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Testimony in the matter of the Revision of
New Mexico Oil Conservation Division Rule 17
Pit waste management and adoption of new rules governing
pit waste management

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-1
HEARING DATE: MAY 14, 2012

Objectives

- Look at incidence of pit failures, historically;
- Look at current and proposed revisions to Rule 17;
- Evaluate whether current and proposed revisions to Rule 17 address the causes of failure; and
- Provide opinion on whether proposed revisions to Rule 17 are protective of public health and the environment.

NM Historic Pit Statistics

- Estimated 80,000 to 100,000 pits have been constructed in New Mexico.
- In prior proceeding, NMOCD alleged <500 pits had caused impacts to groundwater:
 - if 500 pits = ~0.5% of all pits have been suspected of groundwater impacts. This means **99.5%** not suspected of contamination.
- These pits were constructed with less stringent standards than the current and proposed Rule 17, yet **99.5%** are not suspected of contamination.
- A 2007 review of these 500 pits showed only 10 were temporary pits
 - Temporary pits suspected of impacting groundwater represent 0.0125% of all pits constructed in New Mexico. This means 99.98% of temporary pits are not suspected of causing contamination
- Of these 10 pits, none were suspected of being post-closure incidents. All incidents happened during operational phases and were cleaned up.

NM Pit Data 2005 - 2007

- Between 2005 and 2007, 5,763 wells were spud in New Mexico
- An estimated 5,450 wells (95%) used temporary pits instead of closed loop drilling.
- As of November 2008, NMOCD had listed only 6 of these pits as being suspected of impacts to groundwater.
 - 0.11% of all pits constructed, or **99.89%** success

Historic Data Demonstrates

- Even unregulated, unlined pits have historically caused few cases of groundwater contamination.
 - **99.5%** of pits not suspected of contamination.
- This era came to a close with Rule 50 in 2005.
 - **99.89%** of pits not suspected of contamination.
- Rules substantially strengthened with Rule 17 in 2008.

Operators of Pits Need to Prevent

- Operational/Closure Phases:
 - Spills and overland releases
 - Direct contact to pit contents
 - Puncture and leaks in liner
- Post-Closure Phase:
 - Erosion and exposure of contents
 - Leaching of liquids from within pit

Revisions Provide Protections

- The Current and Proposed Requirements of Rule 17 are protective of public health, fresh water and the environment through the use of:
 - Permit and Registration Requirements (secs. 8-9)
 - Siting Requirements (sec. 10)
 - Design and Construction Requirements (sec. 11)
 - Operational Requirements (sec. 12)
 - Closure and Reclamation Requirements (sec. 13)
 - Protective Exception/Variance (sec. 15)

Siting Requirements

- Use setbacks to ensure separation between pits and receptors
 - Public health, surface water, groundwater
- Setbacks from houses unchanged
- Setbacks from water features
 - Prevent immediate release to surface/ground water due to semi-arid nature
 - Overland releases evaporate and percolate into soils
 - Below ground leaks slow due to unsaturated conditions
 - Provide time for detection and mitigation of releases

Siting Revisions are Protective

- Proposed revisions are protective:
 - Still adequate set back for percolation or unsaturated zone transport to slow and allow detection and mitigation
 - Low chloride fluids present lower risks and less impacts
 - Excavated pit material presents less risk than operating pits because no free liquids
 - Tanks present less risk than pit because easier to detect and respond to leaks
 - Unconfined groundwater is vulnerable, while confined groundwater is relatively invulnerable, to contamination from leaks
 - Revisions protect all domestic and stock watering uses

Design and Construction Requirements

Joining the Seam of a Synthetic Liner



Source: Ground Water Protection Council (GWPC), "State Oil and Natural Gas Regulations Designed to Protect Water Resources."

- Mostly unchanged from current Rule 17
- Design and construction standards reduce risk of spills, leaks, or failures through
 - Ensuring a base material that prevents liner strain and punctures
 - Located on a stable slope to prevent side walls from failing
 - Use of a high quality liner, stronger and less likely to tear or puncture
 - Inclusion of leak detection systems for multi-well fluid management pits
 - Orienting liner seams to minimize stress on the seams

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Design and Construction Revisions

- Proposed revisions are protective:
 - Using angle of repose of soil materials is more stable than identifying a specific slope for pit walls,
 - Allowing anchoring of liner trench in bedrock when less than 18 inches of soil are present,
 - Limiting the size of temporary pits to 10 acre feet

Operational Requirements

- Operational Requirements
 - No changes to integrity requirements for liners, liner systems, secondary containment, and repair requirements
 - Tanks moved to separate provisions
 - Multi-well fluid management pits provisions replicate pit requirements plus leak detection system monitoring

Proposed Operational Revisions

- Proposed revisions are protective:
 - Notification and inspection log filing requirements for repairs are burdensome on both operator and OCD
 - OCD must be notified if repair cannot be completed within 48 hours
 - Freeboard change clarifies reasonable response time to reestablish after heavy rain
 - Monthly inspections adequate to prevent overflow/leakage after operations cease because no significant addition of liquids
 - 60 days releases more water to environment and achieves better drying
 - Integrity testing of tanks more stringent than just observation

Closure and Site Reclamation Requirements

- The dilution of pit contents using a 3 parts clean soil to 1 part pit contents is sufficient to prevent elevated chlorides, benzene and TPHs from reaching groundwater
- Removal of liquids should prevent a hydrostatic head from building up inside the pit after closure.
- Exposure of pit contents to atmosphere prior to burial with allow volatile compounds (benzene and TPH) to dissipate by evaporation.

Closure and Site Reclamation Revisions

- Rules fundamentally unchanged from prior Rule 17
 - Closure by removal unchanged
 - Minor changes to closure on-site
 - Addition of closure for multi-well fluid management pits (no sampling if no leaks ever detected in leak detection system)
 - Reclamation essentially unchanged, with revisions to make more sustainable

Closure Revisions are Protective

- Closure by Removal (Subsection A)
 - Leak detection system provides stronger assurance than sampling protocol, hence no sampling required for multi-well fluid management pits with no detected leaks
 - Replaces prior leak detection limits with Table I
- Closure in-place
 - Rewritten, but no substantial changes to most procedures
 - Replaces prior pit content limits and leak detection limits with new Tables I and II

Closure Revisions are Protective

- Table I. Closure Criteria for Soils Beneath Pits and Below Grade Tanks
 - These areas are covered so direct exposure is not a concern as discussed by Dr. Thomas
 - Recovery/revegetation is not a concern for reasons that will be discussed by Mr. Buchanan
 - Limits are protective of groundwater at time and place of reasonably foreseeable future use
 - Benzene and BTEX unchanged
 - TPH will not migrate to groundwater
 - Chloride highly unlikely to exceed WQCC standards

Closure Revisions are Protective

- Table II. Closure Criteria for Wastes Left in Place in Temporary Pits and Burial Trenches
 - These areas are covered so direct exposure is not a concern as discussed by Dr. Thomas
 - Recovery/revegetation is not a concern because under four feet of cover
 - Limits are protective of groundwater at time and place of reasonably foreseeable future use
 - Benzene and BTEX unchanged
 - TPH will not migrate to groundwater
 - Chloride highly unlikely to exceed WQCC standards

Protection from Chemical Migration

- Proposed revisions to Closure Requirements are preventive of chemical migration:
 - the semi-arid climate of the state is conducive to the volatilization of organic compounds like TPH and Benzene,
 - placement of compacted soil cap and the naturally slow infiltration rate of an unsaturated soil zone would result in slow migration of chemicals, and
 - observation of natural chloride bulge in unsaturated soil profile is evidence of low infiltration rates; salts move slowly, if at all, due to limited hydraulic head, limited convective flow, and limited diffusion.

Reclamation Requirements

- Use of stockpiled soil cover from surface horizons will facilitate re-establishment of vegetation
- Grading of the land surface and re-vegetation will help to reduce the risk of erosion and prevent water from infiltrating into the pit preventing contaminant migration from the pit.

Proposed Revisions Are Protective

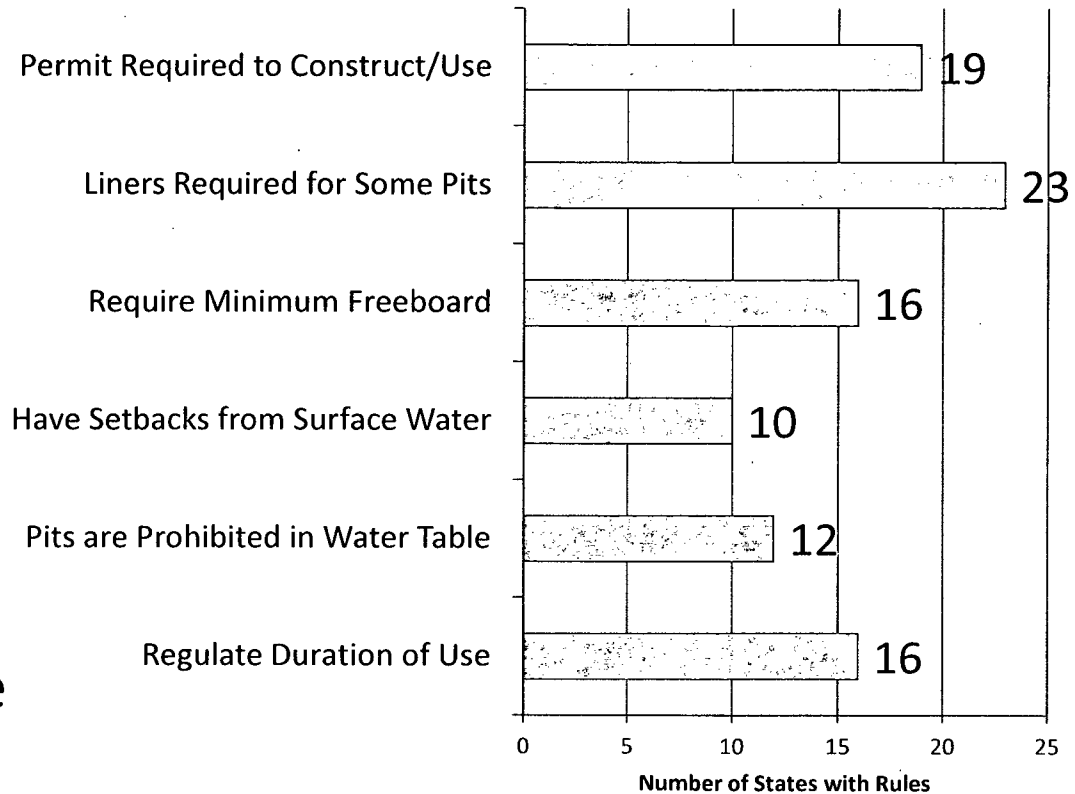
- Operational/Closure Phases:
 - Spills and overland releases
 - Siting prevents immediate release and provides time for detection and mitigation
 - Operational requirements (freeboard, repair) provide for quick response
 - Direct contact
 - Siting and fencing prevent contact
 - Punctures and leaks in liner
 - Integrity, inspection and repair requirements address
 - Leak detection system (for multi-well fluid management pits)
 - Siting provides time for detection and mitigation

Proposed Revisions Are Protective

- Post-Closure Phase:
 - Erosion and exposure of contents
 - Siting prevents location in high risk areas
 - Cover prevents direct contact
 - Contouring and vegetation minimize erosion of cover
 - Leaching
 - Siting sets minimum distances for buffering
 - Table II limits waste constituents loadings to minimize risk to groundwater
 - Contouring and vegetation minimize hydraulic head and hence movement to groundwater

State Oil and Gas Pit Rules

- 33 States with Oil and Gas Production
- New Mexico Rule 17 includes Regulation of the 6 Pit Requirements Identified by the GWPC



Comparison to Six Other State Rules

- The Current and Proposed New Mexico Rule 17 meet or exceed most of the requirements of 6 other states.
 - New Mexico's liner requirements are more stringent than 4 of the other 6 states compared in this analysis.
 - New Mexico's freeboard requirements meet or exceed all of the other 6 states.
 - New Mexico has more detailed setback requirements than all of the other 6 states.
 - New Mexico has more stringent requirements for setback from groundwater than 5 of the other 6 states.

Summary

- The history of temporary pits with incidents which could impact groundwater is small < 0.0125% of all pits.
- Current and proposed Rule 17 uses siting, design, construction, operation, closure, and reclamation requirements to ensure protection of public health and the environment.

Summary

- New Mexico proposed Rule 17 is more detailed and stringent than regulation in most other states with high levels of current oil and gas development.
- Commission can and should conclude that proposed revisions to Rule 17 are protective of public health and the environment.