Colorado Oil and Gas Conservation Commission

http://cogcc.state.co.us/

Pit Discussion

Setback Stakeholders Meeting

June 14, 2012

STATE OF COLORADO OIL & GAS

OIL & GAS CONSERVATION COMMISSION

DRILLING PITS

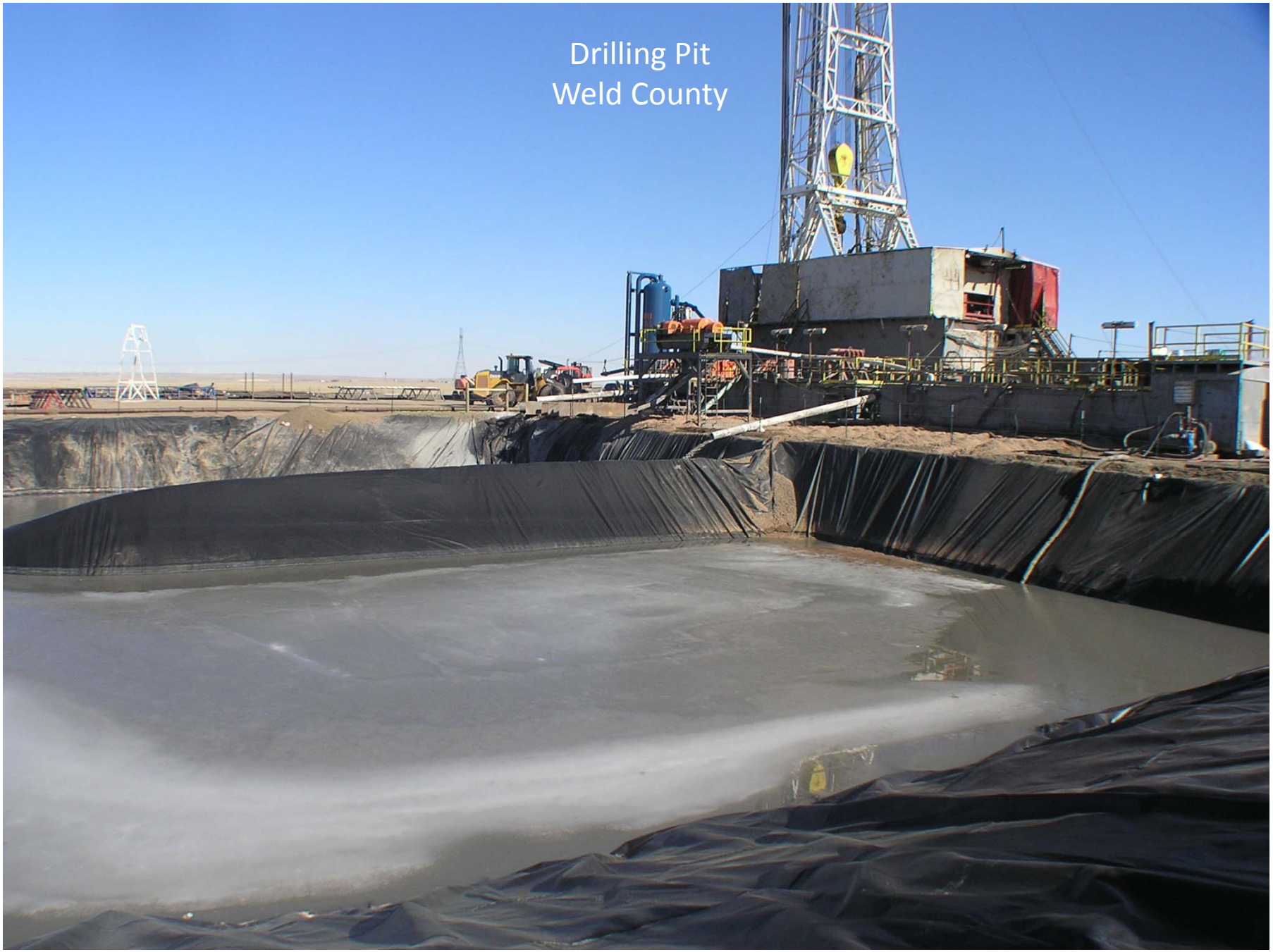
Drilling Pits. Pits used during drilling operations and initial completion of a well:

Ancillary: Contain fluids during drilling operations and initial completion procedures such as circulation and water storage pits (including fresh water).

Completion: Contain fluids and solids produced during initial completion procedures (not originally constructed for use during drilling operations).

Flow back: Contain fluids and solids produced during initial completion procedures.

Reserve: Used to store drilling fluids in use in drilling operations or to contain E&P waste generated during drilling operations and initial completion procedures.


Drilling Pit
Weld County

Freshwater/Frac Pit
Weld County

PRODUCTION PITS

Production Pits: Pits used after drilling operations and initial completion of a well.

Skimming/Settling: Pits used to provide retention time for settling of solids and separation of residual oil for the purpose of recovering the oil or fluid.

Produced Water: Pits used to temporarily store produced water prior to injection for enhanced recovery or disposal, offsite transport, or surface water discharge.

Percolation: Pits used to dispose of produced water by percolation through the bottom or sides of the pit into surrounding soils.

Evaporation: Pits used to contain produced water which evaporates into the atmosphere by natural thermal forces.

Produced Water Skim and Disposal Pit
Weld County

SPECIAL PURPOSE PITS

Special Purpose Pits: Pits used in oil and gas operations which constitute:

Blowdown: Pits used to collect material resulting from including to but not limited to the emptying or depressurization of wells, vessels, or gas gathering systems.

Flare: Pits used exclusively for flaring of gas.

Emergency: Pits used to contain liquids during an initial phase of emergency response operations related to a spill or release or process upset conditions.

Special Purpose Pits: (continued):

Plugging Pit: used for containment of fluids encountered during the plugging process.

Workover Pit: used to contain liquids during the performance of remedial operations on a producing well in an effort to increase production.

Basic Sediment/Tank Bottoms Pit: used to temporarily store or treat the extraneous materials in crude oil which may settle to the bottoms of tanks or production vessels and which may contain residual oil.


Flare Pit
Weld County


Plugging Pit
Weld County

MULTI-WELL PITS

Multi-Well Pits:

Pit used for treatment, storage, recycling, reuse, or disposal of E&P wastes generated from more than 1 well that does not constitute a Centralized E&P Waste Management Facility (see Rule 908) and will not be used for more than 3 years.

Rule 902.e:

Pits used for a period of not more than 3 years for treatment, storage, recycling, reuse, or disposal of E&P wastes **or fresh water** may be permitted to service multiple wells. Director may issue a variance for longer service life.


Multi-well Pit
Garfield County
30
6S91W

SETBACKS FOR PITS

COGCC Rule 604.f. Produced water pits, special use and buried or partially buried vessels, or structures.
At the time of construction, pits shall be located not less than two hundred (200) feet from any building unit.

COGCC Rule 603.e.(3) Setbacks for production equipment (high density areas): At the time of initial construction, production tanks, pits, or associated onsite equipment shall be located not less than 350 feet from any building unit.
…..500 feet from and educational facility, assembly building, hospital, board and care facility, jail or designated area

PITS – GENERAL AND SPECIAL RULES

COGCC Rule 902

COGCC Rule 902.a.
Constructed and operated to protect public health, safety, and welfare and the environment, including soil, waters of the state, and wildlife

COGCC Rule 902.b.
minimum of 2’ freeboard

COGCC Rule 902.c.
removal of accumulations of oil within 24 hours

COGCC Rule 902.d.
fencing and netting

COGCC Rule 902.e.
3 year limit to multi-well pit operation
COGCC Rule 902.f.
no unlined pits in fill
COGCC Rule 902.g.
no unlined pits where communication with groundwater or surface water is likely
COGCC Rule 902.h.
prior treatment of produced water (refers to Rule 907)
COGCC Rule 902.i.
biocide treatment for bacterial growth and related odors

Oil on Pit violation
Weld County

COGCC Rule 323 – OPEN PIT STORAGE OF OIL

Storage of oil in earthen pits is considered to be waste. Except in emergencies or if properly permitted. Oil must be reclaimed.

COGCC Rule 324A. – POLLUTION

a. Operator shall take precautions to prevent significant adverse environmental impacts to air, water, soil, or biological resources … prevent the unauthorized discharge or disposal of oil, gas, E&P waste, chemical substances, trash, discarded equipment or other oil field waste.

b. No operator shall violate water quality standards or classifications

c. No owner shall violate applicable air quality laws, regulations or permits

PIT PERMITTING REQUIREMENTS

COGCC Rule 903

COGCC Rule 903.a.

Prior approval required for:

1. production pits
2. most special purpose pits
3. drilling pits (for high chloride or oil-based mud)
4. multi-well pits

COGCC Rule 903.b.

reporting within 30 days of construction for:

1. emergency response pits
2. flare pits

COGCC Rule 903.c.
A pit permit shall not be required for a drilling pit using water based bentonitic fluids.

COGCC Rule 903.e.
COGCC may place Conditions of Approval (COA) on pit permit to protect waters of the state, public health, or the environment

COGCC Rule 303.d.(2)A.
Requires that a Form 2A be submitted prior to the construction of a drilling or production pit.

PIT LINING REQUIREMENTS

COGCC Rule 904

OIL & GAS CONSERVATION COMMISSION

COGCC Rule 904.a.

For new pits:

1. drilling pits (for high chloride or oil-based mud)
2. production pits – with exceptions for water quality and some county-specific exceptions
3. most special purpose pits
4. skim pits
5. multi-well pits
6. centralized E&P waste management facilities

COGCC Rule 904.b.

Synthetic, impervious liners installed and maintained in accordance with design or manufacturer's specifications with field seams tested

COGCC Rule 903.c.

Pit liner foundation protective of damage to liner and compacted to hydraulic conductivity of 10^{-7}

COGCC Rule 904.e.

COGCC may require leak detection in sensitive areas


Inadequate Pit Foundation
Garfield County

Pit liner failure due to inadequate foundation
Garfield County


Pit liner failure due to poor installation,
operations, and maintenance
Weld County

PIT CLOSURE

COGCC Rule 905

COGCC Rule 905.a.

Drilling pits closed in accordance with 1000-series Rules (reclamation)

COGCC Rule 903.b.

1. Form 27 – Site Investigation and Remediation Workplan
2. Soil and groundwater must meet Table 910-1
3. E&P waste must be treated or disposed
4. Liners removed and disposed
5. Soil samples beneath pit must meet Table 910-1

COGCC Rule 905.c.

Reporting of releases (COGCC Rule 906)

Clean-up of releases (COGCC Rules 909 and 910)

COGCC Rule 1003.d. Drilling pit closure

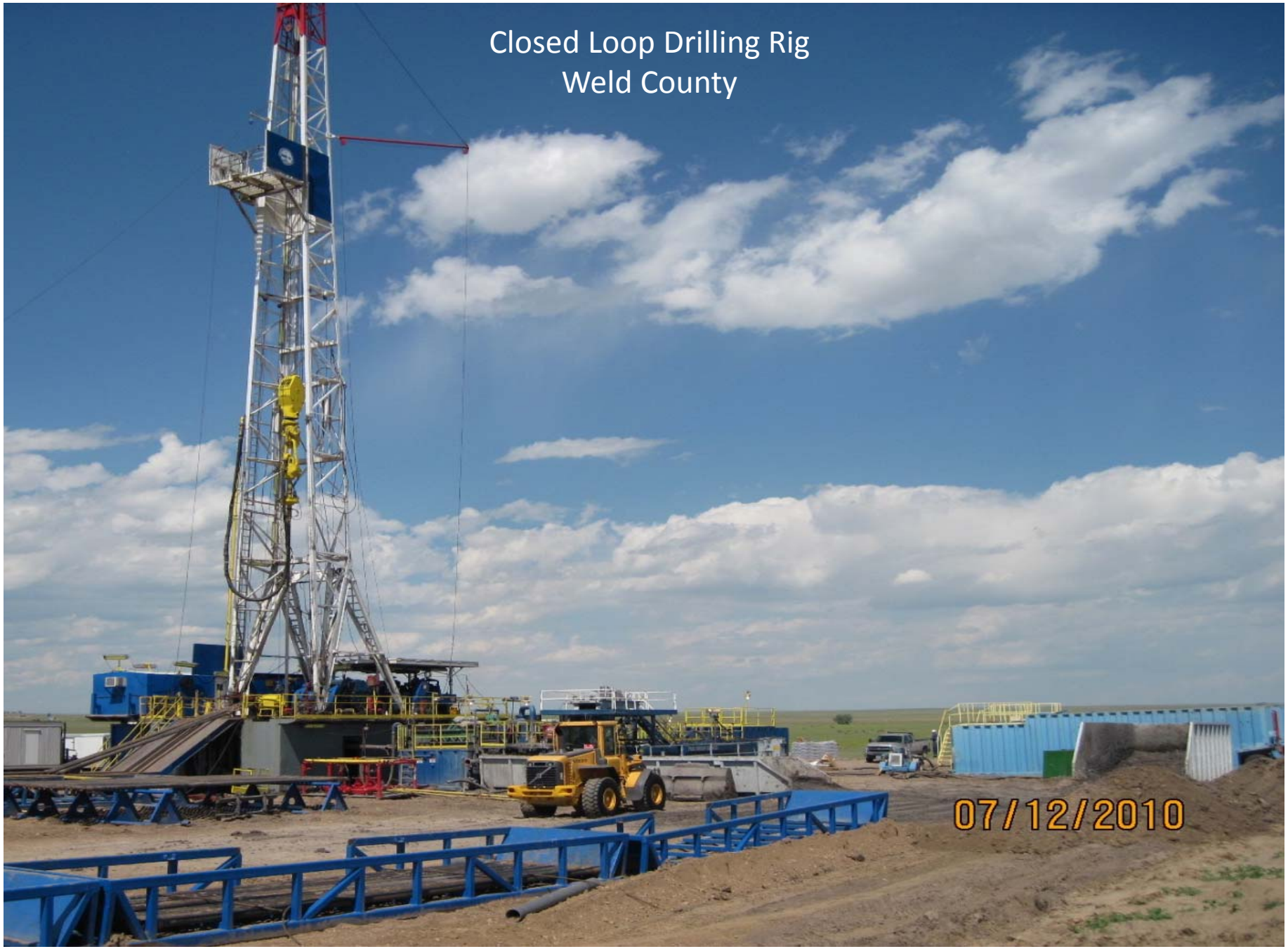
1. On Crop Land
    - Removal of water based bentonitic fluids
    - Soils must meet Table 910-1
    - Prevention of impermeable barrier
    - Cuttings burial
    - Complete within 3 months
2. On Non-Crop Land
    - All drilling fluids disposed
    - Soils must meet Table 910-1
    - Cuttings burial
    - Complete within 6 months
3. Minimum Cover, 2 year prevention of subsidence

Pit reclamation
Weld County

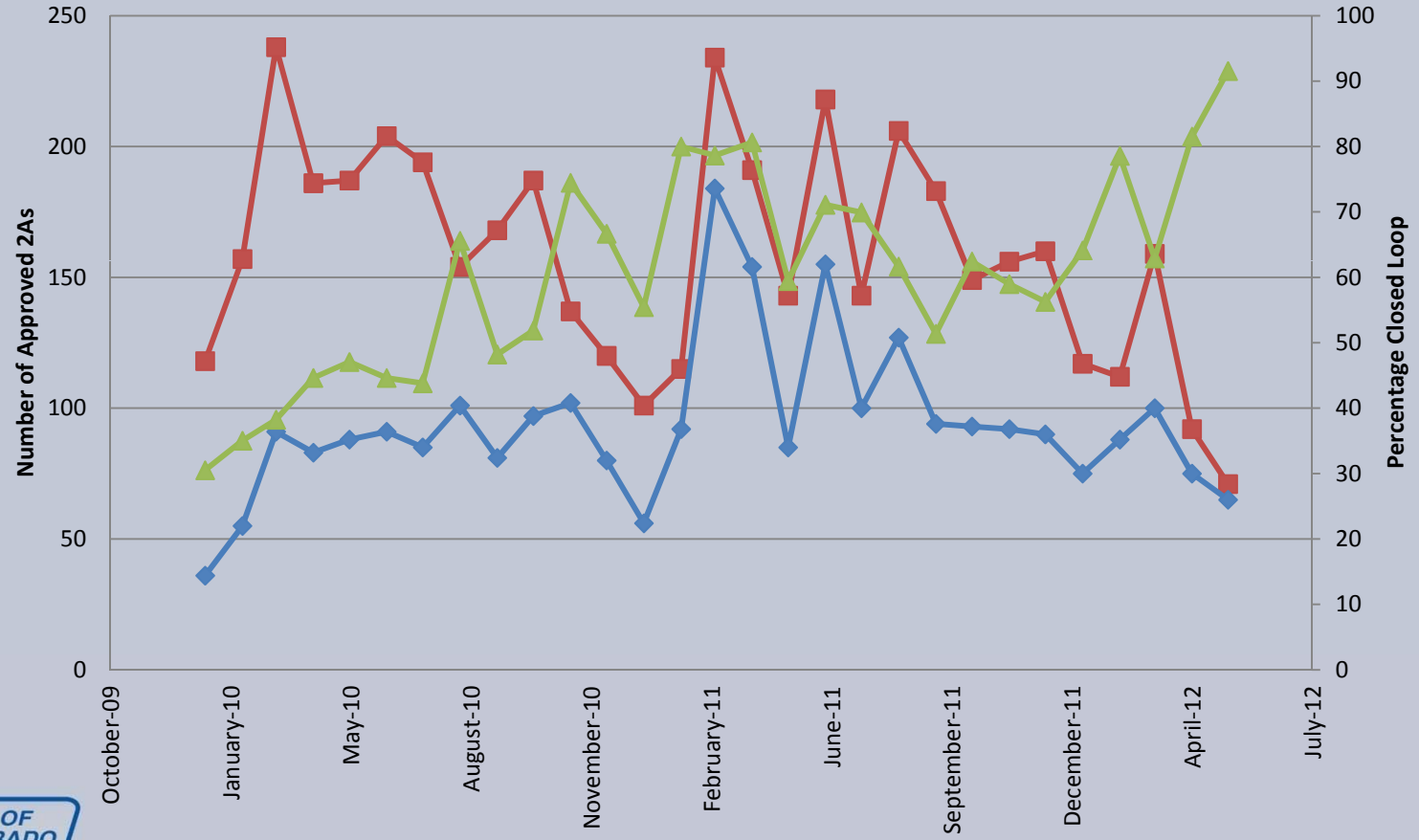
ALTERNATIVES TO PITS

Closed Loop Drilling

- Drilling fluids contained and managed in tanks
- “Dry” cuttings handled in bins


Closed Loop Drilling Rig
Weld County
07/12/2010

Closed Loop Drilling Systems
As Reported on Form 2A
Statewide by Month



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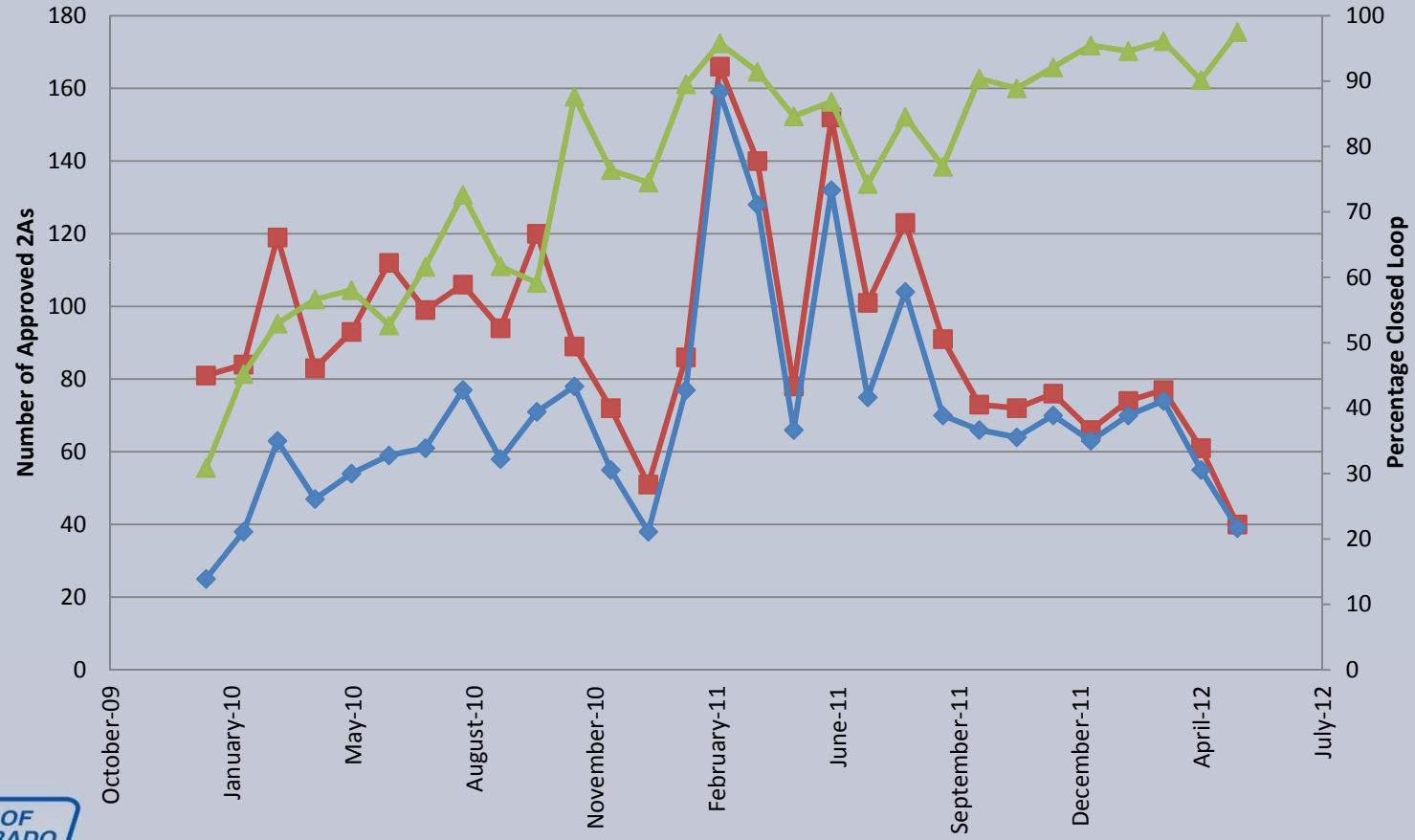
Closed Loop Drilling Systems
As Reported on Form 2A
Weld County by Month



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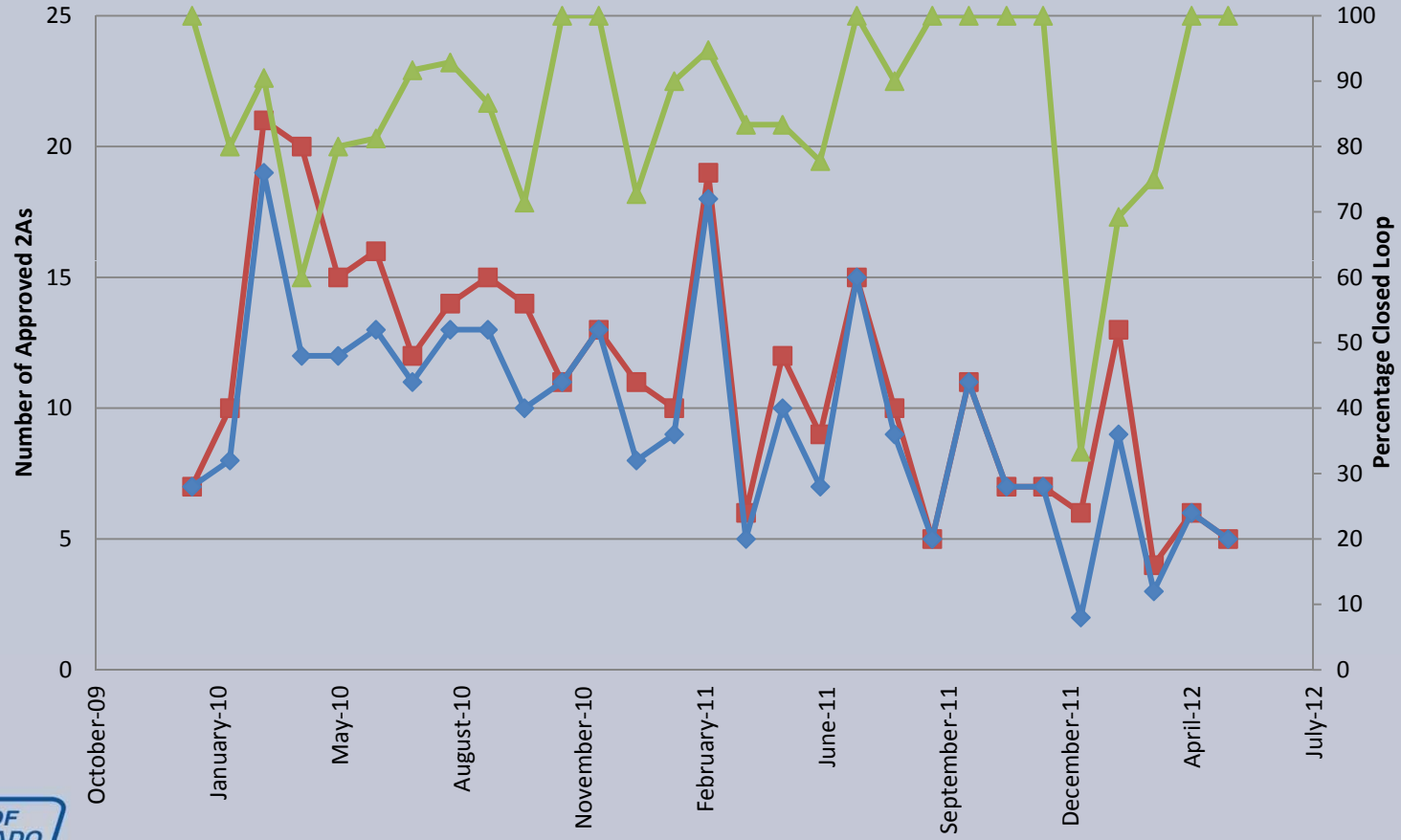
Closed Loop Drilling Systems
As Reported on Form 2A
Garfield County by Month



STATE OF COLORADO
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High capacity fresh water storage tanks

- 100’ diameter
- 12’ tall
- Synthetic liner(s) over frame
- Built on-site
- 30 – 50 Mbbls

Large Capacity Water Tank
Weld County

Municipal water hookups

- Availability
- Hydrants
- Mutually beneficial

ISSUES WITH PITS

Discussion points to follow:

- Emissions
- Odors
- Truck Traffic
- Public Safety
- Impacts to Wildlife & Livestock
- Leaks
- Fire
- Duration
- Shallow Water Table
- Closure requirements

Emissions & Odors

- Drilling pits: Little to no volatile organic compounds (VOCs)
  - Horizontal Niobrara
  - Diesel & chemical additives
- Completions (Flow-back) pits
  - Higher Odors
  - Some VOCs before gas cut
  - After gas cut, green completions can help, but residual from pit
  - Flow back to tanks
- Production pits
  - Odors & emissions come typically come from incomplete separation
  - Bacterial growth

Truck traffic

- High volume of truck traffic to fill fresh water pit or remove fluids from drilling or completions pits
- Can be mitigated by piping water supply
- Mitigate with signage, timing & route selection
- Local jurisdiction over traffic, road access, traffic control plan

Public Safety

- Access control
  - Rule 603.e.(7) Fencing requirements (high density)
  - Rule 902.d. Fencing and netting requirements
  - Site Access/security
- Are fencing requirements adequate to keep kids out
- 200’ setback
- Public awareness
- Signage

Impacts to Wildlife & Livestock

- Access control
  - Rule 603.e.(7) Fencing requirements (high density)
  - Rule 902.d. Fencing and netting requirements
- Site Activity
- Prevention and removal of oil from pit surface

Leaks – Environmental concerns, public health risks

- Adequate Foundation
- Proper installation (anchor trenches, field seam testing)
- Minimum liner thickness requirements
- Dual liners, leak detection
- Pit closure requirements
- Evaluation of receptors
- Hydrostatic testing

Fire

- Low probability event
- Local emergency responders & response coordination
- Oil and gas operators' response contractors
- Emergency response plan

Duration

- Drilling pits at multi-well pads will remain far longer than at single well pads
- 3 year limitation to multi-well pits
- Build up of chemicals, bacteria, sediment, mud & cuttings
- Liner longevity
- Operational durability

Shallow water table

- Limited margin for error
- Floating pit liners
- Difficult leak detection
- Closed-loop, lined pits, no pits

Closure timeframe

- Current rules for closure of drilling pits allow 3 months for crop land and 6 months for non-crop land
- Land near developed communities may not be crop land
- Pits near developed communities should be reclaimed as quickly as possible

SOLUTIONS

For discussion:

- No changes
- No pits
- Revise set-back rules
- Revise pit rules
- COAs
- BMPs