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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.

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-2
HEARING DATE: MAY 14, 2012

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.

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CASE NO. 14784 NMOGA EXHIBIT 14-3
HEARING DATE: MAY 14, 2012

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

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HEARING DATE: MAY 14, 2012

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.

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CASE NO. 14784 NMOGA EXHIBIT 14-5
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-6
HEARING DATE: MAY 14, 2012

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)

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CASE NO. 14784 NMOGA EXHIBIT 14-7
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-8
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-9
HEARING DATE: MAY 14, 2012

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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CASE NO. 14784 NMOGA EXHIBIT 14-10
HEARING DATE: MAY 14, 2012

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

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-11
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-12
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-13
HEARING DATE: MAY 14, 2012

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.

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CASE NO. 14784 NMOGA EXHIBIT 14-14
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-15
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-16
HEARING DATE: MAY 14, 2012

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

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-17
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-18
HEARING DATE: MAY 14, 2012

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.

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CASE NO. 14784 NMOGA EXHIBIT 14-19
HEARING DATE: MAY 14, 2012

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.

BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-20
HEARING DATE: MAY 14, 2012

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

BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-21
HEARING DATE: MAY 14, 2012

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

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CASE NO. 14784 NMOGA EXHIBIT 14-22
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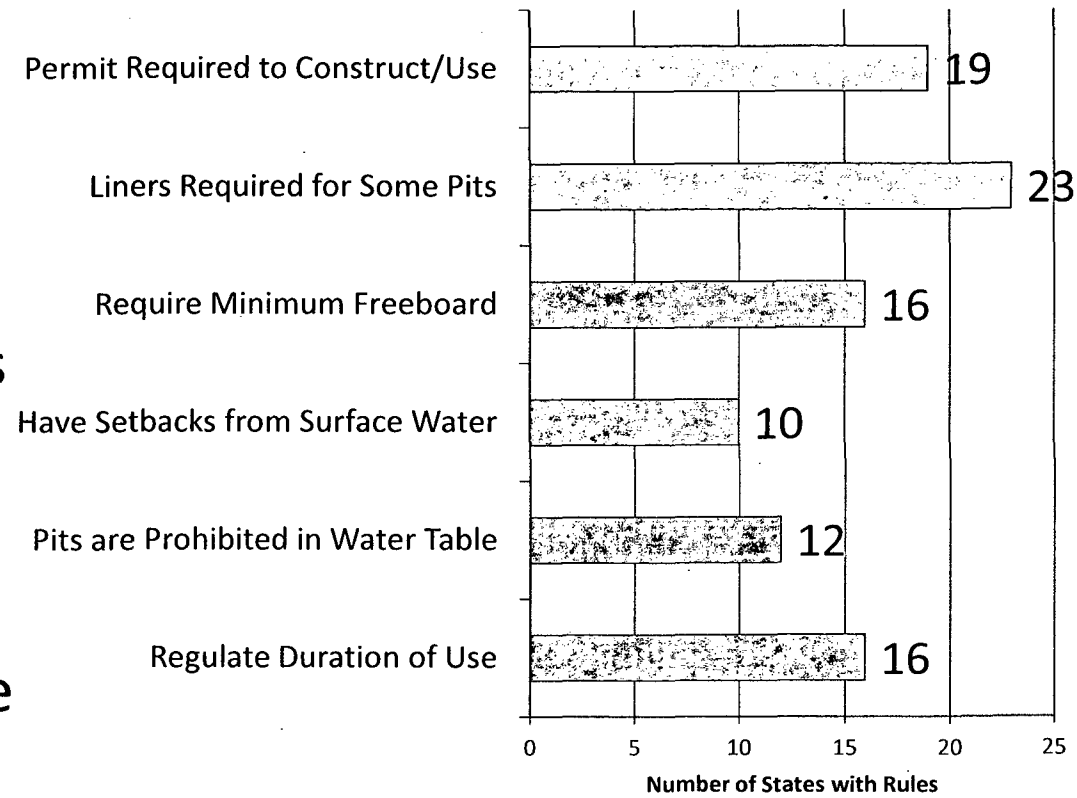
State Oil and Gas Pit Rules

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



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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-23
HEARING DATE: MAY 14, 2012

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 that 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.

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-24
HEARING DATE: MAY 14, 2012

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.

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BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 14-25
HEARING DATE: MAY 14, 2012

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.

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CASE NO. 14784 NMOGA EXHIBIT 14-26
HEARING DATE: MAY 14, 2012