Stray Gas Prevention : Ohio Initiatives

GWPC: Grapevine Texas : 7/11/2013

Scott Kell, Geologist

The Range

Simple/Benign to Multi-Agency Emergency Response

July 24-26, 2012
Cleveland, Ohio
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Failure Root Cause Analysis

State	Period	Years
Ohio	1983-2007	25 (+1)
Pennsylvania	1992-2009	18

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Ohio Findings
Incidents by Phase/Activity

- Orphaned wells: 12
- Production (deficient construction): 12
- Drilling: (subsurface blowout): 1
- **TOTAL : 25**

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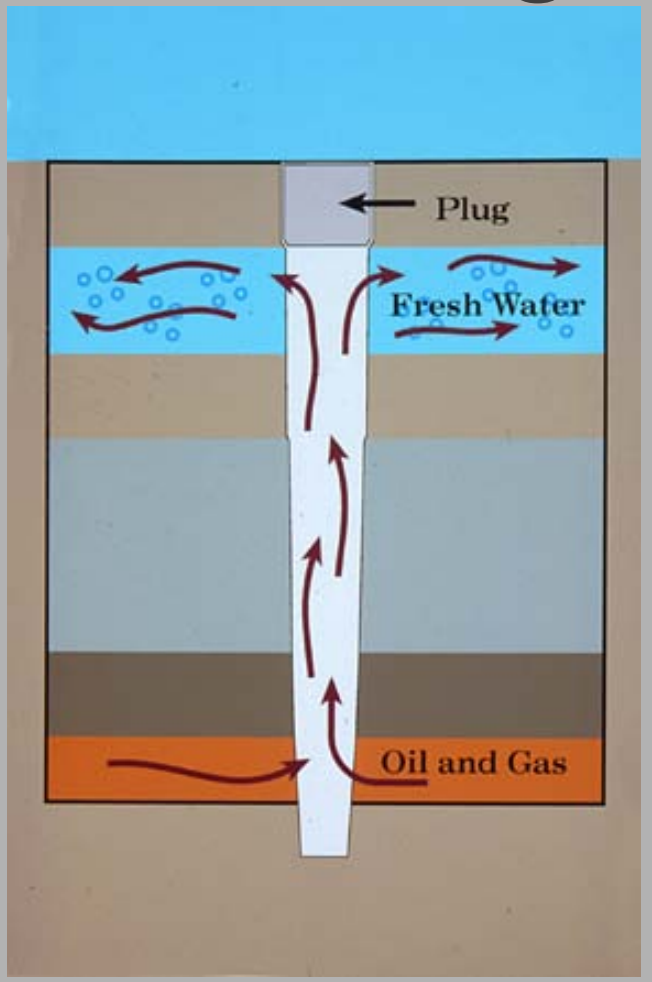
Orphaned Well Leakage



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Ohio Prevention Initiatives for Orphaned Wells

- Orphaned Well Program funding
- No less than 14% annual revenue
- Emergency contract procedures to expedite mitigation

Well Construction/ Wellbore Integrity Failures

1. Deterioration of unsealed surface casing (cable tool operations).
2. Corrosion of cemented surface casing caused by un-isolated hydrogen sulfide-bearing zones.
3. Annular over-pressurization due to un-isolated natural gas flow zones.

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Annular Over-Pressurization

Evaluating System for Ground Water Contamination Hazards Due to Gas Well Drilling on the Appalachian Plateau

Samuel Harrison: Groundwater Journal (Nov.-Dec. 1983)

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Common Factors

- Shallow USDWs
- No intermediate casing strings
- Local structural gas traps
- Un-isolated flow zones in the Big Lime
- SCP >hydrostatic pressure at the surface casing seat
- SCP> breakdown gradient

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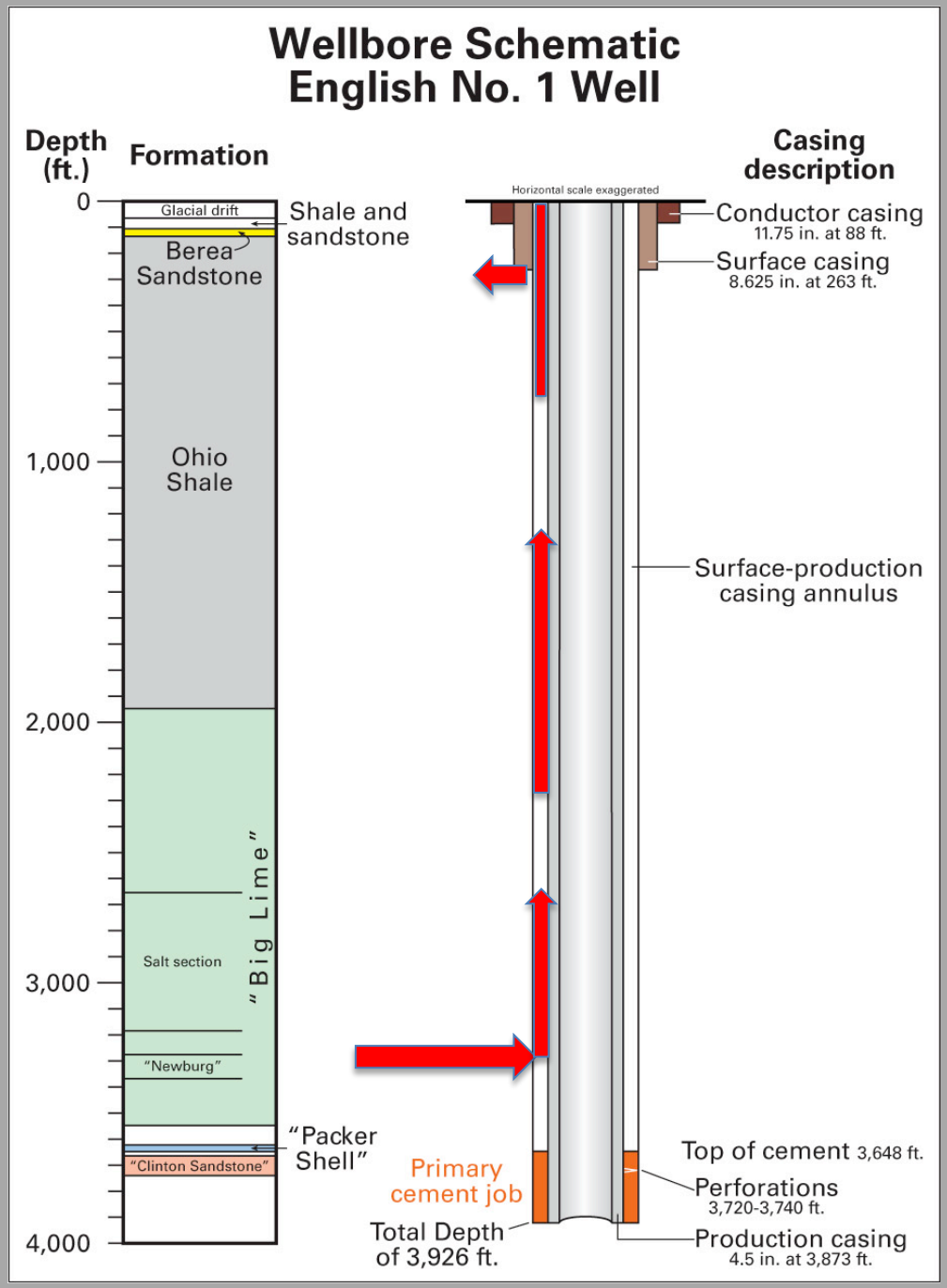
Wellbore Schematic
English No. 1 Well



Ohio Prevention Initiatives

- Statutory well construction performance objectives
- New well construction rules
- Annular monitoring requirements

Statutory Performance Objectives (SB-165)

- Protecting and isolating all USDWs with cement (banned clay sealants for CT wells)
- Isolating all hydrogen sulfide-bearing zones
- Preventing over-pressurization of the surface-production casing annulus

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Annular Over-Pressurization Defined

- "*Annular over-pressurization* means the accumulation of fluids within an annulus with sufficient pressure to allow migration of annular fluids into underground sources of drinking water" (Section 1509.01(BB) ORC)

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Well Construction Rules

- Defines “potential flow zone” consistent with API RP 65-2
- Defines “sustainable annular pressure” consistent with API RP 65-2
- Mandates cement isolation of flow zones behind intermediate or production casing string
- Requires at least 500 feet of cement above the uppermost flow zone
- Requires cement design consistent with API RP 65-2
- Require continuous annular pressure monitoring on an accessible valve to verify ongoing M.I.
- Requires properly functioning pressure relief valve set below hydrostatic pressure at the surface casing seat
- Requires notification of DOGRM upon valve release or observation of excessive pressure and mandates corrective action

Next Steps

- Continuing to develop guidance to promote due diligence and greater consistency in the identification of flow zones, cement design, and effective isolation during primary cementing operations

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