis to be less detailed regarding the costs of alternatives that are clearly not economically efficient
  - Perhaps include a paragraph that would allow the program to identify specific technologies as reasonably available for particular circumstances. Examples might include air strippers, oil and grease separators, ion exchange for metals, enhanced nutrient removal, etc.

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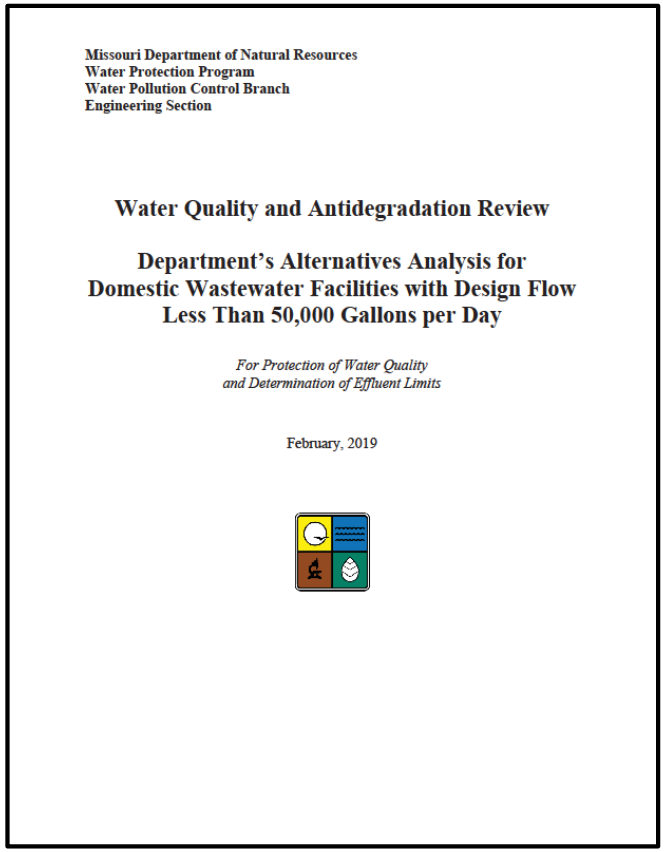
General Antidegradation

- Voluntary process
- Forgo alternatives analysis and accept less degrading effluent limits
- Applicability
  - Domestic wastewater
  - Less than 50,000 gpd
  - Tier 2, non-impaired receiving waterbody



Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
Engineering Section

Water Quality and Antidegradation Review

Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day

For Protection of Water Quality and Determination of Effluent Limits

February, 2019

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Other Edits

- Better define “Temporary Degradation”
- Include reference to Missouri engineering practice statutes, RSMo 327.181.1
- Drop the term “Significantly Degrading”
- Devise a better set of examples and example calculations in the appendix

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Other Edits

- Improve the bioaccumulation language – not solely fish tissue, but all aquatic organisms and sediments (identified in EPA's approval letter)
- Devise a better set of examples and example calculations in the appendix
- Other improvements to wording and clarity

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Feedback

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Facility Plans
&
Engineering Reports

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Reports 10 CSR 20-8.110 & 10 CSR 20-6.010

Engineering Report

Collection Systems, pumping stations, and force mains

Facility Plan

- WWTF changes
- Funded through DNR Grant and Loan Programs at 10 CSR 20-4

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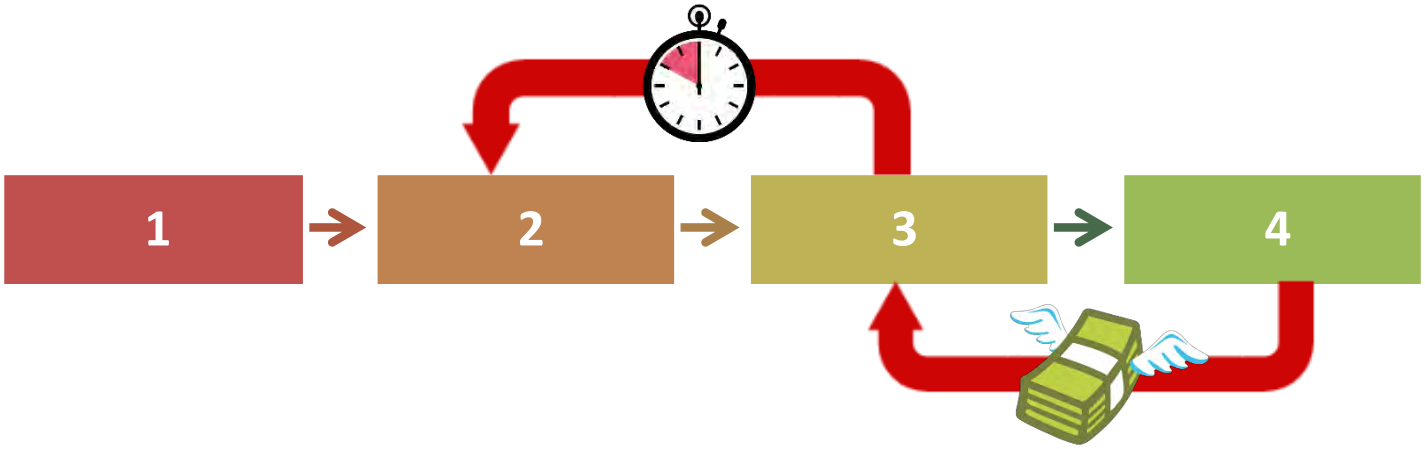
Benefits

Early Planning and Early Feedback

- Avoid costly redesign
- Consider all feasible options → save money
- Speeds up construction permit issuance time



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Facility Plan

- Antidegradation Review Completed First (if applicable)

- Facility Plan Submitted **BEFORE** Construction Permit App and Plans & Specs
  - Early Planning Tool

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Facility Plan / Engineering Report

- **Applicability**
  - For projects that require a CP
  - **NOT** required for:
    - Sewer Extensions w/ General Permit
    - Sewer Extensions w/ Sewer Extension Design Certification Checklist
    - Disinfection in 20-8.190
    - Facilities with Supervised Program Approval

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Facility Plan / Engineering Report

- Electronic Copy (PDF, searchable) and ONE Paper Copy
- Review Request Form: dnr.mo.gov/forms/780-2617-f.pdf

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
FACILITY PLAN OR ENGINEERING REPORT REVIEW REQUEST

1.0 REASON FOR REQUEST:

☐ Facility plan* for a wastewater treatment facility (WWTF) or components thereof

☐ Engineering report* for non-department funded projects limited to collection system improvements only.

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 REQUEST INFORMATION

2.1 Is this a federal/state funded project? ☐ Yes ☐ No
Funding Agency: ☐ USDA-RD ☐ CDBG ☐ Other: _____; Project #: _____

2.2 For new or expanded discharges, has the Missouri Department of Natural Resources approved the proposed project's antidegradation review? ☐ Yes Date of approval: _____ ☐ N/A

2.3 Is the facility currently under enforcement with the department or the U.S. Environmental Protection Agency? ☐ Yes ☐ No

2.4 Is the facility plan or engineering report required for submittal by an enforcement agreement or an operating permit schedule of compliance? ☐ Yes ☐ No

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Purpose

- Identify and Evaluate Problem(s)
- Assemble Basic Information
- Examine Alternatives
- Present Design Criteria and Assumptions
- Preliminary Layouts – Maps & Diagrams
- Recommended Alternative
- Cost Estimates and Financing Methods
- Outlines Project Implementation Schedule

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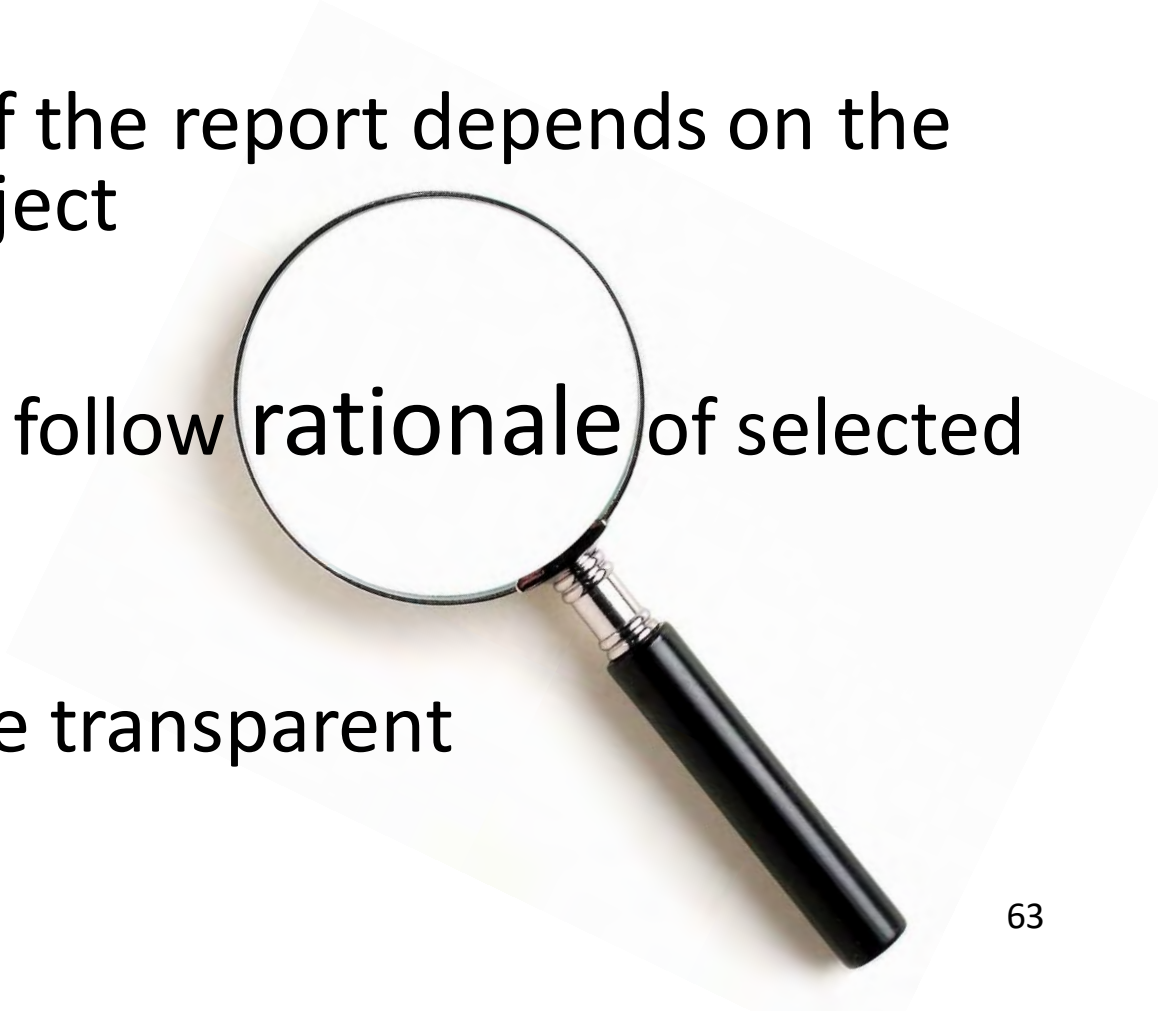
Level of Detail

- Detail and size of the report depends on the scope of the project
- Enough detail to follow rationale of selected alternative
- Project should be transparent



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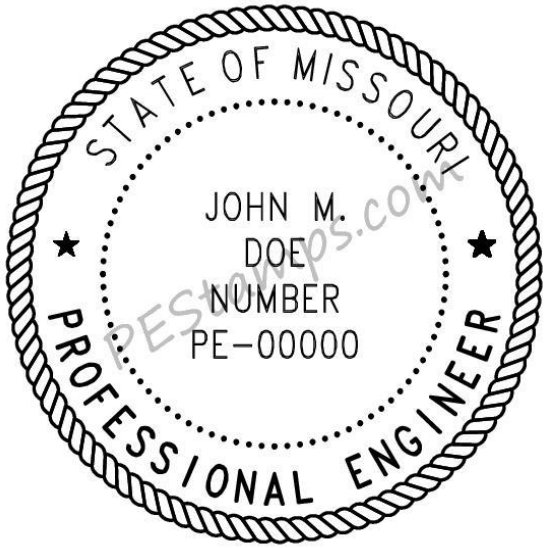
Title Page



- ✓ Name of Project
- ✓ Owner of System
- ✓ Continuing Authority
- ✓ Name, Address, Phone, Email

  for Owner, Cont. Authority, AND Engineer
- ✓ Date of Submittal
- ✓ **<u>Missouri P.E. Seal and Signature</u>**

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Project Description and Site Info

Written Description of

Existing System **and** Proposed Project

Conditions and Problems Needing Correction

- Schedule of Compliance
- Enforcement Orders
- I&I Issues
- CSOs, SSOs

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Project Description and Site Info

Geohydrologic evaluation from MGS required for new construction, earthen basins, new outfall locations, and all land app

GeoEDGE: *dnr.mo.gov/geoedge*

If Applicable:

Topography	Soils
Geologic Conditions	Depth to Bedrock
Groundwater Level	Floodplain Considerations

Distances to water supply structures, roads, residences, etc.

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Drawings/Maps

- Planning Area
- Existing and Potential Future Service Area
- Site of the Project
- Anticipated Location and Alignment of Proposed Facilities
- Preliminary Flow Diagram

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Flow for Existing Systems

Permitted Design Flow or Actual Flow

- Impact on all existing wastewater facilities, including gravity sewers, pump stations, and treatment facilities

Lagoons – Influent Monitoring Recommended

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Flow for New Systems

Average Daily Flow:

~100 gallons per capita per day

Peak Flows:

$$\mathbf{Q} = \frac{\mathbf{18} + \sqrt{\mathbf{P}}}{\mathbf{4} + \sqrt{\mathbf{P}}}$$

Q = Peak Hourly Flow / Design Average Flow

P = Population **in thousands**

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Existing Organic Loading

Projections shall be made from

ACTUAL WASTELOAD DATA

to the extent possible

Influent wastewater tests to characterize the *actual* organic load

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Organic Loading for New Systems

≥ **0.22 lbs. BOD_5** per capita per day

≥ **0.20 lbs. Suspended Solids** per capita per day

Or other values with justification

Proposed Conditions and Loads

Design capacity is the *design average flow* at the *design average* BOD_5

Based on **<u>20 YEAR</u>** planning period

Projections shall be made from *ACTUAL DATA* to the extent possible

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Detailed Alternatives Evaluation

- May be done as part of Antideg
- Consider several options
- Consider **no-discharge**
  - Regionalization
  - Surface Land App
  - Subsurface Land App
- Present Worth Cost Estimate

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Detailed Alternatives Evaluation

- Zoning/Land Use Restrictions/Setbacks
- Future Plant Expansion
- Geologic Considerations
- Present and Future Effluent Limits
  - Nutrient removal
- Outfall Location and Access
- Preliminary Unit Sizing
- Flow Diagram
- Emergency Operation
- Solids Disposal

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No-Discharge Evaluation

Required at:

- 10 CSR 20-6.010(4)(A)5.B. and C.
- 10 CSR 20-8.110(5)(E)3. and 4.

Form for No-Discharge Evaluation

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WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION: REGIONALIZATION AND NO-DISCHARGE EVALUATION

REGIONALIZATION AND NO-DISCHARGE EVALUATION

According to the Antidegradation Implementation Procedure Sections I.B. and II.B.1., the feasibility of no-discharge alternatives must be considered. No-discharge alternatives may include connection to a regional treatment facility, surface land application, subsurface land application, and recycle or reuse.

Please refer to the *No-Discharge Alternative Evaluation* fact sheet for examples of information to provide to justify common reasons for not pursuing regionalization or no-discharge land application. If sufficient information is not provided on this form to demonstrate that these alternatives are not feasible, a more detailed evaluation of no-discharge options may have to be submitted.

Additional pages may be attached if more room is needed.

1. FACILITY:

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No-Discharge Evaluation

- No discharge is *not* always a feasible alternative, but reasons for not choosing it must be **well-documented** and **justified**
- Guidance:
  - dnr.mo.gov/env/wpp/
    - New Regionalization/Centralization Resources
  - dnr.mo.gov/env/wpp/no-discharge.htm

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No-Discharge Evaluation

Factors to consider and document:

Land Availability

Easements/Cost of Easements

Zoning Restrictions

Suitability of Soils

Operation & Maintenance

Size & Type of Wastewater Flow

Land Cost

Leasing Land

Setbacks

Regionalization

Public Perception

Proximity to Neighbors

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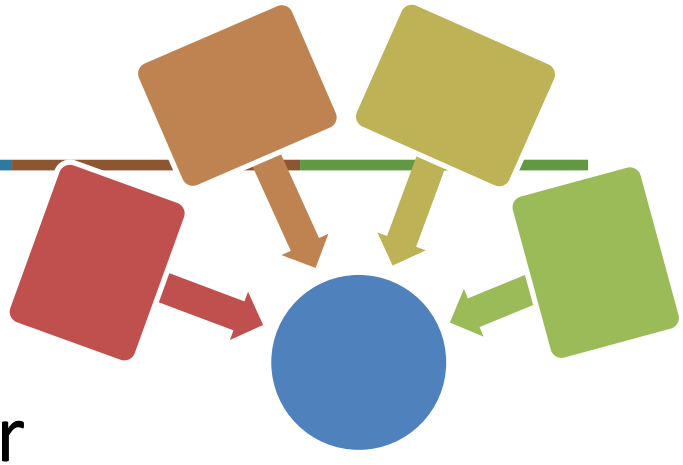

Regionalization

- Connect to existing regional or nearby WWTF
  - Can a nearby facility be upgraded if necessary to accept new flow?
- Consolidate local facilities
  - Are there nearby facilities which will also need to upgrade soon?
  - Could a new regional facility be constructed?
- New Resources at [dnr.mo.gov/env/wpp/](dnr.mo.gov/env/wpp/)

Regionalization

- Distance to closest municipality's line
- Capacity of nearby facilities
- Planning/zoning restrictions
- Capital cost of piping and pumps
- 20 year life cycle cost comparison
- Letter from municipality stating they will not accept the flow

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Land App - Land Availability & Cost

- Calculations for Land Requirements
- Cost of Land
  - Recommend looking within 1.5 miles
  - Document land costs (recent sales)
- Long-term Lease with a Farmer vs. Buying Land
  - How many land owners contacted?
  - What restrictions were presented?
  - Provide copies of correspondence

Land App - Land Availability & Cost

- Look at multiple sites to find optimal application rate
- Public access areas (golf courses, parks, etc.)
  - Disinfection required for surface land app
- 20 year life cycle cost (piping, pumps, etc.) compared to mechanical plant
- Cost for piping & pumps to a site farther away
- Salvage value of land

Land App - Zoning / Setbacks

- Does a county ordinance specifically restrict land application?
  - Both for Subsurface/Drip and Surface?
- Distance to neighboring county without restrictions?
- Setback distances may be reduced for surface land application depending upon the extent of pretreatment and operational techniques.
  - Install vegetated buffer
  - Disinfection

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Land App - Easements / Cost of Easements

- Contact land owners for rights
  - Provide copies of correspondence
- Cost of easement acquisition compared to discharge requirements

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Land App – Size & Type of Wastewater Flow

- Can application rates be increased in any areas to reduce required land area?
  - Geohydrologic Evaluation / Soils Maps
- Lease or buy multiple locations
  - Provide copies of correspondence
  - Provide land costs

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Land App - Proximity to Neighboring Sites

- Increase buffer distances to reduce neighbor issues
- Different method of application
  - Avoid center pivot or spray systems
  - Drip or other Subsurface
- Alternate sites

Land App - Suitability of Soils

- Was a soils report completed, including map information?
  - Submit geohydrologic eval and soils report
- Bring in other soils
- Reduced application rate to suit the soils
- Different method of application
- Alternate sites

Land App - Soils Report

- Required for all subsurface systems to determine soils loading rate
- Required for surface land app systems applying > 24 inches/year
- Best to submit early in process
- *Summary of Soils Report for Land Application of Treated Wastewater*
  http://dnr.mo.gov/forms/780-2696-f.pdf

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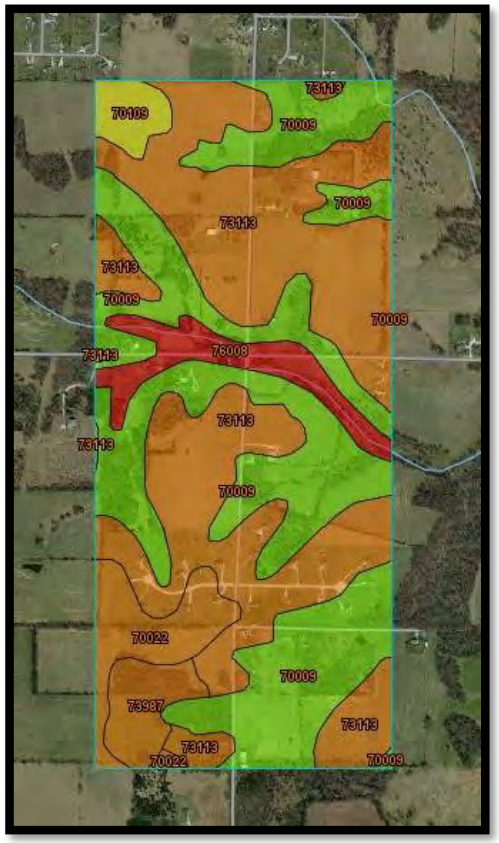
Land App Resources



http://websoilsurvey.nrcs.usda.gov

- Slope
- Soil types
- Drainage
- Frequency of flooding
- Capacity to store and transmit water
- Depth to water table and restrictive feature
- Suitability for several methods of land application

http://dnr.mo.gov/geostrat

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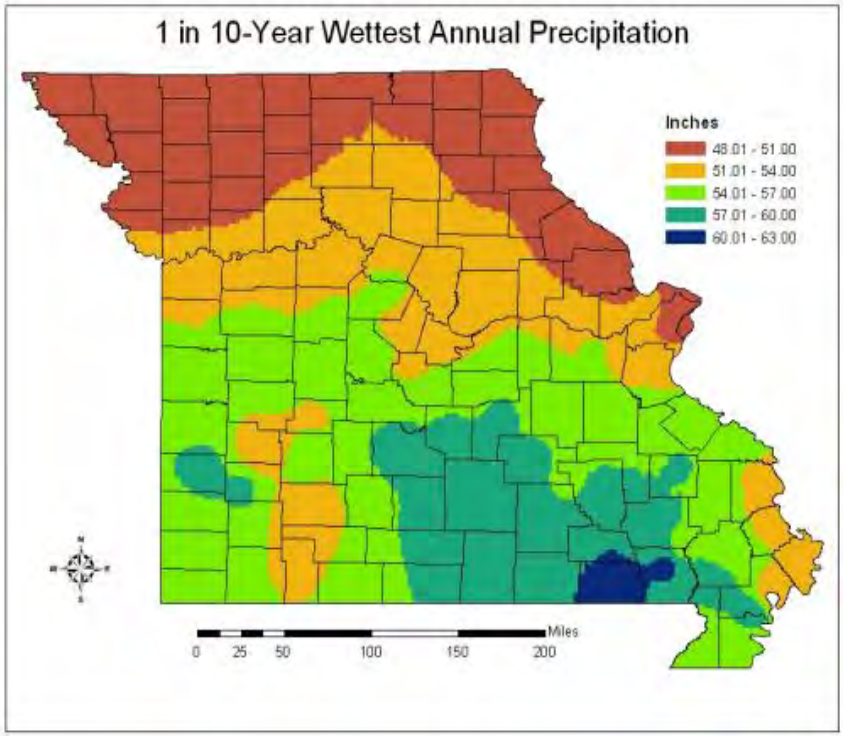
Land App Resources

Missouri Climatic Atlas for Design of Land Application Systems

- 1 in 10-year Precipitation
- Evaporation Rates



MU Design Storm Info:

http://agebb.missouri.edu/weather/designstorm/

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Alternatives Evaluation Conclusion: Recommended Project

- Present Selected Alternative & Reason for Selection
- Provide a project implementation schedule identifying project milestones
- Include financing considerations

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Engineering Design Criteria

10 CSR 20-8 – **Minimum Design Standards**

Identify **Assumptions**

Preliminary **criteria** and **calculations** to determine design flow, velocity, pipe size, pumping station calculations, and preliminary unit sizing

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Flood Considerations

Treatment works structures, electrical and mechanical equipment shall be

- Protected from Physical Damage by the **100 year flood**

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Emergency Operation - WWTF

Alternate source of electric power or *pumping capability* to allow **continuity of operation** during power failures

- 2+ independent public utility sources,
- Internal combustion engine equipment
- Portable pumping equipment when only emergency pumping is required.

Continuous disinfection

Emergency Operation – Pump Stations

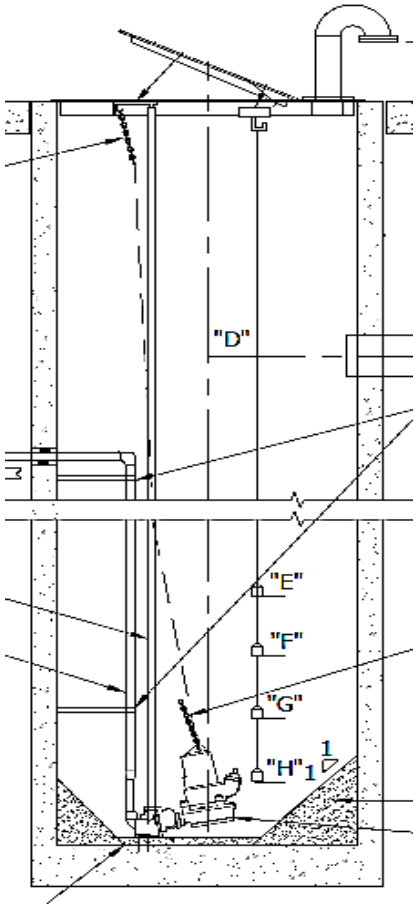
Overflows are not authorized

In addition to the required emergency means of operation, provide

Storage Capacity:

≥100,000 gpd: 2 hr retention

<100,000 gpd: 4 hr retention



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Next Steps

Your FP or ER approval letter will include guidance on what the next steps are

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Questions?

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Water Protection Program Financial Assistance Center

CW Coordinator Unit

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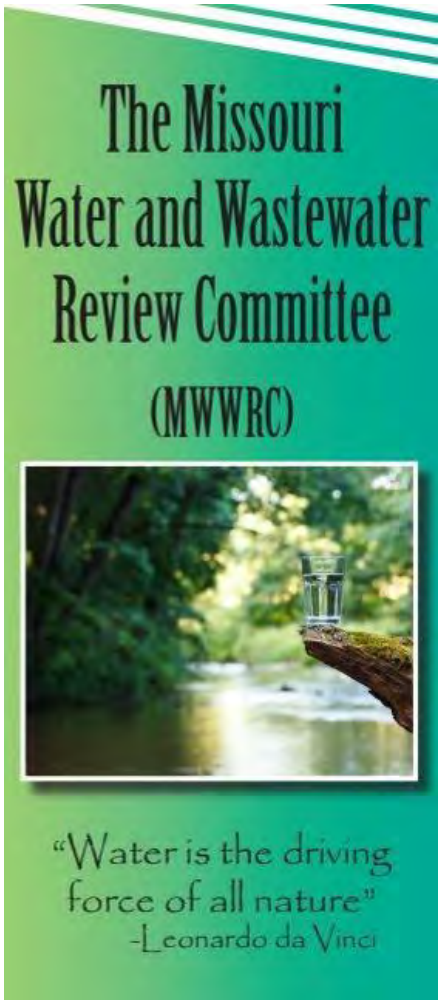
Missouri Water and Wastewater Review Committee (MWWRC)

Members:

- Missouri Department of Economic Development - Community Development Block Grant Program
- Missouri Department of Natural Resources
- U.S. Department of Agriculture-Rural Development

Purpose

- This committee meets monthly to jointly review applications and coordinate financial resources to maximize public infrastructure funds



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Financial Assistance Center

- Clean Water State Revolving Fund Loan Program
- Drinking Water State Revolving Fund Loan Program
- Small Community Engineering Assistance Program – For wastewater
- Drinking Water Engineering Report Services Grants – For drinking water

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SRF Loan Program Eligibility

Clean Water SRF (wastewater and non-point source projects)

- Political subdivisions (counties, incorporated cities and towns, districts) may apply.

Drinking Water SRF

- Political subdivisions (counties, incorporated cities and towns, districts), not-for-profit corporations, and investor-owned water utility corporations may apply. Political subdivisions and not-for-profit corporations receive first priority for funding.

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SRF Loan Programs

- Below market rate loans– interest subsidy 70% of market rate
- One-half percent annual administrative fee
- Loan term typically 20 years or the useful life of the project

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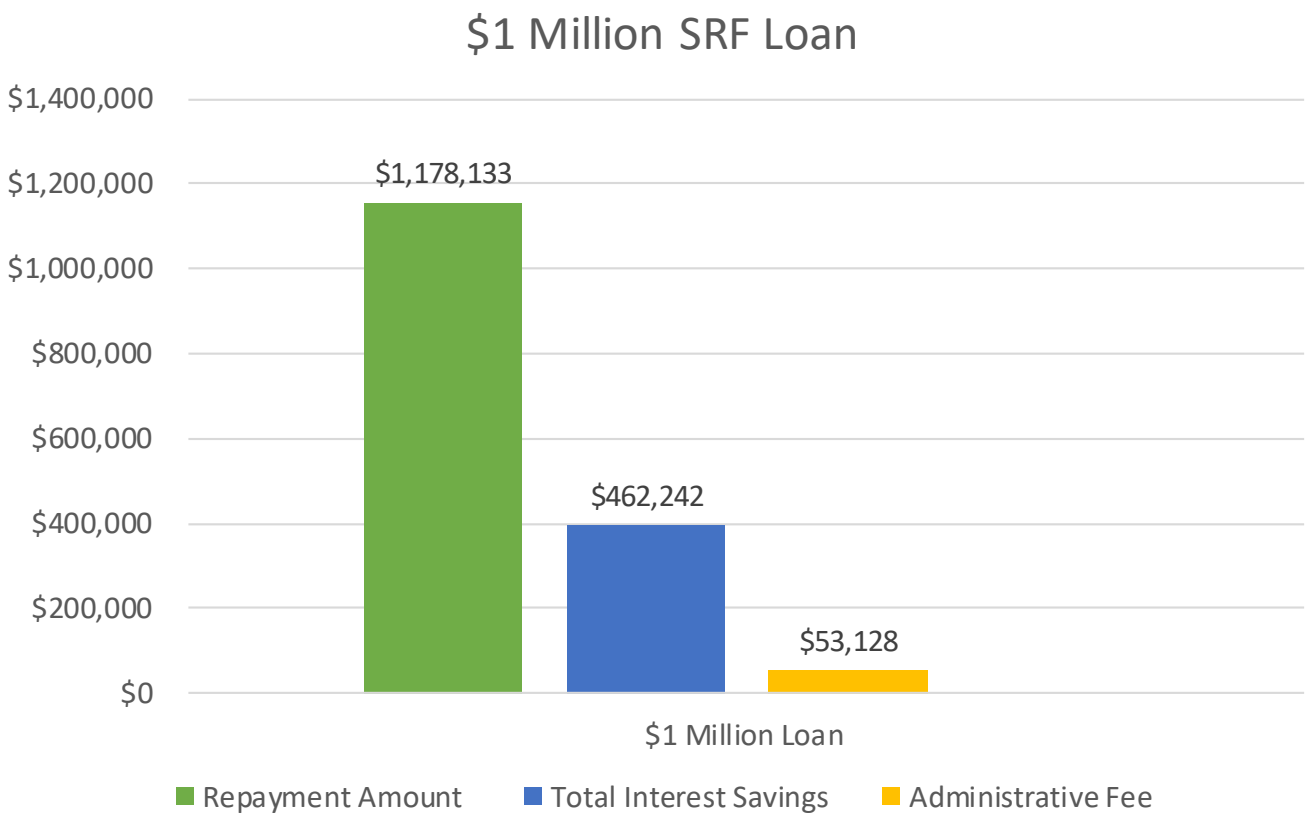
SRF Loan Potential Interest Savings for Borrowers



Total Interest Savings

– Administrative Fee

= $409,114

Net Interest Savings

- For example purposes only
- Assumes market interest rates at 5.00% and a subsidized SRF interest rate of 1.50%
- Actual interest rates, payments, fees, and savings may vary based on market conditions and project specific details

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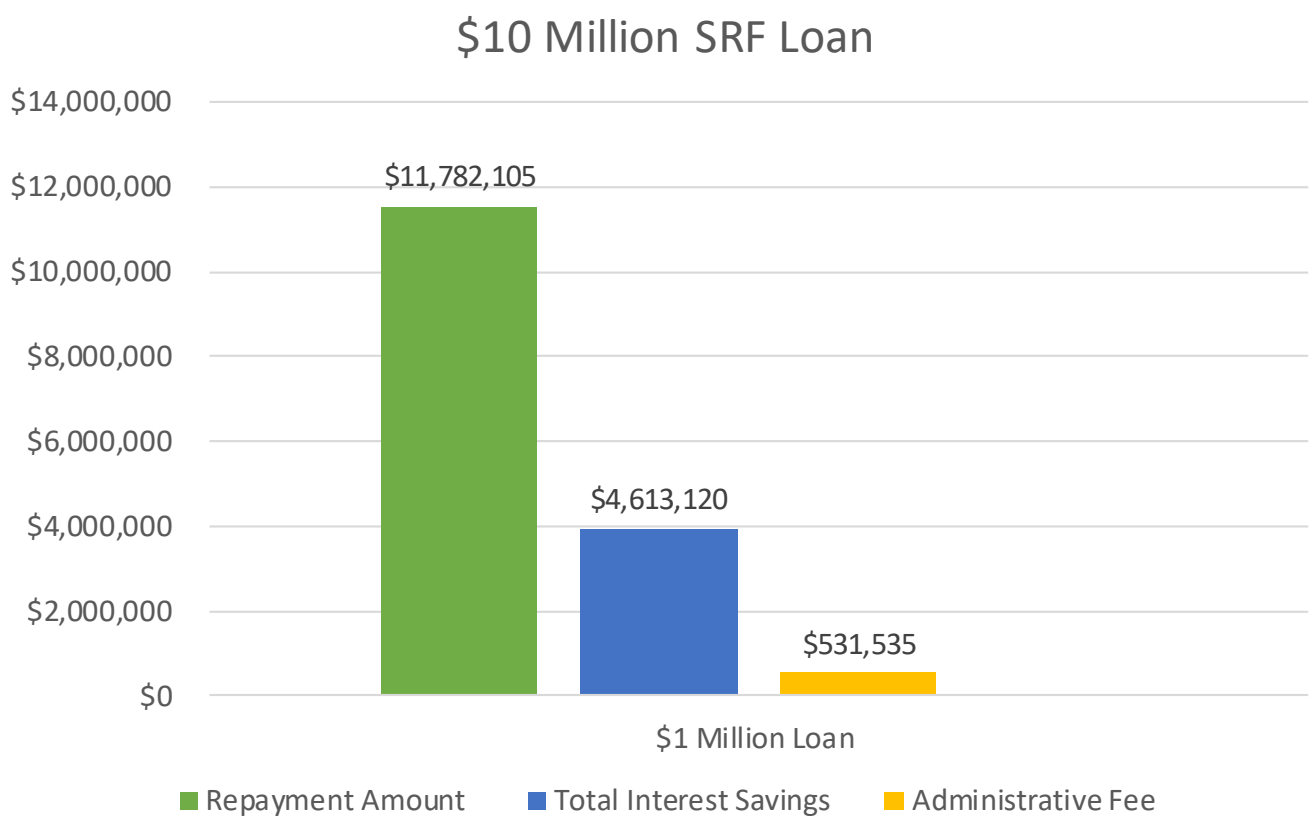
SRF Loan Potential Interest Savings for Borrowers



Total Interest Savings

– Administrative Fee

= $4,081,585

Net Interest Savings

- For example purposes only
- Assumes market interest rates at 5.00 % and a subsidized SRF interest rate of 1.50%
- Actual interest rates, payments, fees, and savings may vary based on market conditions and project specific details

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CWSRF Loan Program

Eligible projects:

- New construction or improvements to:
- Wastewater treatment plants
- Sewer lines
- Storm sewer control
- Non-point source infrastructure projects

Ineligible Projects:

- Operations and Maintenance
- Some projects are limited by private activity

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CWSRF Affordability Grant

- Grant possible with loan up to 50% of the eligible project costs, maximum grant of $2 million
- Must serve a population of 10,000 or less
- Must meet eligibility criteria - DNR analysis indicates borrower would have difficulty financing projects without additional subsidization based on:
  - ✓ Income
  - ✓ Unemployment data
  - ✓ Population trends
  - ✓ Other economic and demographic data

Grant Funding is Limited!

https://dnr.mo.gov/env/wpp/srf/wastewater-assistance.htm

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CWSRF Regionalization Incentive Grant

- Grant for municipalities* connecting small public or private systems that are permitted or should be permitted
- Annual application cycle with competitive scoring - Highest priority to projects connecting small facilities in enforcement
- First application cycle October 31- open December 31, 2019
- Covers 100% of eligible costs

Intended to incentivize interconnection where it would otherwise not be likely

*A municipality as defined by 40 CFR 35.2005(27) is a "city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created under State law, or an Indian tribe or an authorized Indian tribal organization, having jurisdiction over disposal of sewage, industrial wastes, or other waste, or a designated and approved management agency under section 208 of the Act."

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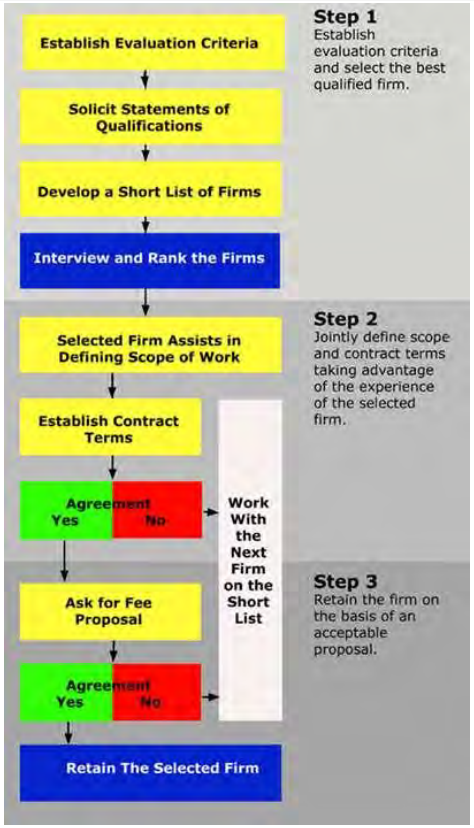
Know Before You Begin…

Architectural/Engineering Procurement and Contracting

- Missouri "political subdivisions of the state" must follow qualifications based selection process to procure professional design and engineering services per RSMo. 8.285 – 8.291
  - ✓ Use Qualifications Based Selection (QBS) Process
- Federal funding recipients entering into contracts must seek and encourage bids from Disadvantaged Business Enterprises (DBEs).
  - ✓ Follow "Six Good Faiths"
- Check with your funding agency for assistance

QBS Process Recommended by American Council of Engineering Companies



Courtesy of American Council of Engineering Companies of Missouri, Inc., www.acecmo.org/qbs/

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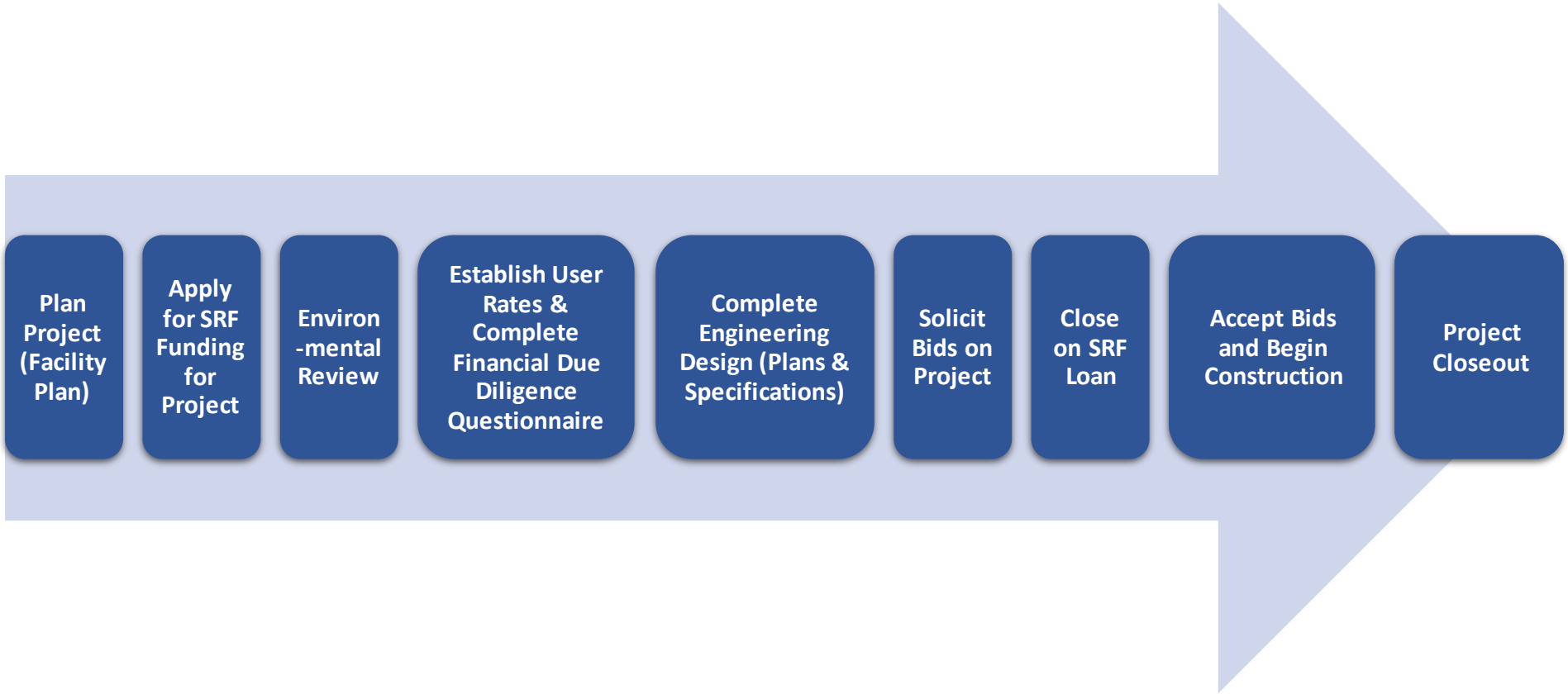
Steps in the SRF Process



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SRF Process Overview

- Planning
- Financial
- User Charge, Sewer Use Ordinances
- Environmental Review
- Architectural & Engineering
- Bidding and Construction

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SRF Application

- Applicant submits application to the Financial Assistance Center by March 1st.
  - ✓ Facility Plan/Engineering Report
  - ✓ Debt Instrument
- DNR scores applications competitively
- DNR lists projects on the Intended Use Plan - Details projects, priority points and allocation of funds
  - ✓ Plan must be approved by Clean Water Commission / Safe Drinking Water Commission
- Financial Assistance Center assigns project coordinator and engineer to provide funding assistance oversight and support project advancement

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SRF Application

- A kick off meeting is scheduled to discuss project and they are given a binder with the SRF checklist and necessary guidance/templates
- A project schedule is prepared and updated as needed
- Checklist is kept up-to-date and shared frequently with the system to remind them of what we still need prior to loan closing to satisfy environmental, technical and financial review

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Financial: Due Diligence Questionnaire

- Financial statements
- Revenues exceed expenses
- Debt service coverage 110%
- Outstanding debt system

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User Charge, Sewer Use Ordinances

- Designed to produce adequate revenues for O/M
- Reserve for replacement
- Account for revenues generated by the system, debt service, and expenditures for O/M

Model Sewer Use and User Charge Ordinances are available on the DNR website:

http://dnr.mo.gov/env/wpp/srf/wastewater-project-guidance.htm

Photo:http://www.hypebot.com/.a/6a00d83451b36c69e201a3fbc41d92970b-600wi

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Architectural & Engineering Agreement

Reviewed for:

- Scope of Work- eligibility
- City and Engineer signed
- Costs in dollars
- Timeframe in days
- Payment method
- Complies with procurement regulations

Major change in scope of work

- Will need to re-procure if not included in contract

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Bidding and Construction

- After plans and specifications approval
- Must advertise for at least 30 days
- Bids opened, tabulation spreadsheet
- Submit bid documents for review and concurrence
- We prefer at least 90 days before bids expire
- Davis Bacon Requirements
- Department of Labor and Industrial Relations
- American Iron and Steel (AIS)

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Construction Financing

- CWSRF loan/grant award occurs after:
  - ✓Project is bid
  - ✓Borrower submits a recommendation of award to DNR
  - ✓DNR concurs
- CWSRF interest rates:
  - ✓ Determined the Friday before loan closing
  - ✓ Interest rates are 30% of the market rate
- Applicants are responsible for all costs incurred;
  - ✓Including ineligible project costs
  - ✓And costs that exceed the financed amount

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SRF Process

- Process takes about 12 to 18 months
- Communication is key!

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STATE GRANTS AND LOANS

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Small Community Engineering Assistance Program

- Population of 10,000 or less
- To finance the development of engineering report/facility plan for wastewater project – does not cover engineering work already completed
- Funds 80% of cost for most communities, or funds 90% of cost for disadvantaged communities with a maximum award of $50,000

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Small Community Engineering Assistance Program

- Will not pay for services or worked performed prior to the grant award
- Budget period is for 2 years
- Submit facility plan at least 90 days prior to budget period expiration

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Small Borrower Loan Program

For wastewater and drinking water needs:

- $100,000 maximum loan
- Maximum 20 year term
- 30% market rate
- No bonds required
- Population of 1,000 or less

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Questions????

Financial Assistance Center

573-751-1192

fac@dnr.mo.gov

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Clean Water State Revolving Fund (CWSRF) Process

Joe Blume, PE

SRF Engineering Unit Chief

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10 CSR 20-4 Grants and Loans

Prior to the Construction Permit

SRF Funding Application → Facility Plan, Clearances, Public Meetings, FONSI/CATEX → Construction Permit App, Plans & Specs → Public notice of operating permit (if applicable)

After Construction Permit Issuance

Bidding, Pre Construction Meeting → Quarterly or Interim Inspections → Works in Operation, Substantial Completion, → Final Inspection, Statement of Work Complete

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Process Flow

- Parallel track process
  - Financial/Technical
- Project Coordinator - Financial
  - Project tracking
  - User Charge and Bid Review
  - Financing paperwork
- Project Engineer - Technical
  - Facility Plan/EID - Environmental Review/Approval
  - Plans and Specs Approval – Construction Permit
  - Inspections

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Facility Plan – Complete!

- First step in the Facility Plan Approval Process – Is it Complete?
- The Facility Plan Submittal Checklist (page 1) identifies the required elements in a Complete Facility Plan.
- SRF Engineer reviews and comments.
- Comments addressed – Complete!

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CWSRF Facility Plan Requirements

- Evaluate most reasonable, environmentally sound, implementable, cost effective alternatives
  - Recommend evaluate 3 or more alternatives
  - Treatment plant alternatives must consider a no-discharge system and regionalization
  - No discharge alternatives may require a soils report
  - Consider water and energy efficiency alternatives

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CWSRF Facility Plan Requirements

- Include User Charge Information
  - current user charge
  - estimated future user charge
  - basis for estimate
- Assess the environmental conditions and environmental impact of the proposed project
- Department will use assessment to make an environmental determination

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CWSRF Facility Plan Requirements

- No Facility Plan Approval prior to:
  - Environmental Review/Determination
  - Public Participation
- Projects switching funding to SRF may be subject to:
  - Additional Facility Plan review
  - New construction permit
- Facility Plan Guidance:
  - http://dnr.mo.gov/pubs/pub2418.htm

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SCEAP Facility Plans

- SCEAP Engineering Report/Facility Plan requirements similar to SRF complete facility plan stage
- Deviations from these requirements considered on case-by case basis based on the scope of the SCEAP application

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SCEAP Facility Plans

- Anti-Degradation evaluation/determination must be included in report/plan if it was part of the A/E contact
- Allow time for Anti-Degradation Review – begin needed steps early in report development time frame
- SCEAP payments could be impacted by reports submitted near the end of a grant period

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SCEAP Facility Plans

- Facility plans that are funded through SCEAP receive a letter of acceptance for final payment.
- The Facility plan still needs to be submitted for approval prior to moving forward with the project.
  - FAC for funded projects
  - Engineering Section for non-funded projects

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Environmental Determination

- Three possible Determinations
  - Categorical Exclusion (CE)
  - Finding of No Significant Impact/Environmental Assessment (FNSI/EA)
  - Record Of Decision (ROD)

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Environmental Determination

- Acceptance of environmental reviews from other agencies is allowed
  - When the funding source has changed
  - When there is joint project funding (SRF with CDBG)
- DNR will confirm review meets our regulations
- DNR will send a letter with concurrence or reasons review not acceptable

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Categorical Exclusion

- Commonly known as CatEx
- For projects excluded from formal environmental review including:
  - Minor rehab projects for existing facilities
  - Construction of small facilities on existing site
  - Project in communities of less that 10,000 population with minor expansion or upgrade
  - New sewer lines in previously disturbed existing right–of-way

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Categorical Exclusion - Not Eligible!

- Construction of new sewer lines outside of existing right-of-ways
- Increase of more than 30% in pollutant loading or volume
- Provides for capacity 30% or greater than the existing population
- Known or expected impacts to cultural resources, threatened/endangered species, or sensitive areas
- Construction project likely to cause significant public controversy

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Finding of No Significant Impact Environmental Assessment

- Department FNSI determination based on Environmental Information Documents (EID) provided by applicant
- Provide Department copies of letter and support information sent to agencies requesting environmental clearances
- Provide Department responses to all clearance requests
- Address any issues

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Clearance Letter Requests

- Request and proposed project information to local, state, and federal agencies below:
  - U.S. Army Corps of Engineers
  - United States Fish and Wildlife
  - Missouri Office of Administration – Federal Assistance Clearinghouse
  - Department of Conservation
  - DNR Office of Historical Preservation
  - DNR Missouri Geological Survey
  - DNR Division of State Parks

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Finding of No Significant Impact Environmental Assessment

- Publish 30 day public notice of public meeting or hearing to discuss the proposed project and its Environmental Impact
- Provide Department a complete record of the public meeting or hearing
- Provide any additional information requested by department

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Finding of No Significant Impact Environmental Assessment

- Department makes determination of no significant impact, issues FNSI, distributes to interested parties
- Facility plan can not be approved for at least 30 days after the publication of the FNSI
- FNSI Comments addressed prior to facility plan approval

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Record of Decision (ROD)

- Required for Projects with Significant Environmental Impacts
- The ROD is based on an Environmental Impact Statement
- SRF projects requiring an ROD are rare (I have never seen one)

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Historical and Cultural Determination

- Required by the National Historic Preservation Act Section 106
- Separate from the National Environmental Policy Act determination discussed earlier
- Applies to all SRF projects

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Historical and Cultural Determination

- Requires obtaining clearance from State Historic Preservation Office (SHPO)
- Requires consulting with all Tribal Authorities who have expressed interest in that area
- Tribal consultation can be done by the applicant or by FAC

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Historical and Cultural Determination

- May require an archeological survey be conducted
- Once the clearances and consultation is complete a determination will be made.
- Cultural determinations are usually included in the environmental determination or the facility plan approval letter

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Plans and Specifications

- ***After facility plan approval*** submit:
  - Construction permit application
  - Plans & specs
  - Summary of Design
- Plans reviewed by SRF engineer
- Specs reviewed by SRF engineer & SRF coordinator

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Plans and Specifications

- Design must comply with 10 CSR 20-8 Minimum Design Standards
- Plans and Specs compliant with 10 CSR 20 – 4.040 CW SRF General Assistance Regulations

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Plans and Specifications

- SRF requirements:
  - Signed and sealed by professional engineer
  - SRF upfront assurance documents in the specs
  - Sole Source Restrictions
  - Experience Clause Restrictions
  - MO Domestic Products Procurement Law
  - American Iron and Steel

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Alternative Project Procurement

- Design-Bid-Build current project delivery
- Aug. 2016 Statute RSMo 67.5060 allows use of alternative procurement for Water/Wastewater infrastructure project delivery
- Authorizes use of Design-Build (DB) and Construction Manager-At Risk (CMAR)

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Design-Bid-Build

- Traditional way to implement water & wastewater infrastructure projects
- Design and construction clearly separated
- Owner issues RFQ to select Engineer
- Engineer designs – contractors bid project
- Owner selects lowest, responsible, responsive, contractor's bid

Design–Build

- Design-Build Engineer/Contractor Team handle design ***and*** construction of project
- RFQ to select licensed engineer to prepare Design-Build RFQ/RFP and evaluation documents
- Owner selects Design-Build Procurement Process:
  - Progressive
  - Fixed Price

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Construction Manager At Risk

- CMAR – a hybrid of Design-Bid-Build and Design-Build
- Owner puts out RFQ for Design engineer
- Design begins
- Owner put outs RFQ for Construction Manager
- Project is bid

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Construction Monitoring

- Pre-construction conference
- Quarterly/Interim Inspections
  - On-site review of American Iron and Steel paperwork and products
- Statement of Substantial Completion
  - Allows issuance of Operating Permit
- Final Inspection
- Statement of Work Complete

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SRF Reminders

- SRF loans are typically 20 years, but can extend up to 30 years (when affordability is an issue).
  - Loan term cannot exceed useful life of project
  - Justification as to why a longer loan is needed
  - All projects require Useful Life certification from project engineer
- SRF projects must show the use QBS method of engineer selection
- Loan Recipient must certify project cost effective project

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SRF Reminders

- Land Acquisition and easements are SRF eligible costs
  - Land must be required to complete project
  - Appraisal and Review Appraisal Required
  - SRF pays up to appraisal value

SRF Reminders

- Land must be purchased in accordance with the *Uniform Relocation and Real Property Acquisition Policies Act*
  - Applies even if land was purchased with the applicants own funds
  - If the land purchase is not done properly the entire project will be ineligible for funding through SRF.

SRF Reminders

- Only components that are owned, operated, and maintained by the applicant are eligible costs
- Example: Grinder pump system components must be owned and maintained by the system not the home owners for them to be eligible costs
- Make sure that easements and ordinances are consistent and clearly state who will own and maintain what
  - Easements and ordinances must be at least for the length of the loan

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Green Project Reserve

- 10% of federal capitalization grant is reserved for Green Projects
- No longer requires business cases to be completed
- Additional SRF Loan Application Priority Points given to projects with Green Project elements including:
  - Green Infrastructure
  - Energy Efficiency
  - Water Efficiency
  - Environmentally Innovative

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Questions?

Thank you!

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Innovative Technology

Cindy LePage, P.E.

Take Away

- Consultants Play Key Role
- Early Contact
- Many Options
- Status of Active Projects

Definition

- Innovative Process 644.051.12, RSMo
  - Completely New Technology in the Type and Method of its Application
  - Minimum Design Criteria Not Well Established

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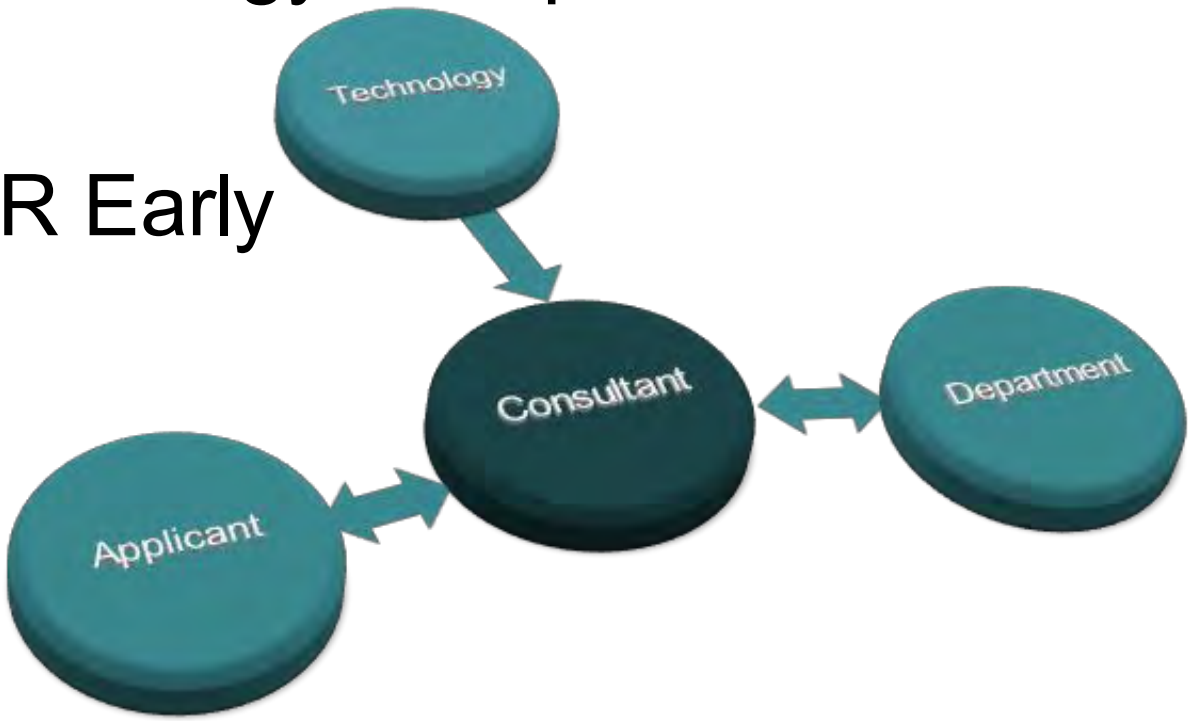
Consultant Role

- Hired by Owner
- Propose Technology for Specific Installation
- Contact DNR Early



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Why Innovative?

- More Stringent Ammonia Limits
- Lagoon Retrofits
- Cost Effective Solutions

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Pilot Project

- Temporary Small-Scale Projects
- No Construction Permit Needed
- Side-stream Installation
- Approved Plan and Testing Protocol
- Report to Evaluate the Efficacy

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Demonstration Project

- Full-Scale Installation
- Requires Construction Permit
- Approved Plan and Testing Protocol
- Requires Operating Permit Modification
  - Match Testing Protocol for Demonstration Period
  - Final Engineering Evaluation

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Regulatory Requirements

- Construction Permit Required per
  10 CSR 20-6.010(5)(A)5

- Process to no longer be Innovative
  10 CSR 20-6.010(5)(E)

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Facility Plan

- Extra Requirements for FP

  10 CSR 20-8.110(6)

- Provide a Contingency Plan

  10 CSR 20-8.110(5)(E)12

Facility Plan, cont.

- Description
- Objective/Benefit
- Literature and Reference Material
- Environmental Impacts
- Warranty or Process Guarantee

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Facility Plan, cont.

- Design Criteria and Assumptions
- Required Operator skills
- Sampling Protocol
  - Methods
  - Schedule
- Existing Installations

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Construction Permit

The Process is the Same

- Approve Facility Plan
- Submit Applications
- Public Notice Modified Operating Permit
- Require Statement of Work Completed
- Issue Modified Operating Permit

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End of Demonstration Period

- Final Engineering Evaluation Report (PE)
- Raw Data
- Explain Excursions
- Discuss Performance

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No Longer Innovative

- LemTec™ Modular Insulated Cover System with the LemTec™ Polishing Reactor™
- Moving bed biofilm reactor (MBBR) as secondary treatment followed by settling

Installations

- Amphidrome® System
- Baffled Bioreactor (BBR)
- BiO_2 Solution
- Bioclere™ - AquaPoint
- Bio-Domes

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Currently Being Assessed cont.

- Bow Reactor™
- IDEAL™
- NitrOx®
- Peracetic Acid
- PRO_2 Accelerator
- Whitewater® Aerobic Treatment Unit

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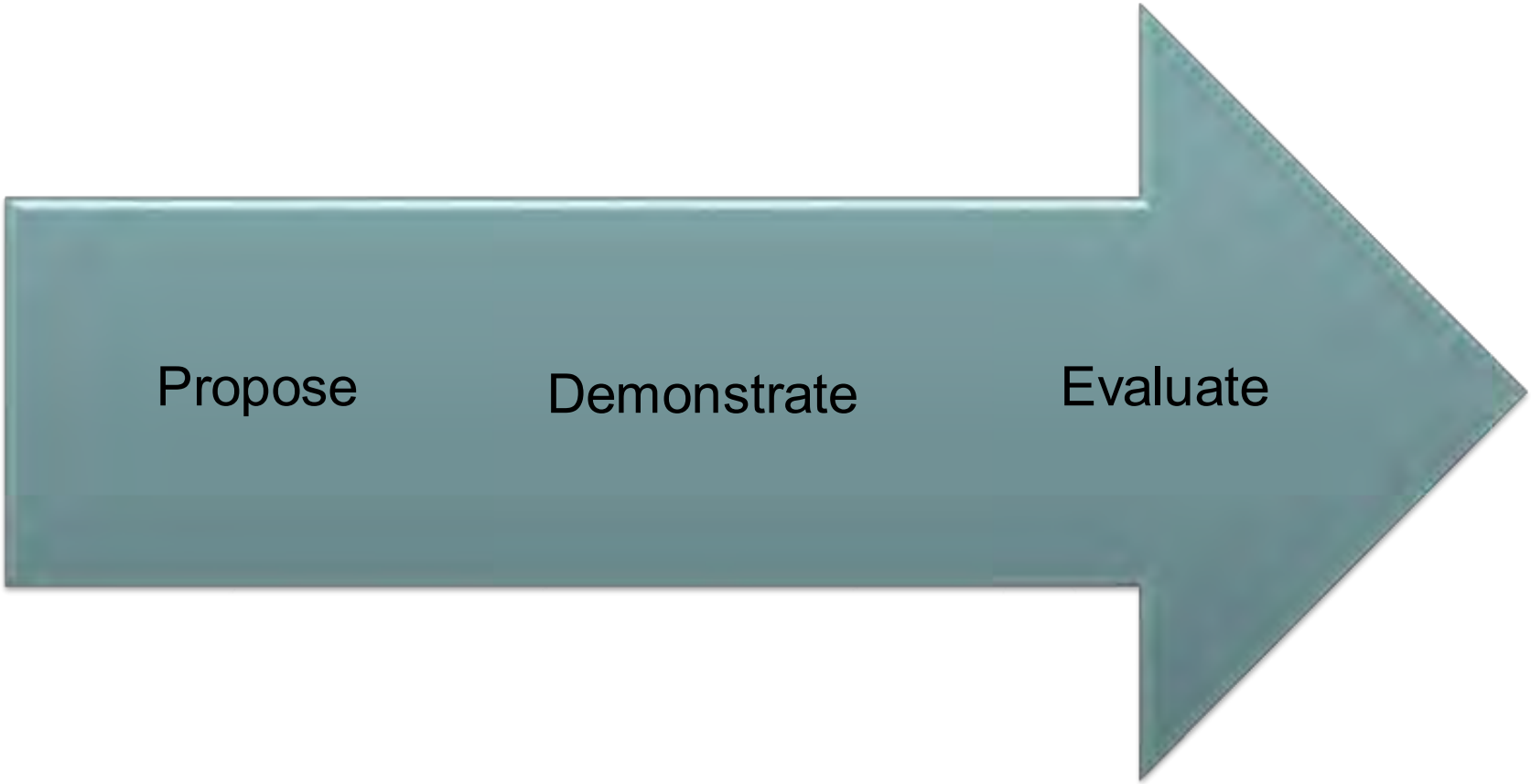
STATUS OF TECHNOLOGY



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NitrOx™ – Triplepoint

- 10 Demonstration Installations
  - 3 Final Reports Under Review
- Promising results

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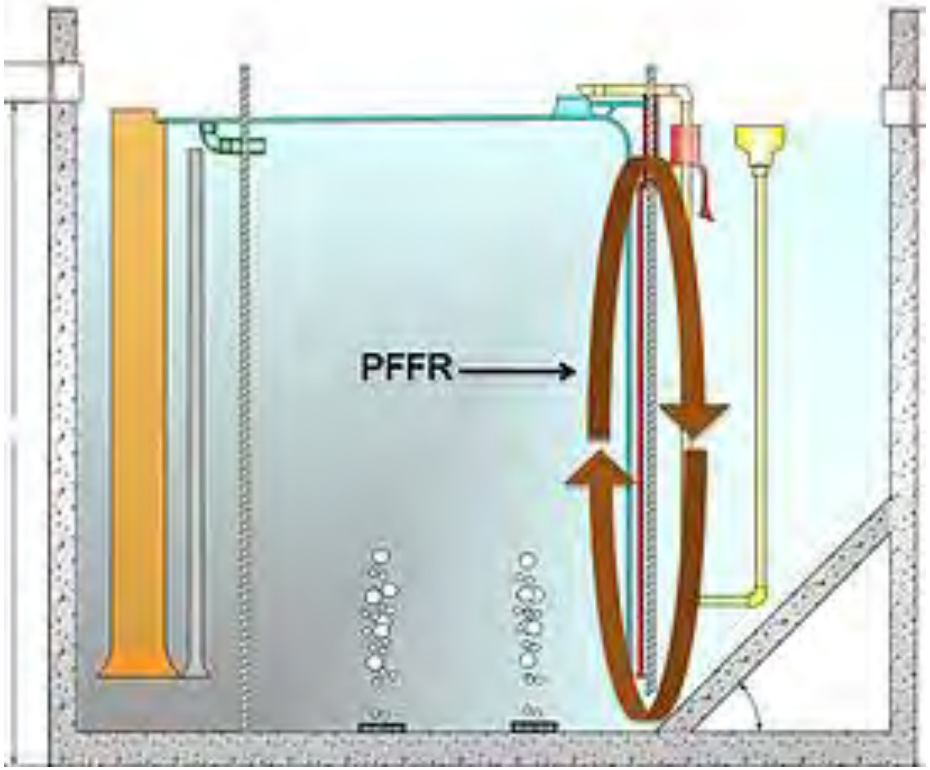
BOW Reactor™ - New Limits

- 2 Pilot Projects
- Promising Results



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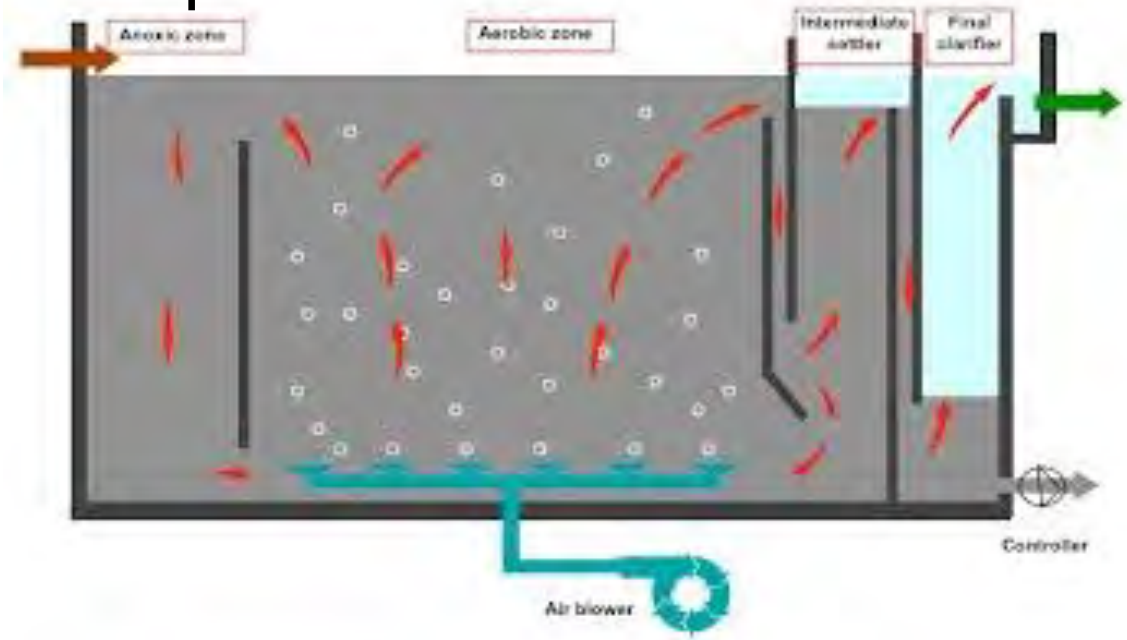
BBR- Frontier Environmental

- Baffled Bio-Reactor
- 1 Installation
  - Accepted Final Report



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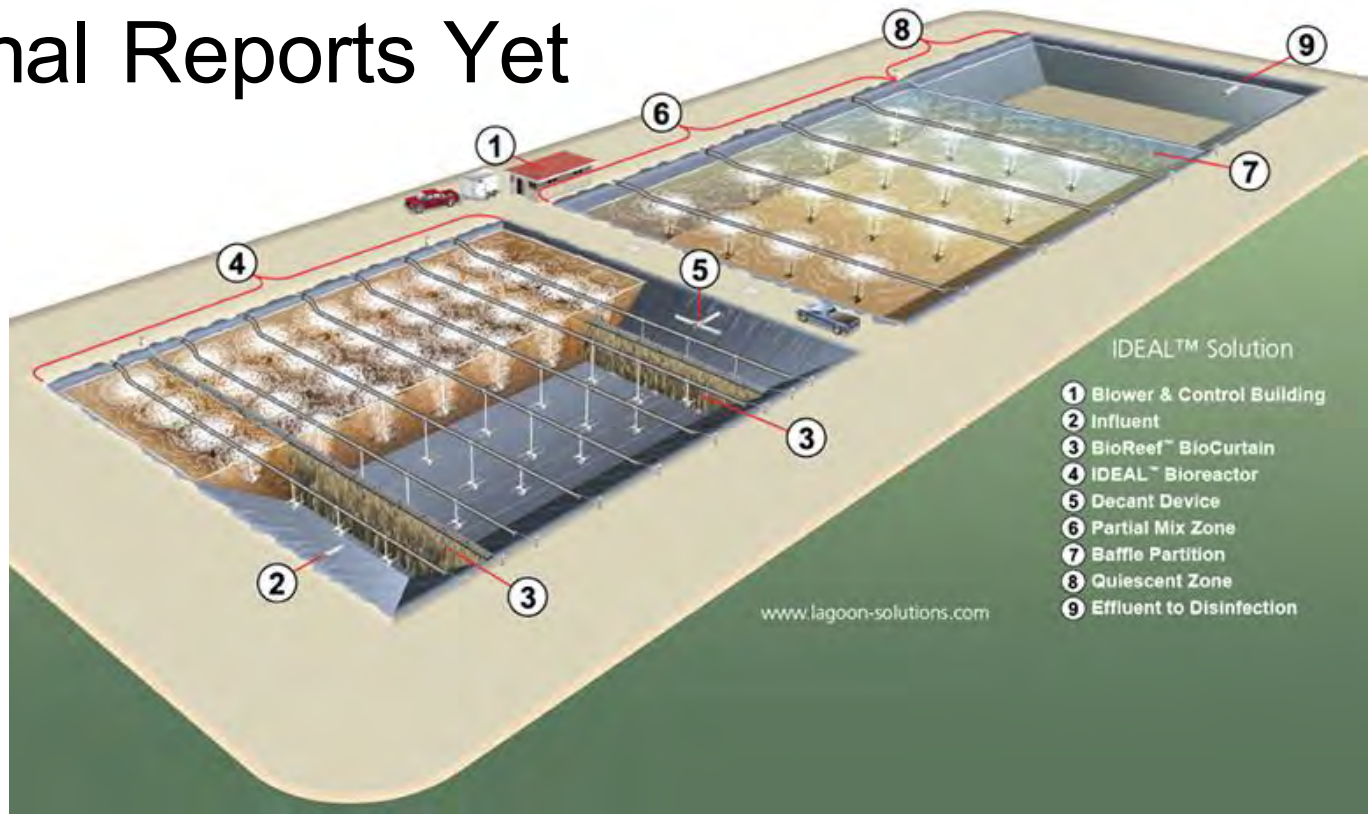
IDEAL BioReef® System – EDI

- 4 Installations
- No Final Reports Yet



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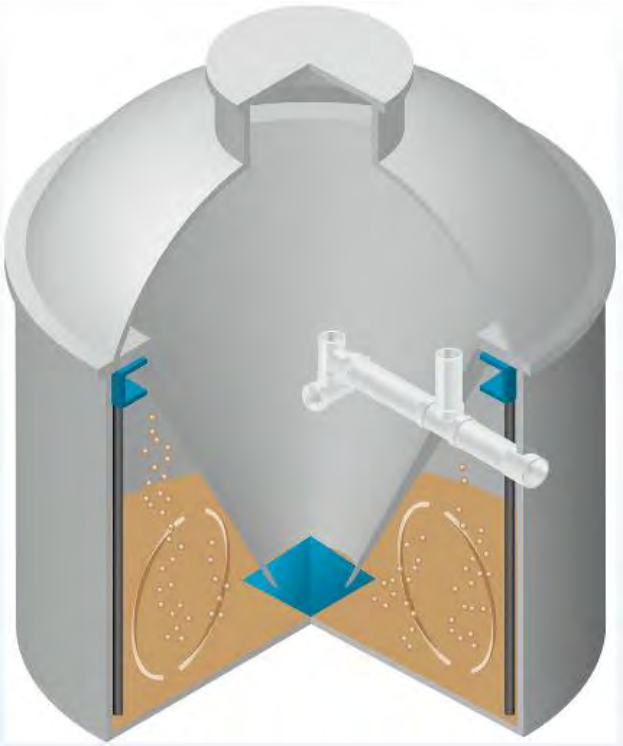
DF50 - Delta Environmental

- Whitewater® Aerobic Treatment Unit
  - 1 Installation
- Demonstration Period



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BiO_2 Solutions

- 2 Installations
  - 1 in Missouri
- Demonstration
- No Final Report for Missouri Installation

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Applied for Construction Permit

- Presby Advanced Enviro-Septic® - Infiltrator Water Technologies

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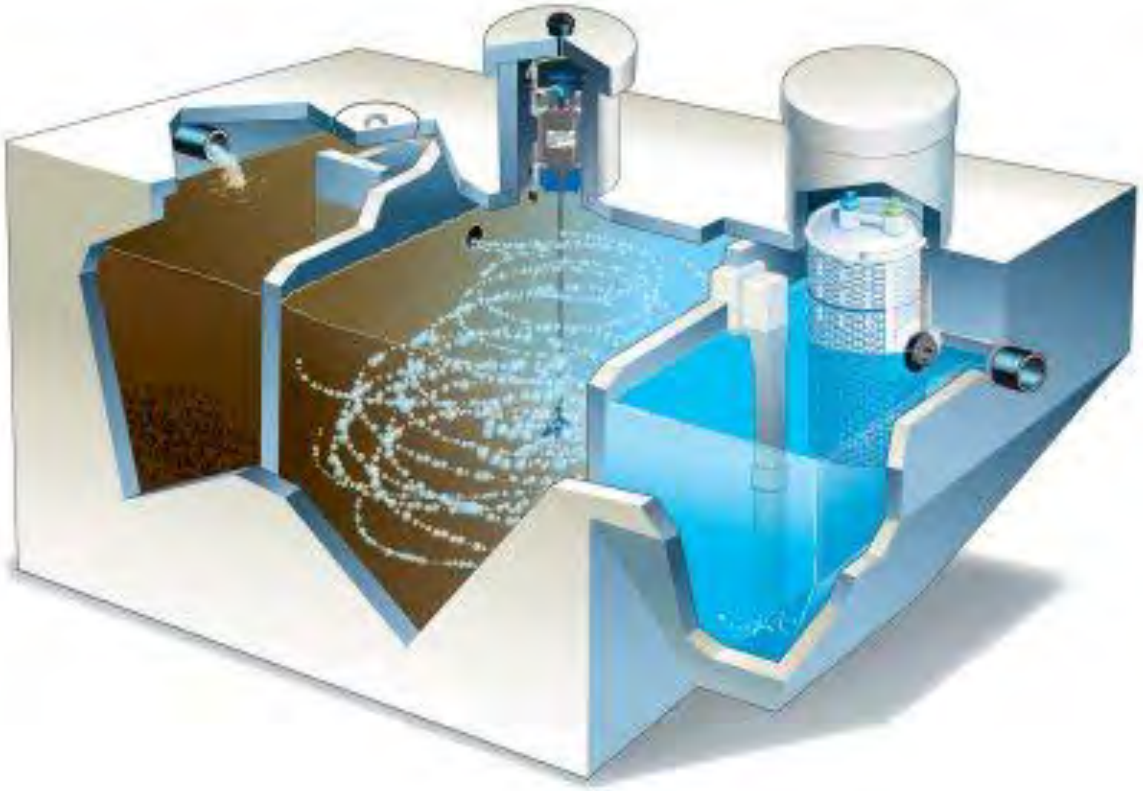
Applied for Construction Permit

- Singulair® Bio-Kinetic - Norweco



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Reference Material

https://dnr.mo.gov/env/wpp/permits/ww-construction-permitting.htm

- **Approval Process for Innovative Technology**, Fact Sheet—PUB2453

Innovative Technology for Treating Wastewater

The department encourages the development of innovative wastewater treatment processes and equipment. Many communities face more stringent effluent limitations, and they are looking for practical and affordable solutions. **More information**

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Contact Information

Cindy LePage, P.E.
Water Protection Program
Engineering Section
Cindy.LePage@dnr.mo.gov
573-751-6618

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Collection Systems

Ellen Modglin
Water Protection Program
Engineering Section

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What's New?

- Updated General Permit
  - MOG-SE effective January 2020
  - Revised requirements to match changes in regulation

- MOG-C expiring April 19, 2020

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MOG-SE Applicability

- Gravity sewer extensions, force mains, and lift stations.
  - Per RSMO 644.051.3.(2), all sewer extensions or collection projects ≤1,000 ft in length with fewer than 2 lifts stations are exempt.
  - A site-specific sewer extension CP may be required due to enforcement actions or for FAC funded projects.

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Sewer Extension Authority Supervised Program

- Available to entities with at least one existing WWTP ≥ 1 MGD
- Approval granted for 5 year period in facility's operating permit

City of Blue Springs	City of Columbia
City of Kansas City	City of Jefferson City
City of Joplin	City of Springfield
City of St. Peters	Duckett Creek Sanitary District
Metro STL Sewer District	

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Secret to getting a faster permit…

Submit a complete application!

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Application Requirements

- General Sewer Extension Construction Permit application with necessary signatures
- Appropriate fee: $300
- Electronic copies

- Plans and specifications each signed and sealed by a registered PE
  - Specifications are not required only for projects within the municipal boundaries of those with approved standard specifications and details
  - https://dnr.mo.gov/env/wpp/permits/sewer-specs.htm

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Approved Municipalities

- Branson West
- Cape Girardeau
- Carl Junction
- Carthage
- Lincoln County PWSD No. 1
- Liberty
- Neosho
- Nixa
- Ozark
- Rock Creek Sewer District
- Wentzville
- PWSD No. 2 of St. Charles County

- Sewer Extension Design Certification Check List
  - Ensures project is compliant with Chapter 8—Minimum Design Standards
  - Generally reduces time required for technical review

- Engineering Report or Summary of Design
  - Design and peak flow calculations and assumptions
  - Information to verify adequate down stream capacity of sewer, pump stations, and WWTF
  - Any design calculations and assumptions related to pipe size and velocity of flow
  - Appropriate pump curve with the system curve superimposed as applicable

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- Statement from the continuing authority accepting wastewater for treatment
  - Must have available capacity
- Statement from the continuing authority accepting responsibility for operation and maintenance

What else are we looking for?

- Sound engineering design
- Compliance with Minimum Design Standards 10 CSR 20-8.120, 8.125, 8.130

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Average Calendar Days to Issue	
2015	49
2016	40
2017	33
2018	34
2019	20

DNR.WPPEngineerSection@dnr.mo.gov

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I Have A Question….

Leasue Meyers,
Engineering Workshops

Spring 2020

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Questions to Kick it Off…

1. Jurisdiction between DNR & DHSS
2. RV Parks
3. Wineries
4. Continuing Authority
5. Regionalization & Consolidation
6. Geohydrological Evaluation
7. Water Quality Standards
8. Operating Permit Mods
9. Construction Permits

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Jurisdiction between DNR & DHSS

- How do I know who is regulatory authority for the project?
  - Single family lagoon ➡ DHSS
  - Subsurface domestic wastewater, no lagoon, ≤3,000 gpd ➡ DHSS
  - Lagoon for multi-family or industrial facility, or >3,000 gpd ➡ DNR
  - Combination of domestic & process wastewater, ≤3,000 gpd ➡ See flow charts

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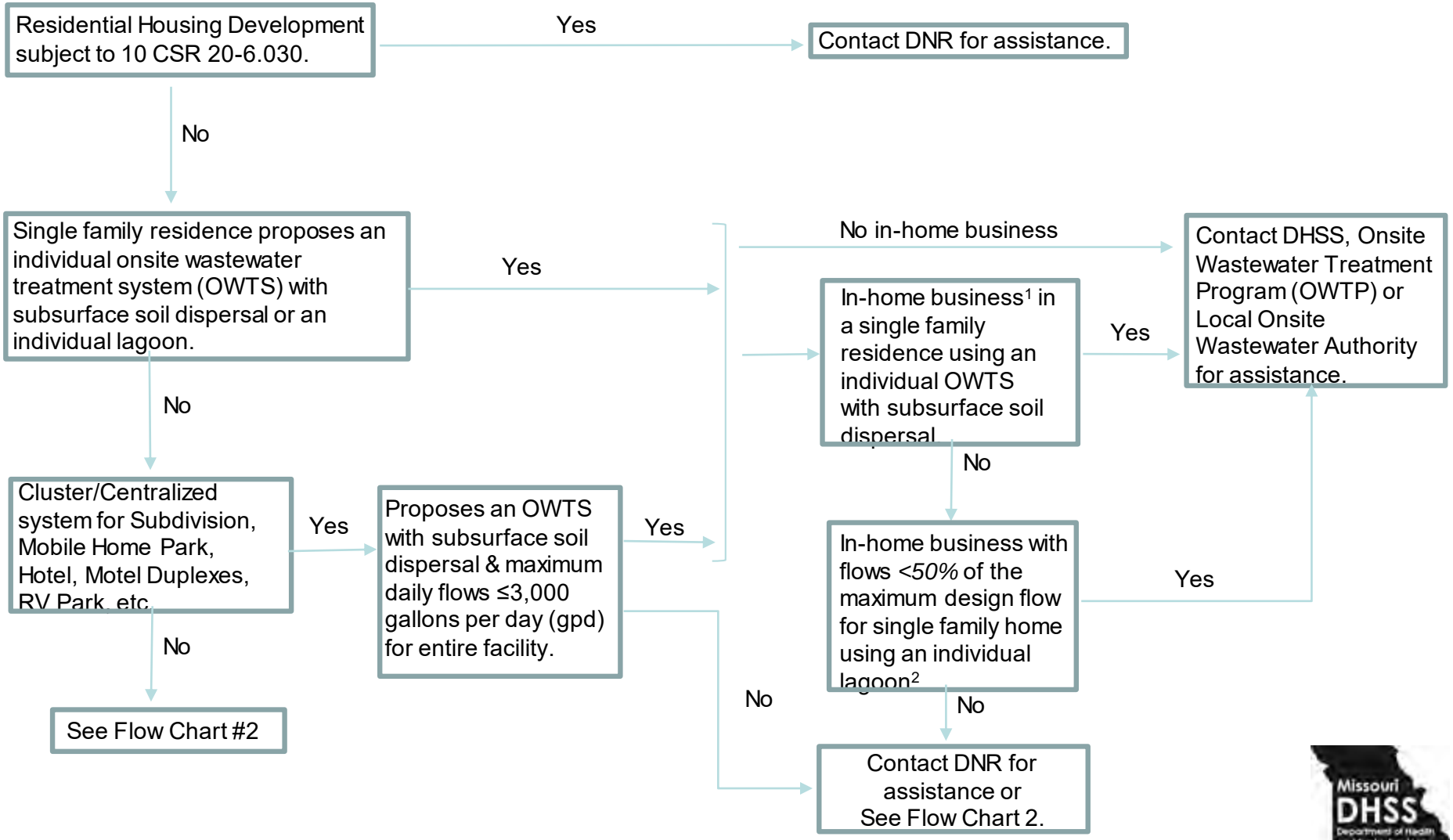
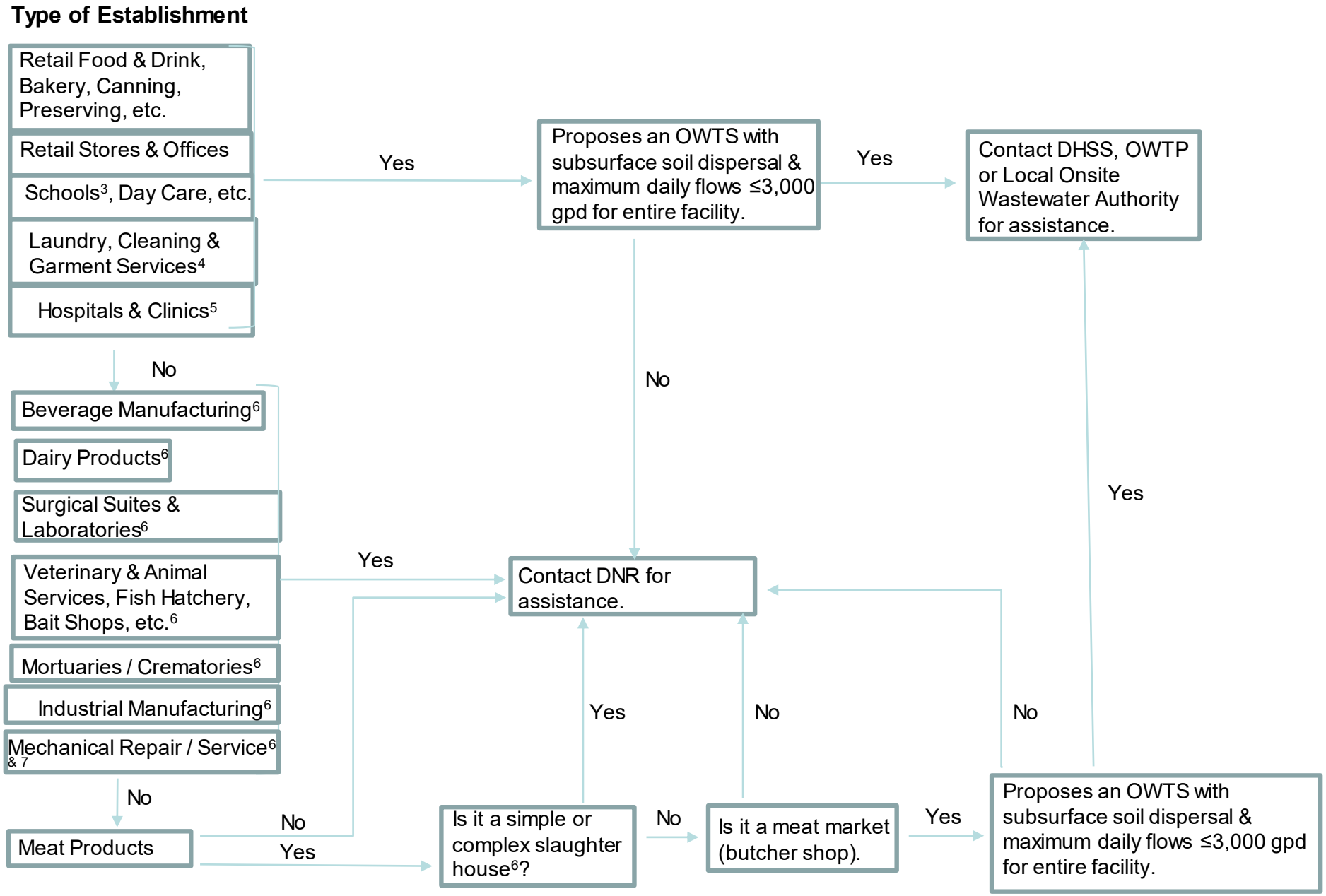
Wastewater Jurisdiction Flow Chart #1



Wastewater Jurisdiction Flow Chart #2



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Wastewater Jurisdiction Foot Notes

1. Typical in-home business include but not limited to daycare, beauty salons, catering, canning/preserving, bakeries, offices, etc. For business such as automotive, heavy/farm equipment repair, etc., see Mechanical Repair/Services.

2. As described in 19 CSR 20-3.060(6)(D), no more than one (1) single-family residence will be allowed on one (1) stabilization pond (lagoon) under the DHSS or local administrative authorities jurisdiction. All other lagoons regardless of flows or types of wastewater are the jurisdiction of the DNR.

3. Waste from science laboratories, floor drains in aviation/auto repair classes, etc. considered nondomestic.

4. Dry cleaning, dyeing, industrial launderers, and chemical treatment considered nondomestic.

5. Waste from any surgical suite considered nondomestic.

6. Waste from bathrooms, handwashing sinks, food stands, etc. considered domestic.

7. Included in this is automotive, farm equipment, heavy machinery, marine, aviation, etc.

Missouri DHSS
Department of Health and Senior Services

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Wastewater Jurisdiction

- How are flows determined?
  - New facilities: jurisdiction is determined by Table 2A of 19 CSR 20-3.060
  - Existing facilities: a minimum of a year of actual data collected daily or during the operating season that DNR, DHSS, & the county are willing to accept
- If DNR's jurisdiction, base design flows on:
  - engineer's judgement, or
  - Tables 1-1 and 1-2 of the Missouri Guidelines & Standards Document, PUB 2754, https://dnr.mo.gov/pubs/docs/pub2754.pdf

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Wastewater Jurisdiction

- DNR Resources
  - Who Regulates Wastewater in Missouri, PUB1296
    - https://dnr.mo.gov/pubs/pub1296.htm
  - Centralized Wastewater Collection & Treatment in Subdivisions, MHPs, & Campgrounds, PUB597
    - https://dnr.mo.gov/pubs/pub597.htm
  - Jurisdictional Change of a Domestic Wastewater Facility, PUB2691
    - https://dnr.mo.gov/pubs/pub2691.htm
- Department of Health Onsite
  - https://health.mo.gov/living/environment/onsite/

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Wastewater Jurisdiction

- Residential Housing Rule, & DNR Liaison on jurisdictional issues
  - Charles Harwood
    - charles.harwood@dnr.mo.gov
    - 573.751.9155

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RV Parks

- Jurisdiction
  - Determined from Table 2A of 19 CSR 20-3.060
    - 120 gpd per spot → **25** RV spots = 3,000 gpd, anything more puts it in DNR jurisdiction
- If expanding to >25 RV spots, include in the facility plan information on the other systems, when they were installed & the permitted flows
  - Document in the CP that it was previously regulated by DHSS
  - All systems covered in the OP

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RV Park Considerations

- Is it just RV spots, or will it include camping spots, event halls, restaurants, shops?
  - Discuss with the owner the site development & how it will be phased
- Year-round usage or will it be closed in the winter?
  - 45 days minimum storage, if not being used during the winter per 10 CSR 20-8.200
- Development of restrictive covenants on usage, structures, length of time present will help with issues

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Wineries & Breweries

- Who regulates winery/brewery wastewater?
  - DNR, see Jurisdiction Flowchart #2
- What are common issues?
  - BOD & TSS loading, see Table 1-1 of Missouri Wastewater Guidelines and Standards Document
  - Seasonal variation in loadings, due to activities occurring onsite
- Winery & Brewery Factsheet, Coming Soon!
- Resource: California Wine Institute, Sustainable Management of Winery Water and Associated Energy, https://www.wineinstitute.org/files/AVF-Guide.pdf

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Continuing Authority

- What is Continuing Authority?
  - 10 CSR 20-6.010(2)
  - Each application for a construction permit or operating permit shall identify the person, that is the owner of, operator of, or area-wide management authority for a water contaminant source, point source, wastewater treatment facility, or sewer collection system. This person shall be designated as the continuing authority and shall sign the application. By doing so, the **person** designated as the continuing authority acknowledges responsibility for compliance with all permit conditions.

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Continuing Authority

- Why does the homeowner's association need to be registered with the Secretary of State's Office?
  - Required by 10 CSR 20-6.010(2)(B)5.A.
  - Nonprofit Corporation Law, Chapter 355, RSMo
  - Condominium Property, Chapter 448, RSMo
    - https://revisor.mo.gov/main/Home.aspx
- Verify that the owner & continuing authority on the permit application match the Sec. of State on the application

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Continuing Authority

- What is the hierarchy?
  - Level 1- Management Entities designated by the Governor, in federal law (East-West Gateway, MARC)
  - Level 2- Municipalities designated by the CWC (Boone County & City of Columbia)
  - Level 3- Municipalities, PSC regulated (MAWC)
  - Level 4- owned by business, individual, 393-not-for profit facilities
  - Level 5- homeowner's associations

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Continuing Authority

- Hierarchal structure serves to prioritize control as higher level of Continuing Authority, such as Levels 1-3, typically have
  - More reliable operations and maintenance
  - Have the ability to raise revenues
  - Usually governed by laws, ordinances, & a city council or district board

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Regionalization & Consolidation

- What is regionalization and consolidation?
  - Regionalization: sharing physical infrastructure when an entity provides wastewater service economically by way of physically connecting existing & future wastewater treatment or collection systems to a regional or central treatment plant or collection system.
  - Consolidation: centralized ownership of multiple wastewater treatment or collection facilities through a merger, purchase, or ownership transfer.

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Regionalization & Consolidation

- Why is it a Department initiative?

Characteristics of Permitted Domestic Wastewater Facilities (as of March 8, 2019)					
Facility Size	< 0.05	0.05 - < 0.1	0.1 - < 1.0	≥ 1.0	Total
# of Facilities	1880	232	304	122	**2538**
% of all Facilities	**74%**	9%	12%	5%	100%
# in Enforcement	192	32	49	16	289
% of Enforcement facilities by size	66%	11%	17%	6%	100%
# of Continuing Authorities	1551	211	275	101	Unique CAs: 2065 (CAs = 2138)
% of all Continuing Authorities	72.5%	9.9%	12.9%	4.7%	100%

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Regionalization & Consolidation

- Why evaluate it?
  - Requirement for Antideg & Facility Plans
  - Evaluation of cost effective alternatives
  - "**E**" in NPD**E**S means elimination
- What benefit does it serve?
  - Possible cost savings
  - Removal of permitting requirements and a permit
  - For larger communities, potential new revenue from more service connections
  - Consolidation of operations

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Regionalization Tools

- Department's Regionalization Tool
  - Includes both drinking water and wastewater sites
  - https://modnr.maps.arcgis.com/apps/MapSeries/index.html?appid=89e9a2310cee4fae9f7a27b1b2e83397
- Wastewater Publication
  - https://dnr.mo.gov/pubs/documents/pub2819_000.pdf
- Drinking Water Publication
  - https://dnr.mo.gov/pubs/documents/pub2818.pdf

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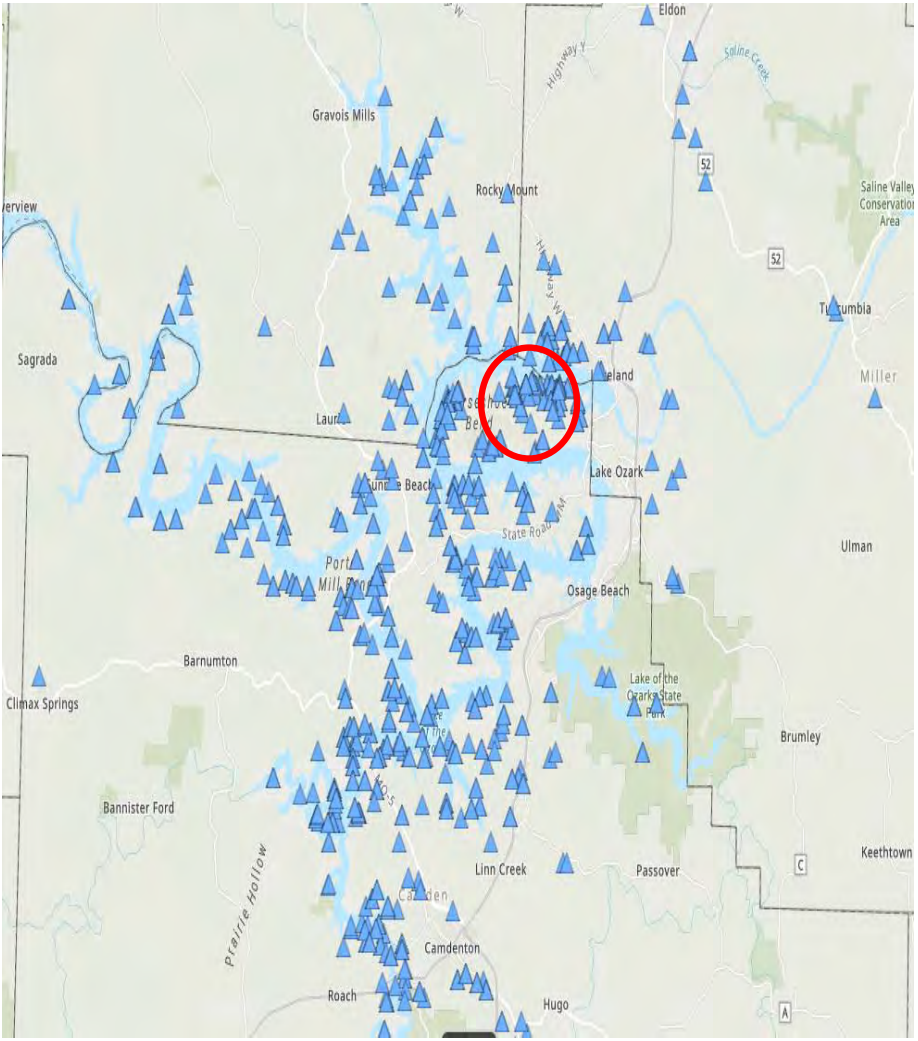
Mapping Tool



- Open the browser
- Zoom to your location, or enter permit number
- Then use the find features nearby and set a boundary
- Return results within that distance in that area

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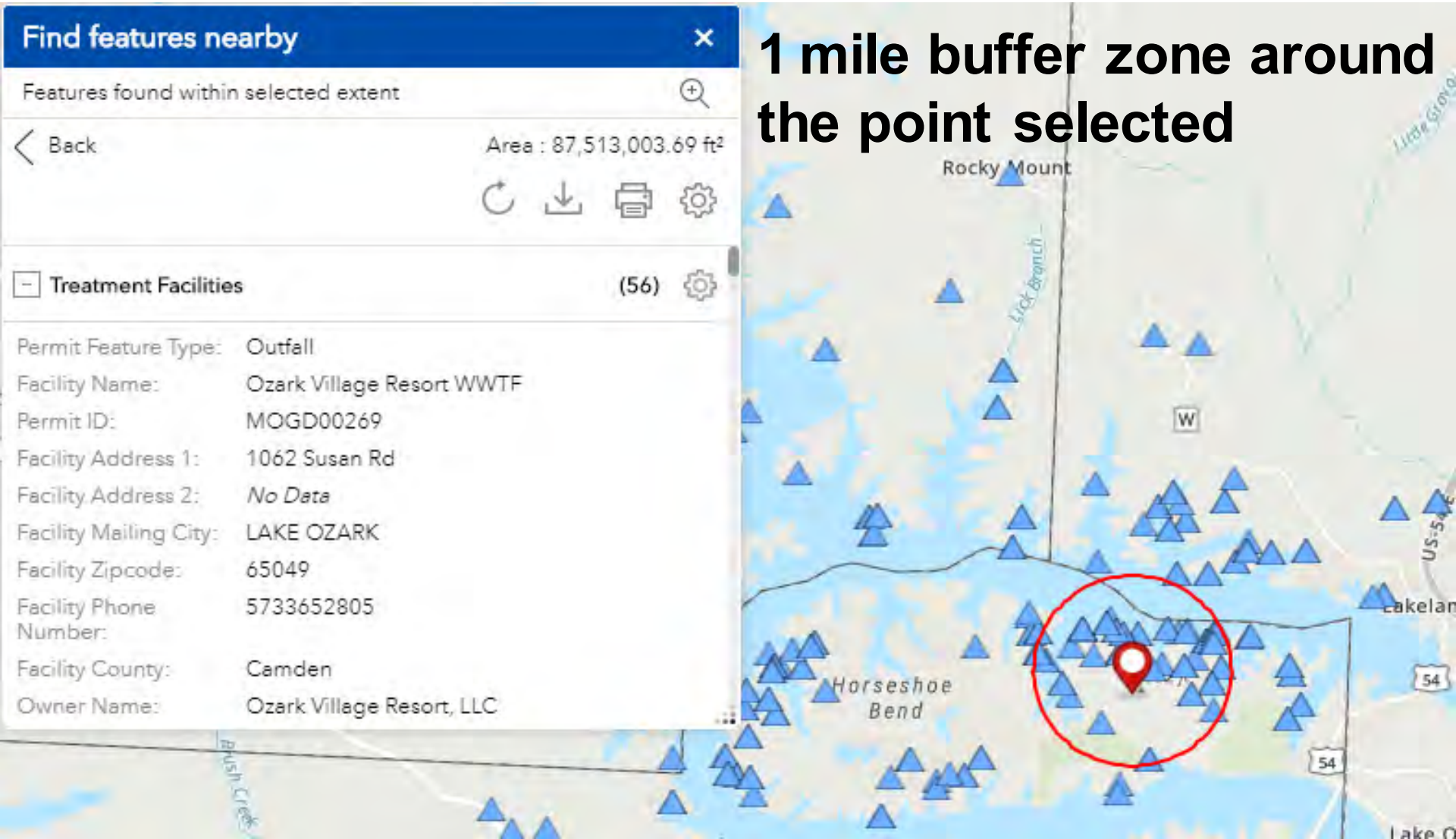
Mapping Tool

1 mile buffer zone around the point selected



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Geohydrological Evaluation

- When is one required?

Project	Purpose
New Discharge to a Stream	Gaining or Losing
Earthen Basin	Collapse Potential
Irrigation Systems	Collapse Potential & Karst Features
Subsurface Dispersal	Karst Features

- When in the project should it be done?
  - As early as possible, especially since it can identify losing streams, sinkholes in the area, or other items that need to be considered in the design

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Geohydrological Evaluation

- Does the engineer have to submit the request?
  - No, it can be the owner or the engineer
  - The engineer does need to submit the results with the Facility Plan
- What is the timeframe for getting an evaluation done?
  - No statutory timeframe, but goal is 60 days
- How do I request one?
  - https://apps5.mo.gov/geoedge/menu.action

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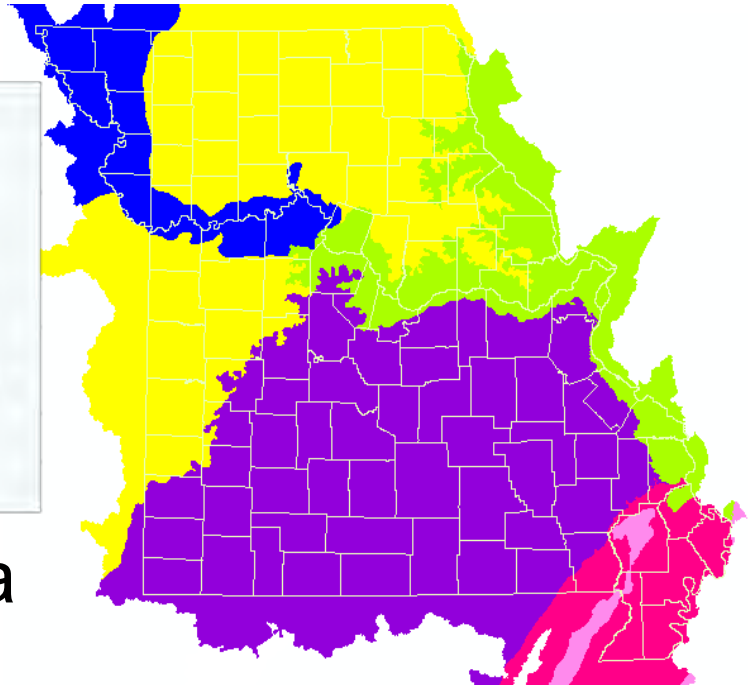
Water Quality Standards Revisions

- What are the changes to WQS?
- 2018 Triennial Review
  - Cadmium Criteria
  - Hardness at 50th Percentile, rather than 25th Percentile

Level III Ecoregion Hardness	50th %, mg/L	
Central Irregular Plains	200	Yellow
Interior River Valleys and Hills	208	Green
Mississippi Alluvial Plains	130	Magenta
Mississippi Valley Loess Plains	108	Light Pink
Ozark Highlands	170	Purple
Western Corn Belt Plains	240	Blue



  - Lake Numeric Nutrient Criteria

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2020 Triennial Review

- Aluminum Criteria
- Acute Cadmium Criteria
- Chlorides + Sulfate Criteria
- Drinking Water Source and Industrial Use Review
- Updates based on Use Attainability Analysis (UAA) and presumed use review results
- Commission approved variances
- Rules in Development, https://dnr.mo.gov/env/wpp/rules/wpp-rule-dev.htm
- Questions: Angela at angela.falls@dnr.mo.gov

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Lake Watersheds

- How do I know if the facility is located in a lake watershed?
  - Water Quality Standards Stream and Lake Classifications and Use Designations on the Department's Online Map Gallery, https://dnr.mo.gov/gis/
- How is the rule being implemented?
  - Nutrient Implementation Plan,
    - https://dnr.mo.gov/env/wpp/rules/documents/nutrient-implementation-plan-final-072618.pdf

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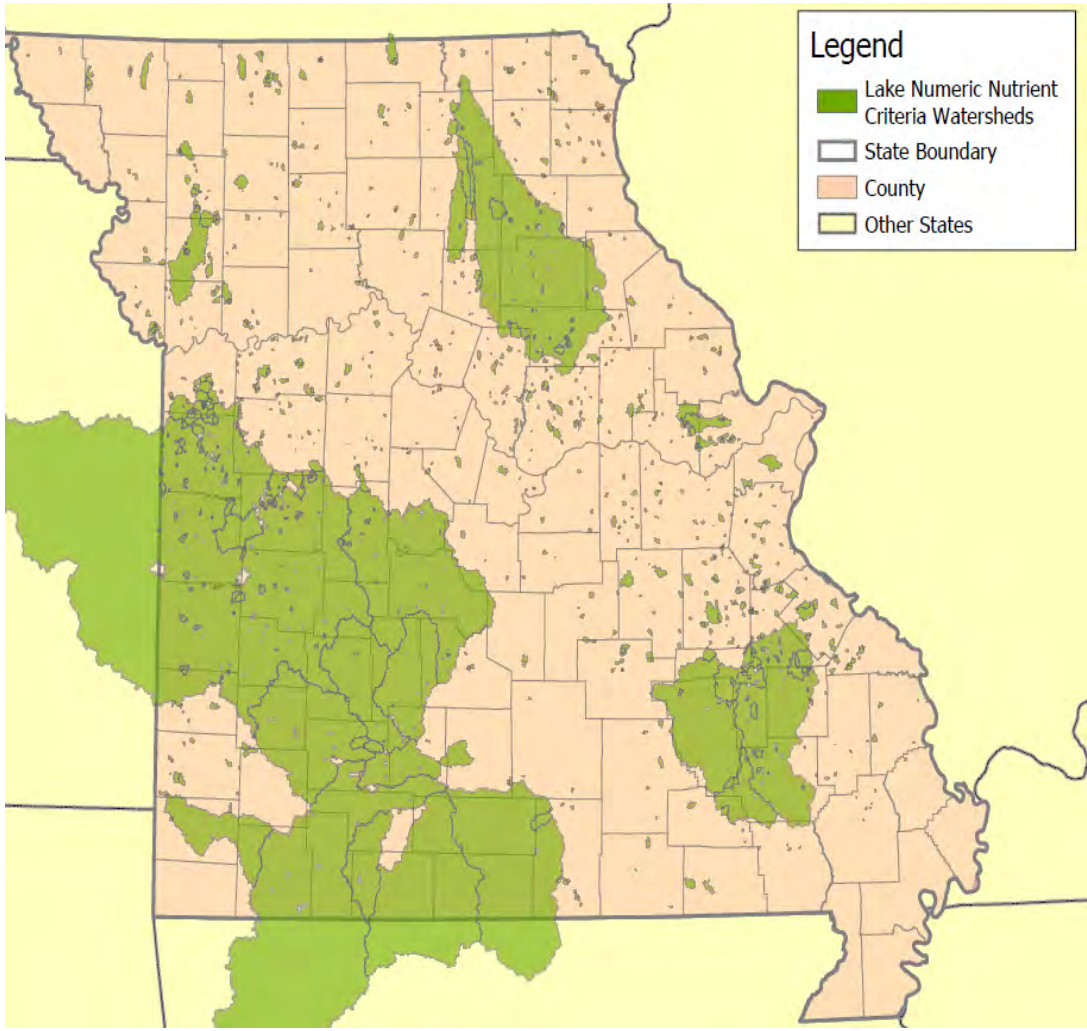
Lake Watershed Mapping

- Open the Map, https://dnr.mo.gov/gis/
- Can search by outfalls, lake classification, stream classification or zoom into the location
- Under layers tab, turn on Lake Numeric Nutrient Criteria



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Operating Permits

- How do I find a copy of the most recent operating permit?
  - https://dnr.mo.gov/env/wpp/permits/issued/wpcpermits-issued.htm
- Inspection report or copy of discharge monitoring reports?
  - Contact the Regional Office, https://dnr.mo.gov/regions/
  - Submit a sunshine request, https://dnr.mo.gov/sunshinerequests.htm

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Operating Permits Modifications with CPs

- When:
  - Changes effluent limits or pollutants of concern
  - Increases in design flow
- Why:
  - To provide the public the opportunity to comment with concerns
  - To meet the regulatory requirements in 10 CSR 20-6.200 & 40 CFR 124.10
- Available on the webpage, updated weekly on Friday
  - https://dnr.mo.gov/env/wpp/permits/pn/index.html

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Operating Permit-Cost of Compliance

- Why is there a cost of compliance analysis with the modification?
  - Required for any new environmental requirement, per 644.145, RSMO, including
    - new or changed monitoring requirements, such as total residual chlorine, *E. Coli*, or nutrients; or
    - new requirements due to other changes in the permit or at the facility.
  - https://dnr.mo.gov/env/wpp/affordability.htm

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Operating Permit Mods & Fees

- What is the cost to modify the operating permit
  - For POTWs, $200
  - For existing private facilities, 25% of the annual fee
  - For new privates, the annual fee based on proposed design flow, see PUB2564, https://dnr.mo.gov/pubs/pub2564.htm

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Operating Permit Mods & CP exemptions

- What if the project is exempt from construction permitting but still needs an operating permit modification?
  - Submit modification 60 days before expected to be implemented
  - Provide engineering certification that it meets the requirements of 10 CSR 20-8
  - Provide a schedule of when things will occur
  - Stay in contact with the permit writer
    - Contact information is provided in the welcome letter or email

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Operating Permit Considerations

- Provide updated flow & process diagrams with the
  - Construction permit application,
  - Modified operating permit application, &
  - Provide the owner a copy for use in renewal applications
- Fill in all email addresses & phone numbers
- A modification application DOES NOT replace the renewal application
- Always download forms from the website
  - https://dnr.mo.gov/forms/#WaterPollution

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Construction Permit

- When is a construction permit required?
  - Required for domestic wastewater facilities
  - For industrial facilities constructing an earthen basin
  - Certain projects exempt, see 10 CSR 20-6.010(5)(B), if not part of a larger project
    - If exempt from construction permitting, it still needs to be designed by a professional engineer, 644.051.3, RSMo

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Construction Permits

- How many construction projects reviewed per year?

	2015	2016	2017	2018	2019
Sewer Extensions Issued	77	115	113	130	131
Avg. Days to issue Sewer Extensions	49	40	33	34	20
Construction permits Issued	53	62	52	81	100
Avg. Days to issue Construction Permits	173	155	216	158	100

- Where can I find a copy of my construction permit?
  - https://dnr.mo.gov/env/wpp/permits/issued/wpcpermits-cp-issued.htm
    - Maintained 6 months after expiration

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Construction Permit

- Why are construction permits so long now?
  - Documents the Department review
  - Provides detailed information on existing system that is remaining in use
  - Provides detailed information on the design for historical record
  - Provides the effluent limits the facility is expected to achieve
  - Provides the next steps for the owner and engineer regarding operating permits

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Construction Permit

- Why do I need to submit a SOWC?
  - Required per 10 CSR 20-6.010(5)(N)
  - Provides a record that the project was completed
  - Trigger to issue an operating permit modification
  - Can be submitted electronically by the owner, the engineer, or the owner's designee
  - SOWC form, https://dnr.mo.gov/forms/780-2155-f.pdf
- As-builts only need submitted if changed from the plans reviewed

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Construction Permit Cost

- Why is the project cost asked for in the CP application & on the SOWC?
  - Comparison between estimated cost for upgrades that are done as part of the Cost of Compliance with a permit renewal/modification & the actual cost
  - Help answer fiscal note questions on existing & proposed rules

Affordability

Pursuant to **Section 644.145, RSMo**, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act.

Tools Used by the Department to Determine Affordability

- Cost Analysis for Compliance (CAFCom)
- CapdetWorks
- Affordability Prescreening Tool
- Rural Missouri Sustainability Assessment Tool (MOSAT)
- Financial Questionnaire

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Construction Permit Considerations

- Make the electronic version of the specifications searchable
- Readability of plans
  - Consider: size, color & location of text
- Double check numbers
- Provide clarification on
  - Flow Measurement
  - Emergency Operations & Power
    - Size of the generator or storage available
  - Pump Curves

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Construction Permit References

- Construction Permit Webpage
  - https://dnr.mo.gov/env/wpp/permits/ww-construction-permitting.htm
- Wastewater Design Guidelines & Standards Document
  - https://dnr.mo.gov/pubs/docs/pub2754.pdf
- Construction Permit Form
  - https://dnr.mo.gov/forms/780-2189-f.pdf
- Facility Plan Form
  - https://dnr.mo.gov/forms/780-2617-f.pdf

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Now it's your turn,…

- What are your questions on…
  - Rules
  - Antidegradation
  - Facility Plans
  - Construction Permits
  - Financial Assistance Center
  - Innovative Technologies
  - ????

THANK YOU FOR ATTENDING THE 2020 ENGINEERING WORKSHOP

Leasue Meyers

- leasue.meyers@dnr.mo.gov
- https://dnr.mo.gov/env/wpp/permits/ww-construction-permitting.htm

Let’s Review

Who is the best pitcher in St. Louis Cardinal history?

A. Jay Hanna "Dizzy" Dean

B. Grover Cleveland Alexander

C. Daniel Raymond "Quiz" Quisenberry

✓ D. Bob Forsch

E. Bob Gibson

Only pitcher to throw 2 no-hitters in Busch stadium, has 12 career homeruns, batted 0.308 in 1975, and pinch hit 4 times in his career.

Refaat Mefrakis is the Engineering Section Chief.

A. True

✓ B. False

Refaat has moved to the Waste Management Program

A summary of design is not required for collection system projects permitted under the general construction permit.

A. True

✓ B. False

An innovative technology demonstration project requires a

A. Testing Protocol.

B. Construction Permit.

C. Operating Permit Modification.

D. Final Engineering Evaluation.

✓ E. All of the above.

An expanding facility discharges to Lake of the Ozarks. You show chemical addition (metal salts) and settling is the "base case" and other less degrading options are not economically efficient. Antidegradation application should address the metals (ferric or alum) as new pollutants of concern by –

A. Calculating expected concentrations of iron and aluminum and evaluating less degrading concentrations.

✓ B. Expecting the permit to include monitoring for metals.

C. Choosing iron because it is less toxic.

D. Choosing alum because it does not foul/stain UV bulbs.

Mixing and feed location is also important.

I don't need to evaluate the regionalization option in my facility plan because I am choosing land application as my treatment alternative.

A. True

✔ B. False

Both no-discharge and regionalization must be considered per 10 CSR 20-8.10(5)(E)3 and 4

A signed and sealed copy of the specifications is not required for collection system projects when

A. I recently submitted a copy of the same specifications for a previous project.

B. The project is utilizing a city or sewer district's official standard specifications.

✓ C. The project is within the municipal boundaries of a city with DNR approved standard specifications.

Just because the city has their own standard specifications doesn't mean the Department has approved them.

Which of the following are considered eligible cost under SRF?

A. Land acquisition for land application.

B. Grinder pumps and force mains that will be owned, operated, and maintained by the applicant.

C. Land easements.

✓D. All of the above.

A proposal for innovative technology is

A. Not associated with a facility.

✔ B. Made by consultants through a facility plan.

C. Made by the manufacturer of the technology.

D. Not accepted by the Department.

Request a geohydrologic evaluation from the Missouri Geological Survey –

✓A. Before submitting your Facility Plan.

B. At the same time that you submit your Facility Plan.

C. When engineering staff request.

The RESULTS should be included part of your Facility Plan.

Both an environmental determination and a cultural/historical determination has to be completed for SRF projects.

A. True

B. False

Thank you