



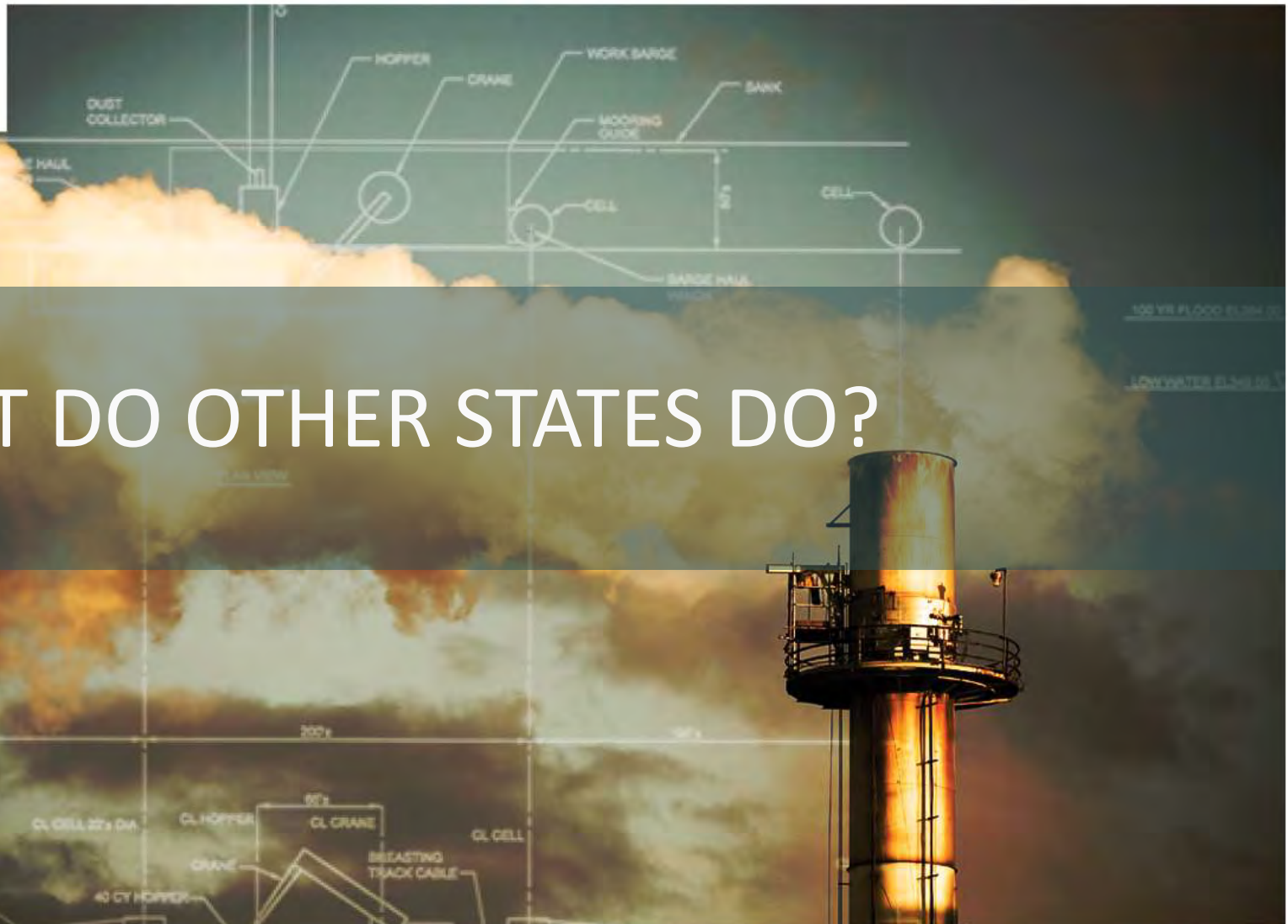
▶ BEST MANAGEMENT PRACTICES

What Can Kentucky Learn?

KORI ANDREWS

NOVEMBER 7, 2014





▶ WHAT DO OTHER STATES DO?



STATE OF *Kentucky*

WHAT DO OTHER STATES DO?

Posters/Utah



1 Reduce Emissions During Drilling

- Use National Initiative Coalitions (NICs) via Best Practices to reduce greenhouse gas emissions during well completion or Best Practice needed.

2 Reduce Emissions During Production

- Minimize venting and/or non-flared gas process where possible during "lean burns".
- Compress low emitting engines.
- Tighten connections and replace gaskets to minimize leaks and fugitive emissions.
- Use wellhead pressure facilities, seals and valves to minimize air emissions.
- Reduce emissions of industrial hydrocarbons by sealing emissions to flare or combustion of existing, flareless and emissions to flare stage combustion.
- Lower gas flaring rate to avoid over-firing.

3 Conserve Water

- Utilize on-site water treatment facilities, such as a 3 phase liquid separator, and gas separator on the finished flow.
- Use carefully chemical well completion.

4 Less Toxic Materials

- Eliminate organic solvents, petroleum or hydrocarbon additives for oil based fluid to reduce toxicity.
- Eliminate acid treatment and diesel fluids instead of diesel oil.

5 Reuse Resources

- Recover and reuse existing resources and drilling fluids. Water drilling fluid can be reused or flow backline to be recycled in drilling and completion operations.

6 High Efficiency Equipment

- Replace high diesel fuel consumption equipment with lower fuel consumption.
- Upgrade or convert gas turbines to natural gas turbines to reduce air emissions or other devices to conserve.

7 Monitoring & Maintenance

- Implement a detailed inspection and maintenance program to identify fugitive gas leaks from existing compressors, valves, connections, seals, and open ended tool joints through all flow stages and completion operations, early detection, repair, and maintenance and maintenance history.

8 Dust & Tailpipe Emissions

- Apply water to control dust emissions on the roadways during well completion, hydraulic fracturing, or gravel operations.
- Replace vehicle sparkplugs to 0.2 inch or less.
- Cover or seal-in materials to reduce storage piles after drilling work.
- Minimize unnecessary vehicle idling.

9 System Design

- Ensure operation of all devices by considering environmental impact during well completion.

10 Construction & Reclamation

- Use direction flow construction, drilling and reworking to reduce exposure of sensitive areas to drilling and completion operations.
- Segregate construction materials from flow storage, handling, and loading facilities, and operations area from completed wells.
- Use additional cover, erosion, and siltation control construction to reduce loss of sediment and construction materials.
- Avoidance of sensitive areas.
- Reclaim disturbed areas.

TOP TEN BMPs for Oil & Gas Industry Operators

For more information on Pollution Prevention and Oil and Gas BMPs, contact:

Utah Department of Environmental Quality
deq.utah.gov
 800.HELP.UTAH.GOV
 Environmental Division 1-800-438-6942



WHAT DO OTHER STATES DO?

Posters/Utah

Check List

Reduce Emissions During Drilling

- Use Reduced Emissions Completions (RECs), aka Green Completions to capture gas produced during well completions that is otherwise vented or flared. Electricity needed.

Reduce Emissions During Production

- Minimize venting and/or use closed loop process where possible during "blow downs."
- Convert to low-emitting engines.
- Tighten connections and replace packing to minimize leaks and fugitive emissions.
- Use and maintain proper hatches, seals, and valves to minimize air emissions.
- Reduce emissions of unburned hydrocarbons by routing emissions to flare or combustor or routing dehydrator still emissions to first stage compression.
- Lower glycol circulation rate to avoid over-dehydrating.

Conserve Water

- Utilize on-site water treatment facilities, such as a 3-phase (liquids, condensate, and gas) separator on the flowback fluid.
- Use carefully planned well completions.

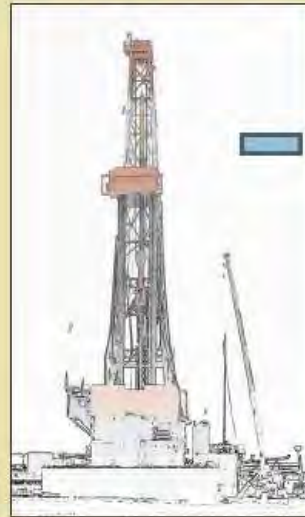
Less Toxic Materials

- Substitute organic additives, polymers, or biodegradable additives for oil-based mud to reduce toxicity.
- Lubricate with mineral oil and lubra-beads instead of diesel oil.

Reuse Resources

- Recover and reuse weighting materials and drilling fluids. Waste drilling mud can be reused at other locations for spudding or plugging and abandoning operations.

A Checklist Of Actions That Oil And Gas Operators Can Take To Reduce Waste And Air Emissions



For more information on Pollution Prevention and Oil and Gas BMPs, contact:

Utah Department of Environmental Quality

BizHelp.utah.gov

Environmental Hotline: 1-800-458-0145

High Efficiency Equipment

- Replace high bleed valves with compressed air, electric valves, or low bleed valves.
- Install or convert gas operated pneumatic devices to electric, solar, or compressed air driven devices or controllers.

Monitoring & Maintenance

- Implement a Directed Inspection and Maintenance program to identify and repair fugitive gas leaks from leaking compressors, valves, connectors, seals, and open-ended lines using infrared cameras, organic vapor analyzers, soap solutions, and ultrasonic leak detectors.

Dust & Tailpipe Emissions

- Apply water or chemical treatment, such as magnesium chloride, calcium chloride, lignin sulfonate, or asphalt emulsion.
- Restrict vehicle speeds to 10 mph on site.
- Cover or reclaim excavated or inactive storage piles after activity ceases. Eliminate unnecessary vehicle idling.

System Design

- Improve operational efficiencies by consolidating production, e.g., operating multiple wells from a production site.

Construction & Reclamation

- Use diversion dikes, containment diking, and curbing to reduce exposure of storm water runoff to cuttings and other waste storage areas.
- Segregate stormwater drainage from liquid storage, loading/unloading facilities, and operations areas from unimpacted areas.
- Use sediment traps, swales, and mulching during construction activities to reduce loss of sediment and contamination of runoff.
- Accelerate reclamation of site.
- Reclaim disturbances.

WHAT DO OTHER STATES DO?

Posters/Utah



WHAT ARE THEY?

1. Reduce Emissions During Drilling/Completions
2. Reduce Emissions During Production
3. Conserve Water
4. Less Toxic Materials
5. Reuse Materials
6. High Efficiency Equipment
7. Monitoring and Maintenance
8. Dust and Tailpipe Emissions
9. System Design
10. Construction and Reclamation

1 Reduce Emissions During Drilling

- Use Reduced Emissions Completions (RECL) and Green Completions to capture gas produced during well completions that is otherwise vented to the atmosphere.

2 Reduce Emissions During Production

- Minimize venting activity and closed-loop processes where possible using "lean flows".
- Commission low-polluting engines.
- Optimize completions and optimize ability to minimize induced high gas emissions.
- Use well production power loss flow-back, and water-injected air emissions.
- Reduce emissions of industrial hydrocarbons by routing emissions to flare or incinerator or using degasser and emissions to flare (gas compressor).
- Lower glycol emissions rate to avoid over-venting.

3 Conserve Water

- Utilize water reuse treatment facilities, such as 0 phase, 0 phase, 0 phase, 0 phase, and gas separator on the Backflow Side.
- Use readily generated water.

4 Less Toxic Materials

- Eliminate organic solvents, petroleum hydrocarbons and other hazardous materials from all fluids used in well completion.
- Eliminate use of toxic and hazardous materials.

5 Reuse Resources

- Reuse and recycle drilling equipment and drilling fluids. Store drilling mud and cement in clean tanks for possible reusing and reworking operations.

6 High Efficiency Equipment

- Replace high diesel emission (compressor) units with low diesel units.
- Install or ensure gas separator (compressor) design to reduce water consumption or other fluids or emissions.

7 Monitoring & Maintenance

- Implement a formal inspection and maintenance program to identify fugitive gas leaks from drilling operations, storage, production, water, and gas separator being utilized on-site. Repair major equipment, equipment, and equipment as soon as possible and minimize emissions.

8 Dust & Tailpipe Emissions

- Apply water or chemical treatment, such as soap, to reduce dust and emissions.
- Optimize vehicle or engine emissions.
- Monitor vehicle speeds to 55 mph or less.
- Cover or enclose equipment for waste storage sites after safety event.
- Minimize idling time of vehicles.

9 System Design

- Design operations of all devices to minimize production gas venting activities with flare production site.

10 Construction & Reclamation

- Use location of construction, drilling, and reclamation activities to minimize impact on sensitive areas and other nearby areas.
- Design and construct drilling from flare storage, venting, and reclamation, and operations activities to minimize impact.
- Use readily generated water and recycling during construction activities to reduce use of additional water and contaminants in well.
- Minimize disturbance of life.
- Reclaim all activities.

TOP TEN BMPs for Oil & Gas Industry Operators

For more information on Pollution Prevention and Oil and Gas BMPs, contact:
Utah Department of Environmental Quality
844help.utah.gov
Environmental Division 1-888-438-6946

WHAT DO OTHER STATES DO?

Web sites/Intermountain Oil and Gas

Getches-Wilkinson Center for Natural Resources, Energy, and the Environment University of Colorado Law School


Intermountain Oil and Gas BMP Project

Welcome to the Intermountain Oil and Gas BMP Project Website

BEST MANAGEMENT PRACTICES

The Getches-Wilkinson Center for Natural Resources, Energy, and the Environment and its partners welcome you to this free-access website of Best Management Practices (BMPs) for oil and gas development in the Intermountain West. BMPs are state-of-the-art mitigation measures applied to oil and natural gas drilling and production to help ensure that energy development is conducted in an environmentally responsible manner (see the [Bureau of Land Management BMP website](#)).

The focus of this website is a [searchable database](#) addressing surface resources affected by oil and gas development. The database includes both mandatory and voluntary Best Management Practices currently in use or recommended for responsible resource management in the states of Colorado, Montana, New Mexico, Utah, and Wyoming.



BMP CATEGORIES

The database includes BMPs to address a variety of resources and issues:

- [Air Quality and Emissions](#)
- [Aquatic and Riparian Values](#)
- [Community](#)
- [Cultural/Historic](#)
- [Grading and Agriculture](#)
- [Human Health and Safety](#)
- [Land Surface Disturbance](#)
- [Noise](#)
- [Other](#)
- [Soils \(Conservation, Pollution, Reclamation\)](#)
- [Vegetation](#)
- [Visual Aesthetics](#)
- [Water Quality and Pollution](#)
- [Water Quantity and Rights](#)
- [Wildlife](#)

[Browse all](#)

WHAT'S NEW

Check out our new [comparative legal database](#) of water quality statutes and regulations pertaining to oil and natural gas activities.

The Natural Resources Law Center at Colorado Law is now known as the [Getches-Wilkinson Center for Natural Resources, Energy, and the Environment](#) and is dedicated to serving the people of the American West, the nation, and the world through creative, interdisciplinary research, bold, inclusive teaching, and innovative problem solving in order to further true sustainability for our lands, waters, and environment. The Getches-Wilkinson Center is building on the successful legacies not only of the NRLC, but also of other existing programs in natural resources, energy, and the environment at Colorado Law.

BMP SEARCH

What management practices are recommended or required for oil and gas development? To find out, use the drop down menus or type Keywords. For a more refined search, click "Advanced Search" or use the [BMP SEARCH](#) button.

WHAT DO OTHER STATES DO?

Web sites/Intermountain Oil and Gas

- ▶ Includes mandatory and voluntary BMPs
For Colorado, Montana, New Mexico, Utah and Wyoming
Maintained through a part of the University of Colorado Law
School

Receives information from the public on

- Comments on BMPs already listed in the database
- Supplemental documents (including monitoring reports, case studies, data sets) on BMPs already included in the database
- New BMPs
- New Glossary entries
- New Acronyms
- New Laws, regulations, ordinances, guidelines, policies
- New Links to organizations' websites

WHAT DO OTHER STATES DO?

Web sites/Intermountain Oil and Gas

▶ Searchable database

BMP SEARCH

[Help](#) | [Add Info](#) | [Acronyms](#)

Keywords:

Category:
Any ▼

Location:
Any ▼

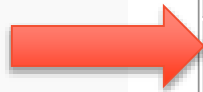
[Advanced Search...](#)

Any
Air Quality
Aquatic and Riparian Values
Community
Cultural/Historical
Grazing and Agricultural
Human Health and Safety
Land Surface Disturbance
Noise
Other
Soils
Vegetation
Visual Aesthetics
Water Quality and Pollution
Water Quantity and Rights
Wildlife

WHAT DO OTHER STATES DO?

Web sites/Intermountain Oil and Gas

VIEW BMP



| | |
|---------------------------------|--|
| BMP ID: | 1296 |
| Title: | Apply erosion control measures for roads |
| Text: | "To control or reduce sediment from roads, guidance involving proper road placement and buffer strips to stream channels, graveling, proper drainage, seasonal closure, and in some cases, redesign or closure of old roads will be developed when necessary." |
| Source Publication Name: | Pinedale Anticline Oil & Gas Exploration & Development Project Record of Decision |
| Citation Section: | Appendix A: Mitigation Guidelines and Standard Practices for Surface-Disturbing and Disruptive Activities |
| Citation Page: | A-7 |
| Supplemental Documents: | |
| Usage Type: | Recommended |
| Timing: | • Planning / Environmental Review |
| Oil / Gas Field: | Pinedale Anticline Project (GREATER GREEN RIVER) |
| Surface Ownership: | • Federal |
| Mineral Ownership: | • Federal |
| Primary Contact: | BLM - Pinedale Field Office 1625 West Pine St., PO Box 768 Pinedale, Wyoming 82941 United States Phone: (307) 367-5300 Alt. Phone: Fax: E-mail: WyMail_Jonah_Infill@blm.gov |
| Alternate Contact: | |
| Categories: | Water Quality and Pollution Land Surface Disturbance Aquatic and Riparian Values |
| Location: | Wyoming |
| Species: | |
| Vegetation Types: | |
| General Comments: | |
| Cost-Benefit Analysis: | |
| BMP Efficacy: | |
| Date Entered: | 2009-02-04 13:40 MDT |
| Last Updated: | 2011-06-07 15:19 MDT |

WHAT DO OTHER STATES DO?

Paper Manuals / Ohio & New Mexico



BEST MANAGEMENT PRACTICES FOR OIL AND GAS WELL SITE CONSTRUCTION



Revised June 2013

WHAT DO OTHER STATES DO?

Paper Manuals / Ohio & New Mexico

► Provides **minimal guidelines** that prepare for **average conditions** by looking at the following topics:

- Planning Well Sites
- Erosion, Sedimentation Control, Access Roads
- Water Bars/Broad Based Dips
- Pipe Culverts
- Access Roads
- Surface Drains
- Construction Guidelines
- Vegetative Practices/Seeding
- Mulch/Fertilizer



BEST MANAGEMENT PRACTICES FOR OIL AND GAS WELL SITE CONSTRUCTION



Revised June 2013

WHAT DO OTHER STATES DO?

Paper Manuals/ Ohio & New Mexico



About The Pocket Guide

The Pollution Prevention/Best Management Practices Pocket Guide for the New Mexico Oil and Gas Industry is a quick lookup reference for common oil and gas pollution prevention and waste management practices. The Guide, a supplement to the two-volume Pollution Prevention/ Best Management Practices Manual, will help identify ways to prevent pollution and manage wastes effectively in oil and gas field operations. While the manual promotes the development of a pollution prevention plan through an evaluation of waste-generating processes, the pocket guide stresses the quick but effective solution that would not require a plan to implement.

Appreciation is extended to the U.S. Environmental Protection Agency, the Railroad Commission of Texas, the Interstate Oil and Gas Compact Commission, and Texaco Exploration and Production for researching and developing information for this pocket guide. Also, representatives of the New Mexico oil and gas industry participated in reviewing this pocket guide and provided valuable suggestions and comments.



WHAT DO OTHER STATES DO?

Paper Manuals / Ohio & New Mexico

WASTE

ALTERNATIVES

Stormwater

Source Reduction:

- ◆ Improve work process and properly maintain equipment and facilities to reduce leaks, spills, etc.
- ◆ Cover facilities to eliminate contamination of stormwater.
- ◆ Segregate stormwater drainage from liquid storage, loading/unloading facilities and, operations areas from unimpacted areas.
- ◆ Clean up spills and leaks promptly to minimize stormwater contamination.

Recycling:

- ◆ Use stormwater as make-up water in the process. For example, use contaminated stormwater for first stage washing of equipment, use stormwater as make-up water in drilling/ completion operations, and use stormwater for process water and agricultural purposes.

Sulfur recovery unit wastes, including sulfur-contaminated

Source Reduction:

- ◆ Substitute a less hazardous catalyst in the Scot Tailgas process of a sulfur recovery plant. Nonhazardous spent catalyst waste can result, thereby resulting in disposal cost savings.

Special considerations: Use appropriate PPE. Avoid eye and skin contact. Consult MSDS for additional guidance for specific chemical.

Tank bottoms (basic


Source Reduction:

- ◆ Recycle back through treatment system, with no additional

WHAT DO OTHER STATES DO?

Paper Manuals / Ohio & New Mexico


- ▶ • Quick lookup reference
- ▶ • Supplement for a larger document
- Stresses quick but effective solution that does not require a specific plan to implement
- Helps identify ways to prevent specific types of pollution and manage specific wastes
- Guidance only
- Produced by funds from USDOE and the New Mexico Energy, Minerals and Natural Resources Department



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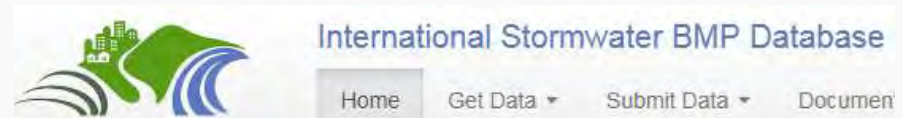
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WHAT DO OTHER STATES DO?

International Stormwater BMP Database

- ▶ The International Stormwater Best Management Practices (BMP) Database project website features a database of over **530 BMP studies**, **performance analysis results**, **tools for use in BMP performance studies**, **monitoring guidance** and other study-related publications.



<http://www.bmpdatabase.org/>

WHAT DO OTHER STATES DO?

International Stormwater BMP Database



Select one or more search criteria from the drop down boxes to retrieve BMP water quality and flow data, along with access to summaries of performance in PDF format, BMP layouts, photos and other information.

Alternatively, access data through the [mapping tool](#).

Select Study Location

All

State

Country

Select

Select

Select BMP Category

BMP Type

Select

Select Water Quality Parameter

Parameter Group

Select

Individual Parameter

Select

Select Study Information

Select Study Sponsor or Monitoring Agency

Select

Retrieve Studies

Reset

WHAT DO OTHER STATES DO?

International Stormwater BMP Database



▶ Searchable by

- **State**
- **BMP Type** (Biofilter, Bioretention, Composite, Control, Detention Basin, Green Roof, Infiltration Basin, LID, Maintenance Practice, Manufactured Device, Media Filter, Percolation Trench/ Well, Porous Pavement, Retention Pond, Wetland Basin, Wetland Chanel)
- **Water Quality Parameter** (Biological, General, Metals, Nutrients, Organics, Solids)

BEWARE!



You do not want lawmakers to use specific BMPs to determine if you are in compliance or not.



▶ HOW TO CREATE A BMP

BOOK 551 PAGE 500

STATE OF *Kentucky*

HOW TO CREATE A BMP

Regulatory Considerations

- ▶ State stormwater permitting (NPDES)
- ▶ Local erosion prevention and sediment control programs
- ▶ Clean Water Act Sections 401 and 404 Requirements



HOW TO CREATE A BMP

Things to Consider...

- ▶ • Erosion Prevention & Sediment Control
- Housekeeping and Other Control Measures
- Principles for Selecting Runoff Controls
- Inspections and Maintenance
- Make your BMPs specific enough to address issues but general enough to be used in all of your locations



CONTACT

Questions?



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▶ **THANK YOU**
from Smith Management Group

www.smithmanage.com

LEXINGTON
859-231-8936

LOUISVILLE
502-587-6482

STATE OF *Kentucky*

A decorative banner at the bottom of the slide. It features a red background with a white silhouette of the state of Kentucky. The text "STATE OF" is in white, and "Kentucky" is written in a red, cursive script. To the right of the state outline, there are silhouettes of bridges and a crane against a light blue background.