



▶ WHY SHOULD I CARE ABOUT WATER QUALITY STANDARDS?

SPEAKERS

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DATE

November 6, 2014



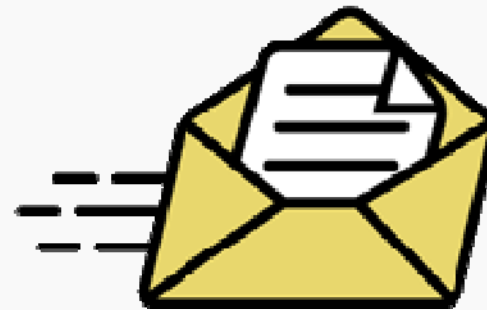
INTRODUCTION



▶ Today's Presenters

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INTRODUCTION



▶ Smith Management Group (SMG)

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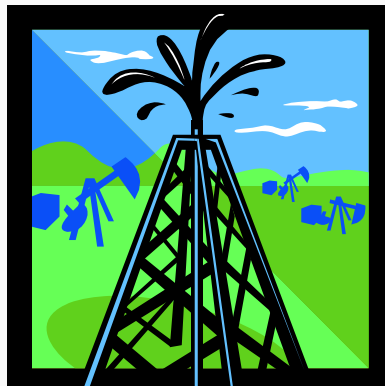
The map displays the central region of Kentucky, highlighting the locations of Smith Management Group. A red pin labeled 'A' is placed in Lexington, and another red pin labeled 'B' is placed in Louisville. Major interstate highways (65, 71, 75, 64, 60, 62, 68) and state routes (150, 127, 27, 31E, 421) are shown in orange and yellow. The Ohio River is visible in the northeast. The map includes navigation controls like a compass and zoom in/out buttons. At the bottom, it reads 'Map data ©2014 Google Terms of Use Report a map error'.

INTRODUCTION



► Objectives

- Review Water Quality Standards (WQS) and Applicable Regulations
- Examine Antidegradation Policy and Procedures
- Discuss Kentucky's New Selenium Standards
- Consider Future Changes to Water Quality Standards
- Evaluate How WQS Can Affect Oil and Gas Operations





▶ WHAT ARE WATER QUALITY STANDARDS?



WHAT ARE WATER QUALITY STANDARDS?

▶ Who defines Water Quality Standards?

- EPA / Federal Government
 - Federal WQS regulations are located at 40 CFR 131
 - EPA's regulations outline the minimum requirements for states
- State governments must adopt their own WQS
 - Protect public health or welfare
 - Enhance the quality of the water
 - Serve the purposes of the Clean Water Act
- Where can you find state WQS?
 - Kentucky: Chapter 10 of KAR Title 401
 - West Virginia: 47 CSR 2
 - Michigan: Part 4 of MAC Chapter 323
 - Ohio: Chapter 3745 of OAC
 - Indiana: Title 327 of IAC
 - Illinois: 35 IAC 302
 - Pennsylvania: 25 PA Code Chapter 93
 - Tennessee: Chapter 0400 of Title 69-3-101
- Not sure if WQS apply? If your operation affects a Water of the United States, you will be impacted by WQS



WHAT ARE WATER QUALITY STANDARDS?



▶ Surface Water Standards (Kentucky)

- 401 KAR 10:031 identifies allowable instream concentrations of pollutants
- How does DOW establish KPDES permit limits? Look at the water quality standards in Section 6:
 - Mercury = 0.051 $\mu\text{g/l}$ (Fish criteria)
 - Copper = $e^{(0.9422 \times (\ln(\text{hardness}) - 1.7))}$ (Acute criteria)
- WQS may not always have a number (i.e. nutrients)



WHAT ARE WATER QUALITY STANDARDS?



Section 6. Pollutants. (1) Allowable instream concentrations of pollutants are listed in Table 1 of this section.

Pollutant	CAS ¹ Number	Table 1 Water Quality Criteria µg/L ²			
		Human Health:		Warm Water Aquatic Habitat ³ :	
		DWS ⁴	Fish ⁵	Acute ⁶	Chronic ⁷
Acenaphthene	83329	670	990	-	-
Acrolein	107028	190	6	3	3
Acrylonitrile	107131	0.051	0.25	-	-
Aldrin	309002	0.000049	0.000050	3.0	-
alpha-BHC	319846	0.0026	0.0049	-	-
alpha-Endosulfan	959988	62	89	0.22	0.056
Anthracene	120127	8,300	40,000	-	-
Antimony	7440360	5.6	640	-	-
Arsenic	7440382	10.0	-	340	150
Asbestos	1332214	7 million fibers/L	-	-	-
Barium	7440393	1,000	-	-	-
Benzene	71432	2.2	51	-	-
Benzidine	92875	0.000086	0.00020	-	-
Benzo(a)anthracene	56553	0.0038	0.018	-	-
Benzo(a)pyrene	50328	0.0038	0.018	-	-
Benzo(b)fluoranthene	205992	0.0038	0.018	-	-
Benzo(k)fluoranthene	207089	0.0038	0.018	-	-
Beryllium	7440417	4	-	-	-
Beta-BHC	319857	0.0091	0.017	-	-
Beta-Endosulfan	33213659	62	89	0.22	0.056
bis(chloromethyl)ether	542881	0.00010	0.00029	-	-
bis(2-chloroethyl)ether	111444	0.030	0.53	-	-
bis(2-chloroisopropyl)ether	108601	1,400	65,000	-	-
bis(2-ethylhexyl)phthalate	117817	1.2	2.2	-	-
Bromoform	75252	4.3	140	-	-
Butylbenzyl phthalate	85687	1,500	1,900	-	-
Cadmium	7440439	5	-	e(1.0166 (ln Hard*)-3.924)	e(0.7409 (ln Hard*)- 4.719)
Carbon tetrachloride	56235	0.23	1.6	-	-

401 KAR 10:031
Section 6

WHAT ARE WATER QUALITY STANDARDS?



► Designated Uses

- Designated uses may be thought of as:
 - Water quality goals
 - Management objectives
 - Communication tools
- Designation does not depend on whether the use is being attained
- Kentucky WQS designate uses in 401 KAR 10:026 for each stream or stream segment in the Commonwealth
 - WAH/CAH = Warm Water / Cold Water Aquatic Habitat
 - PCR/SCR = Primary / Secondary Contact Recreation
 - DWS = Domestic Water Supply
 - OSRW = Outstanding State Resource Water
 - Surface waters not specifically listed will be designated WAH, PCR, SCR and DWS



WHAT ARE WATER QUALITY STANDARDS?



▶ Water Health Portal

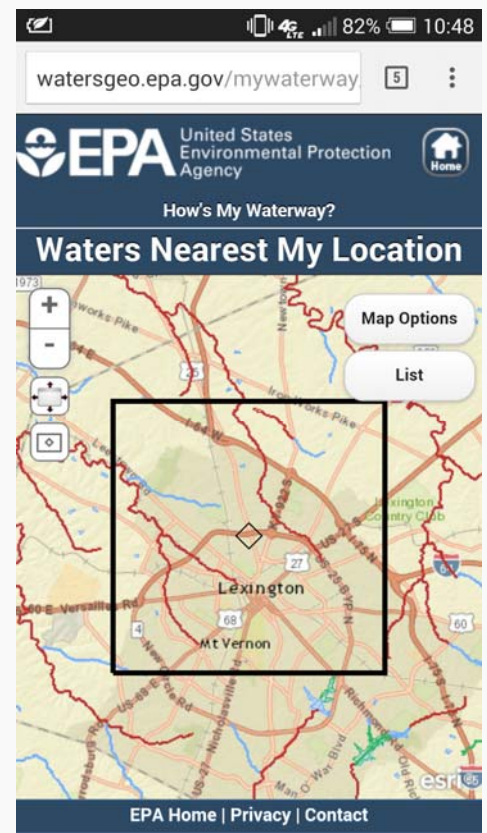
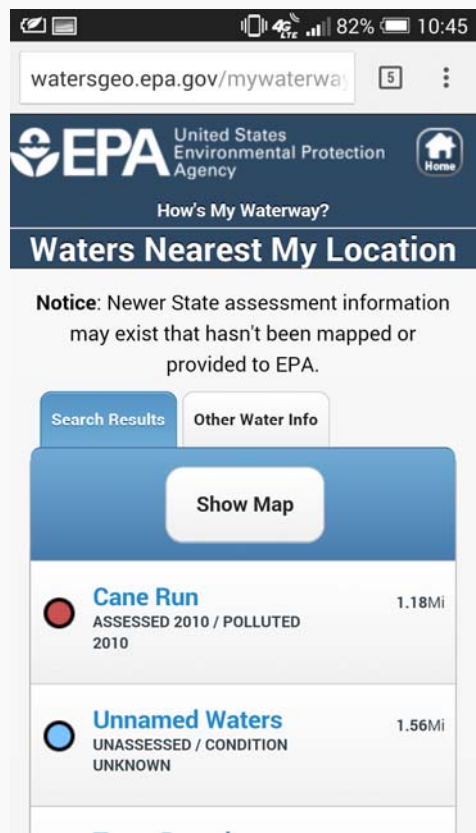
- Access the portal at <http://watermaps.ky.gov> (not yet active)
- Currently being developed; expected completion late 2014
- Access the portal on your PC or tablet to find water information using stream name, address, or latitude and longitude
- The site will identify stream status, including TMDLs, impairments, designated uses, and other information that DOW reports to EPA
- In the field, EPA's "How's My Waterway?" website provides similar information on your smartphone



WHAT ARE WATER QUALITY STANDARDS?



▶ Access “How’s My Waterway” on your smartphone: <http://watersgeo.epa.gov/mywaterway>



WATER QUALITY – CONDITION OF WATERS

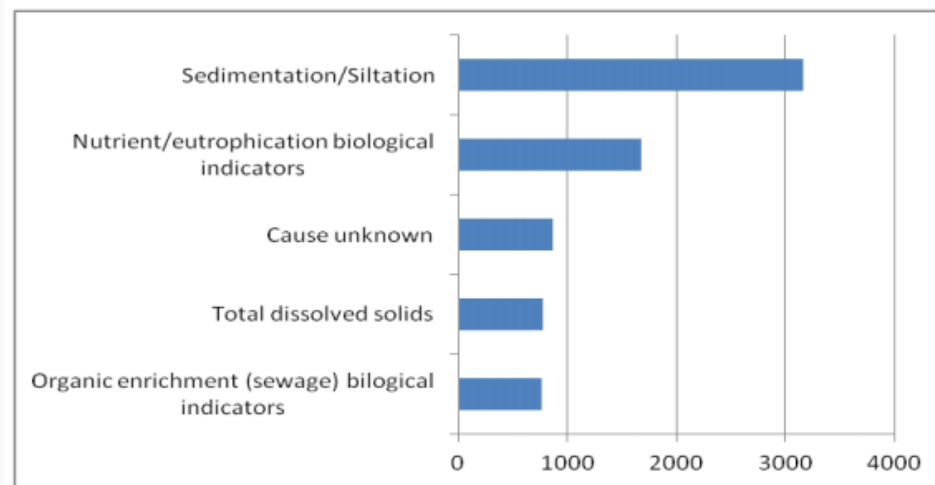
▶ Integrated Report

305(b) Assess and Report Water Quality

- States report to EPA every 2 years
 - Three classifications used to designate level of support:
 - » Fully supporting
 - » Partially supporting
 - » Nonsupporting

303(d) List of Impaired Waters

- Listed waters impaired for any designated use.
 - TMDL development required for pollutant exceeding water quality standard.
 - » TMDL is a calculation of the total amount of a pollutant a waterbody can assimilate while meeting applicable designated uses.



The five leading causes (pollutants) affecting aquatic life use water quality statewide, in miles.

TMDL DEVELOPMENT



▶ TMDL development

- **TMDL = WLA + LA + MOS**
 - TMDL is the allowable load;
 - WLA is the wasteload allocation (allowable load for KPDES-permitted sources);
 - LA is the load allocation (for sources that do not have a KPDES permit);
 - MOS is the margin of safety to account for uncertainty.

Surface Water Assessment Categories

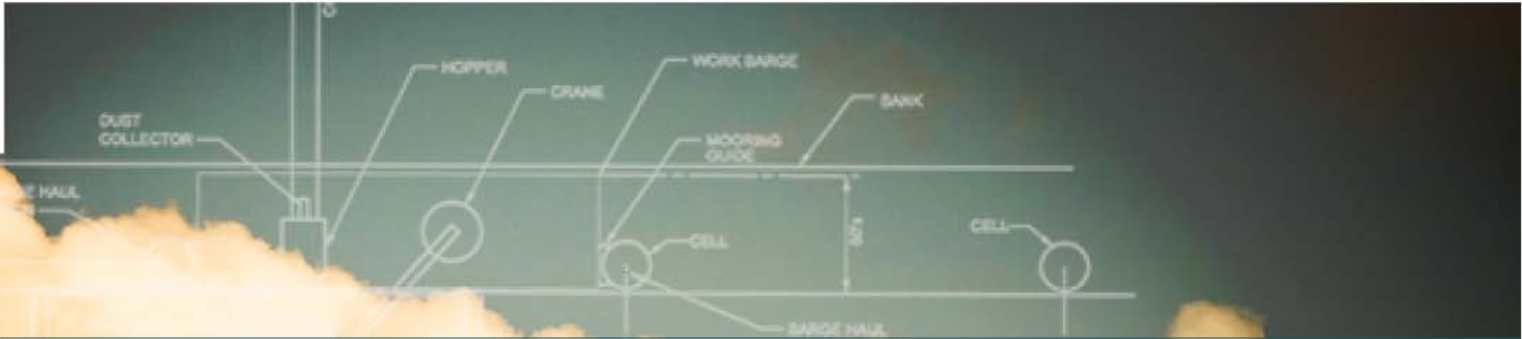
Category	Definition
1	All designated uses for water body fully supporting.
2	Assessed designated use(s) is/are fully supporting, but not all designated uses assessed.
2B	Segment currently supporting use(s), but 303(d) listed & proposed to EPA for delisting.
3	Designated use(s) has/have not been assessed (insufficient or no data available).
4A	Segment with an EPA approved or established TMDL for all listed uses not attaining full support.
4B	Nonsupport segment with an approved alternative pollution control plan (e.g. BMP) stringent enough to meet full support level of all uses within a specified time.
4C	Segment is not meeting full support of assessed use(s), but this is not attributable to a pollutant or combination of pollutants.
5	Segment does not support designated use(s) and is impaired by a pollutant or a combination of pollutants. A TMDL is required.
5B	Segment does not support designated uses based on evaluated data, but based on Kentucky listing methodology insufficient data are available to make a listing determination. No TMDL needed.

TMDLS – IMPAIRED STREAMS



▶ TMDL development and approved TMDLs

- If TMDLs are approved for Sediment/Siltation, Total Dissolved Solids
 - Permits for direct dischargers in the watershed should expect more stringent effluent limitations based on the approved TMDLs.
- 303(d) Example: 2012 Integrated Report lists two stream segments in Powell County (~10 miles) impaired for Total Dissolved Solids. Source of pollution is attributed to “petroleum/natural gas activities”. Category of assessment for stream segments is an established or approval TMDL with listed uses not attaining full support.



▶ ANTIDEGRADATION



ANTIDEGRADATION



► What is Antidegradation?

- The purpose of antidegradation policy and procedures is to maintain and protect existing water quality
- EPA requires that states develop and adopt a statewide antidegradation policy to protect:
 - Existing in-stream uses for all waters of the United States
 - High Quality Waters
 - Outstanding State Resource Waters

Designated Uses

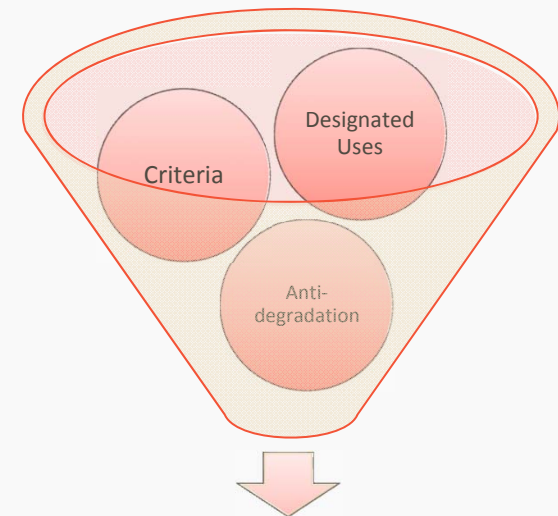
- Warmwater Aquatic Habitat
- Primary Contact Recreation
- Domestic Water Supply

Criteria

- Numeric values and/or narrative statements
- Protect designated uses

Antidegradation

- Policy and procedures protect existing uses, high quality waters, and outstanding national/state resource waters



NPDES Permit Limit

KY ANTIDEGRADATION POLICY



▶ Antidegradation Policy and High Quality Waters

401 KAR 10:029 & 401 KAR 10:030

Purpose of Antidegradation Policy

- *To safeguard surface waters for their designated uses*
- *Prevent creation of new pollution*
- *Abate existing pollution*

Kentucky Antidegradation Policy

Four categories of surface waters

- Outstanding National Resource Water
- Exceptional Water
- High Quality Water
- Impaired Water

ANTIDEGRADATION



► Kentucky's Antidegradation Policy

- 401 KAR 10:029, Section 1
- Implementation methodology is found at 401 KAR 10:030
 - Categorization: a water is considered high quality if it is not listed as an ONRW, exceptional water, or impaired water
 - The quality of high quality waters may be lowered only if found to be “necessary to accommodate important economic or social development”
 - Socioeconomic Demonstration and Alternatives Analysis (Form SDAA) is required for new or expanded discharges to exceptional or high quality waters
 - » Requirement applies to both general and individual permits
 - » SDAA is sent to public notice along with the draft permit

The image shows a form titled "KPDES FORM SDAA" and "Kentucky Pollutant Discharge Elimination System (KPDES) Socioeconomic Demonstration and Alternatives Analysis". The form includes a map of Kentucky with a water drop icon. Below the title, there is a paragraph explaining the purpose of the form: "The Antidegradation Implementation Procedure found at 401 KAR 10:030, Section 1(2)(b) requires KPDES permit applications for new or expanded discharges to waters categorized as 'Exceptional or High Quality Waters' to conduct a socioeconomic demonstration and alternatives analysis to justify the necessity of lowering local water quality to accommodate important economic or social development in the area to which the water is located. The demonstration shall include the completed form and copies of all supporting reports, economic feasibility studies, or other supporting documentation." The form is divided into sections: "I. Project Information" with fields for "Facility Name:", "Location:", and "County:"; "Receiving Water Impacted:"; "II. Socioeconomic Demonstration" with two numbered questions: "1. Define the boundaries of the affected community: (Specify the geographic region the proposed project is expected to affect. Include name all cities, towns, and counties. This geographic region must include the proposed receiving water.)" and "2. The effect on employment in the affected community: (Compare current unemployment rates in the affected community to current state and national unemployment rates. Discuss how the proposed project will positively or negatively impact those rates, including quantifying the number of jobs created and/or continued and the quality of those jobs.)". At the bottom, it says "DEP Form 7032", "- 1 -", and "May 19, 2009".

OUTSTANDING WATERS



▶ Outstanding State Resource Waters

401 KAR 10:031

- Automatically included if designated under:
 - Kentucky Wild Rivers Act
 - Federal Wild and Scenic Rivers Act
 - Kentucky Nature Preserves Act
- Waters included if supporting federally recognized endangered or threatened species.

Wild Rivers Permits

- <http://water.ky.gov/permitting/Pages/WildRiversPermits.aspx>
- Permit is required to remove a resource such as oil or gas, to selectively harvest timber or to introduce a new agricultural use involving the removal of one-half acre or more of timber. Wild Rivers regulations at [401 KAR 4:125](#) specify the kinds of land-use changes that require a permit.
 - » Additional standards specific to exploration for and extraction of oil and gas (Section 15 of [401 KAR 4:140](#)) include prohibition of discharges within a wild river corridor.

The background of the slide is a low-angle photograph of a suspension bridge's towers and cables. The towers are dark, silhouetted against a light sky. The cables are thin lines stretching across the frame. The image has a technical, blueprint-like overlay with faint white lines and text. A semi-transparent grey horizontal band is positioned behind the main title text.

KENTUCKY'S SELENIUM STANDARDS

STATE OF *Kentucky*

KENTUCKY'S SELENIUM STANDARDS



▶ New Selenium Criteria (401 KAR 10:031, Section 6)

- State-specific water quality criteria for total selenium revised in May 2013
 - Decision received from EPA on November 15, 2013
 - EPA did not approve changes to the acute criteria. The practical result is that previous acute criteria of 20 $\mu\text{g}/\text{L}$ will remain
 - Chronic criteria = 8.6 $\mu\text{g}/\text{g}$ (dry weight) of whole fish tissue, or 19.3 $\mu\text{g}/\text{g}$ (dry weight) of egg/ovary fish tissue
 - Selenium concentration ≥ 5.0 $\mu\text{g}/\text{L}$ in the water column will trigger further sampling and analysis of whole-body fish tissue or fish egg/ovary tissue. If sufficient fish tissue cannot be obtained, the permittee will be in non-compliance for exceeding the 5 $\mu\text{g}/\text{L}$ trigger.



KENTUCKY'S SELENIUM STANDARDS



▶ Kentucky's New Selenium Criteria

- The discussion is not over!
 - EPA sued by environmental interest groups in February 2014 over approval of selenium standards. Litigation alleges that:
 - » EPA improperly relied on Kentucky's interpretation of provisions
 - » Criteria failed to protect fishless streams and also commercially and recreationally important species
 - » Approval violates the Endangered Species Act
 - Kentucky has intervened in the litigation to support EPA's approval of the standards
 - Decision is expected by the US District Court in Western Kentucky in early 2015





▶ CHANGING WATER QUALITY STANDARDS

BOOK 551 PAGE 500

STATE OF *Kentucky*

▶ Triennial Review

- Clean Water Act Section 303(d) and 40 CFR 131.20 requires all states to review WQS every three years and modify and adopt standards, as appropriate
 - Public participation in the form of a public hearing is required
 - Results of the review shall be submitted to EPA
 - Kentucky's next Triennial Review is in 2015



CHANGING WATER QUALITY STANDARDS



▶ New Numeric Standards Can Have a Big Impact

- Comparison of Fish Consumption Standards (µg/L), 2003 vs. 2014

Pollutant	2003	2014
Antimony	4,300	640
Thallium	6.3	0.47
Zinc	69,000	26,000

- Comparison of Warmwater Aquatic Habitat Criteria (µg/L), 2003 vs. 2014

Pollutant	2003, Acute	2014, Acute	2003, Chronic	2014, Chronic
Cadmium	$e(1.128(\ln H) - 3.687)$	$e(1.0166 (\ln H) - 3.924)$	$e(0.7852 (\ln H) - 2.715)$	$e(0.7409 (\ln H) - 4.719)$
Mercury	1.7	1.4	0.91	0.77

H = hardness as mg/L of receiving stream

▶ Other Changes Can Have a Big Impact

Kentucky's most recent triennial review addressed the following:

- 401 KAR 10:026
 - 27 new Outstanding State Resource Waters (OSRWs)
- 401 KAR 10:030
 - 16 new exceptional waterbodies
- 401 KAR 10:031
 - Adopted federal water quality standards for Acrolein and Phenol





▶ HOW CAN WQS AFFECT OIL AND GAS OPERATIONS?



HOW CAN WQS AFFECT OIL AND GAS OPERATIONS?



► Why should operators care about WQS?

- 401 KAR 5:090, Control of water pollution from oil and gas facilities
 - Section 3, Prohibition: “No person shall construct, modify, or operate a facility in violation of state or federal water quality standards...”
 - » An awareness of state WQS will help the operator avoid obvious violations
 - » Includes numeric and narrative criteria
 - » Failure to obtain a KPDES permit does not relieve a discharger from complying with applicable KPDES performance standards

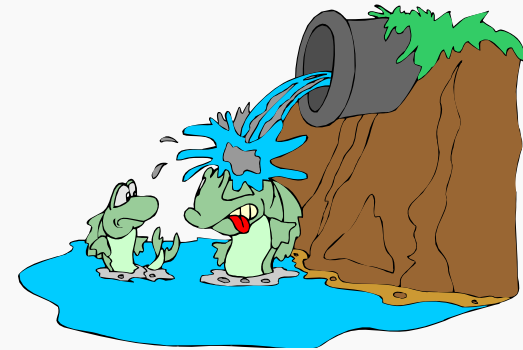


HOW CAN WQS AFFECT OIL AND GAS OPERATIONS?



▶ KPDES Permit Limits

- 401 KAR 5:090, Section 8(2): “A KPDES permit...is required prior to beginning a discharge of pollutants into waters of the Commonwealth.”
- The permitting agency will perform a Reasonable Potential Analysis (comparison with WQS) using effluent sampling data.
- 40 CFR 122.44(d)(1): Permit must have effluent limits for all pollutants that will cause or will have reasonable potential to cause or contribute to an excursion above any state water quality standard.



HOW CAN WQS AFFECT OIL AND GAS OPERATIONS?



▶ KPDES Permit Conditions

- Permit conditions can be added due to status of the receiving stream
 - Stream is an OSRW due to presence of endangered mussels. A mussel survey might be required.
 - Stream is impaired due to sediment. Enhanced BMPs might be required.
 - Discharge is within 5 miles of a public drinking water intake. Upstream and downstream sampling might be required. It is possible that the discharge will not be approved.



Note: It is not recommended to eat endangered mussels!

OIL AND GAS – KY REGISTRATION REQUIREMENTS



- ▶ The KY Division of Water coordinates the registration of oil and gas tank batteries, transport off-site of produced water and holding pit construction permits.

401 KAR 5:090 – Control of water pollution from oil and gas facilities

- Registration requirements include: Tank battery location, production associated with tank battery, produced water disposal method
 - Typical disposal method: Storage/Holding Tank and Transportation Off-Site
 - » Other disposal methods: Injection for Enhanced Recovery; Injection to Disposal Well; Discharge to Surface Water
 - If hauling off-site, DOW requires transporter name, disposal site information, and hauled quantity of produced water.

OIL AND GAS – KY REGISTRATION REQUIREMENTS



▶ Electronic Oil and Gas Registration

- <https://dep.gateway.ky.gov/eForms/default.aspx?FormID=2>

1. Registration:

Type of Registration:	New	Registration No. (For Updates Only)	
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2. Owner Information:

Owner Company Name(*)	
Owner First Name(*)	
Owner Last Name(*)	
Owner Address Line 1(*)	
Owner Address City(*)	
Owner Address State(*)	Kentucky
Owner Address Zip(*)	
Owner Phone(*)	
Business Form:	KY Corporation

3. Operator Information:

Manager/Pumper Company Name(*)	
Manager/Pumper First Name(*)	
Manager/Pumper Last Name(*)	
Manager/Pumper Address Line 1(*)	
Manager/Pumper Address City(*)	
Manager/Pumper Address State(*)	Kentucky
Manager/Pumper Address Zip(*)	
Manager's/Pumper's Phone Number(*)	

4. Leasee:

Lease Name(*)	
---------------	--

5. Tank Battery Location and Size:

Latitude: (*)		Longitude: (*)	
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*Registration is required for all oil and gas operators (401 KAR 5:090, Section 4)

HOW CAN WQS AFFECT OIL AND GAS OPERATIONS?



► What can you do?

- Consider other methods for disposal of water besides discharge to a surface water
- Complete the registration form and verify it was received
 - Contact Allen Ingram of DOW at 502-564-3410 or allen.ingram@ky.gov
- If applying for a KPDES permit, allow adequate time for the application to be processed and the permit to be issued
- Familiarize yourself with the state's Water Quality Standards
- Provide adequate containment for tanks and implement proper O&M to prevent an accidental discharge



QUESTIONS?





Contact Information

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▶ **THANK YOU**
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