Inter-Wellbore Communication
Risks and Regulatory Approaches
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September 7, 2018
Outline

• Terminology
• Environmental and economic risks
• Regulatory approaches
• What’s coming next?
Terminology

• Inter-wellbore communication
• Pressure hits
• Well bashing
• Area of Review
Environmental / Economic Risks

• Groundwater contamination
• Surface water contamination
• Air quality / methane
• Productivity loss
• Formation damage
Regulatory approaches: Alberta

• AER Directive 83 (2013)
  – HF plan that includes identification of each offset well, examination of integrity of those wells and determination of risk
  – Well control plan for each offset well
  – Notification plan for each offset well operator
  – Must attempt to make mutually acceptable well control plan (“Licensees of both offset and subject wells are responsible for maintaining control of its licensed wells at all times.”)
  – Notification to offset well operator in case of communication event
Regulatory approaches: Alaska

• 20 AAC 25.283 (2014):
  – Offset operator notification to one-half mile
  – The location, the orientation, and a report on the mechanical condition of each well that may transect the confining zones, and information sufficient to support a determination that the well will not interfere with containment of the hydraulic fracturing fluid within the one-half mile radius of the proposed wellbore trajectory;
  – The location of, orientation of, and geological data for each known or suspected fault or fracture that may transect the confining zones, and information sufficient to support a determination that the known or suspected fault or fracture will not interfere with containment of the hydraulic fracturing fluid within the one-half mile radius of the proposed wellbore trajectory
Regulatory approaches: North Dakota

  – The operator conducting any well stimulation shall give prior written notice, up to ten days and not less than seven business days, to any operator of a well completed in the same pool, if publicly available information indicates or if the operator is made aware, if the completion intervals are within one thousand three hundred twenty feet [402.34 meters] of one another.
Regulatory approaches: Ohio

- ODNR policy, starting in mid-2010s
  - Agency conducts analysis of well applications in the Rose Run field, which has vertical wells penetrating the Utica formation, to determine risk
  - Wells posing risk receive permit conditions that include offset wellbore monitoring; isolation of zones in offset wellbores; P&A of offset wells; modification of HF design (e.g. skipping stages)
  - More recently, since the emergence of induced seismicity in OH, wells near faults/fractures are subject to microseismic monitoring requirements that can pick up communication events
Regulatory approaches: Colorado

• Interim Statewide Horizontal Offset Policy (2014)
  – Operators submit form with all wells within 1500’ of wellbore, including cement information
  – COGCC evaluates whether those wells have adequate isolation to prevent communication
  – Four mitigation options for “wells of concern”
    • Remedial cement to isolate problematic zones
    • Plug well to isolate problematic zones
    • If well is PA/DA, re-enter and isolate
    • Alternative mitigation or showing that offset well is not of concern
  – Offset wells must be equipped to withstand 5000 PSI
  – 90 day offset operator notice
  – Offset well operators “shall not refuse to have their well appropriately mitigated to meet the requirements of this Policy”
Regulatory approaches: Colorado

  - Evaluate active wells within 150’, provide notice

- 317s. Statewide Fracture Stimulation Setback (2015)
  - Waivable ban on stim within 150’ of existing wellbore’s stimulated zone
Regulatory approaches: California

  – Determination of “axial dimensional stimulation area”
  – Identification of all wells within 2x ADSA, with integrity analysis of casing and cement, and wellbore path
  – Review of geological features within 5x ADSA and their likelihood of communication
  – Design treatment to ensure treatment fluids and hydrocarbons do not migrate

• Note also requirement to monitor stimulation for signs of communication and terminate if discovered
Regulatory approaches: Pennsylvania

• § 78a.52a. Area of review (2016)
  – Operator identifies surface and bottomhole locations of all wells with wellbores within 1000’ feet of proposed wellbore, using official records, historical records, and landowner questionnaire
  – Operator provides a monitoring plan for at-risk offset wellbores
    • Per guidance, can include automatic shut-off devices, pressure gauges, tanks, gas detectors, visual monitoring
Regulatory approaches: Pennsylvania

• § 78a.73. General provision for well construction and operation (2016)
  – Notification to operators with wells that penetrate within 1500’ of stim zone
  – Non-producing wells (orphaned, abandoned, P&A) that penetrate within 1500’ of stim zone must be visually monitored during stim
  – Operator must cease HF and notify agency immediately if there are indications at the well being stimulated or at offset wells of a communication incident (via treatment pressures, volumes, or surface expression)
    • Per guidance, rapidity of notification depends on severity of communication incident
  – Any non-producing well impacted by HF must be plugged or returned to production by operator
    • Per guidance, adoption may occur prior to HF

• See also Guidelines for Implementing Area of Review (AOR) Regulatory Requirement for Unconventional Wells (2016)
Regulatory approaches: Oklahoma

• 165:10-3-1(a), 2017
  – As part of APD, plat w/ location and TD of all wells within 1/4 mile of completion interval of proposed well

• 165:10-3-10(b), 2017, rev. 2018
  – Five days' notice to offset operators within 1/2 mile of completion interval and completed in same common source of supply
  – If offset operator has evidence that HF ops have impacted its well(s), the operator may report to OCC via designated form
Regulatory approaches: Model Regulatory Framework

- Operator analysis of proximate wellbores and known faults and fractures that transect the stimulation zone, including anti-collision evaluation

- Attestation to regulator that any such wells, faults or fractures will not be a conduit for movement of fluids into a source of protected water

- Pre-stim offset operator notification
What’s coming next?

• More rounds of rulemaking in Oklahoma?
• Codification of Colorado / Ohio policy?
• Texas finds an innovative, technology-driven solution?