

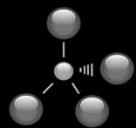
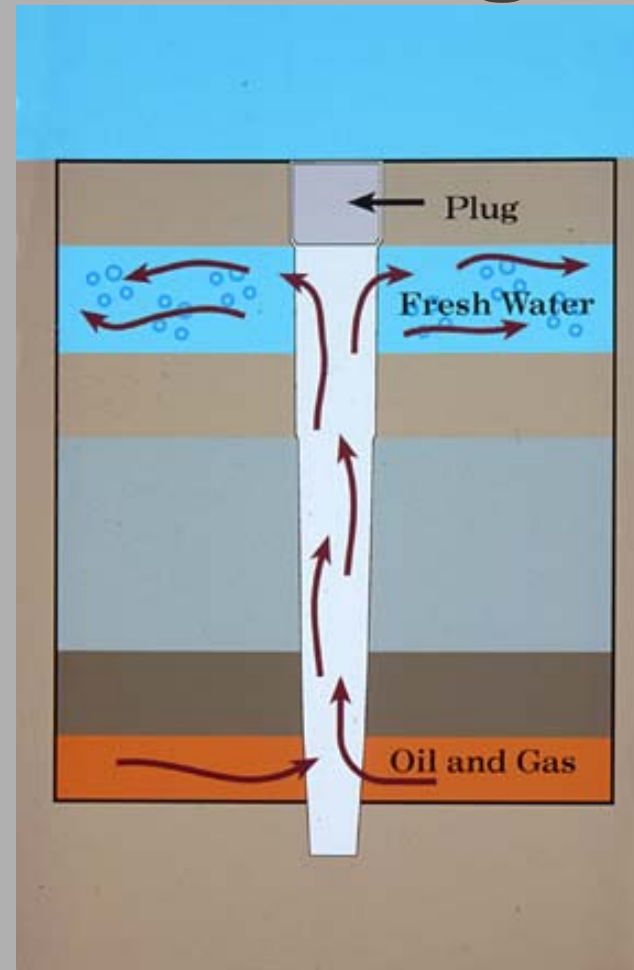
July 24-26, 2012
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STRAY GAS

Incidence & Response Forum

Prevention of stray gas incidents: Ohio regulatory initiatives

Orphaned Well Leakage



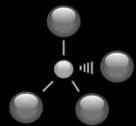
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Drilling Operations

(subsurface blowouts)



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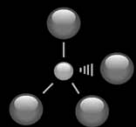
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Controlled burn: Air Rotary Drilling

Controlled Burn

Air Rotary Drilling



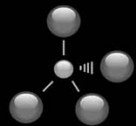
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Producing Operations

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

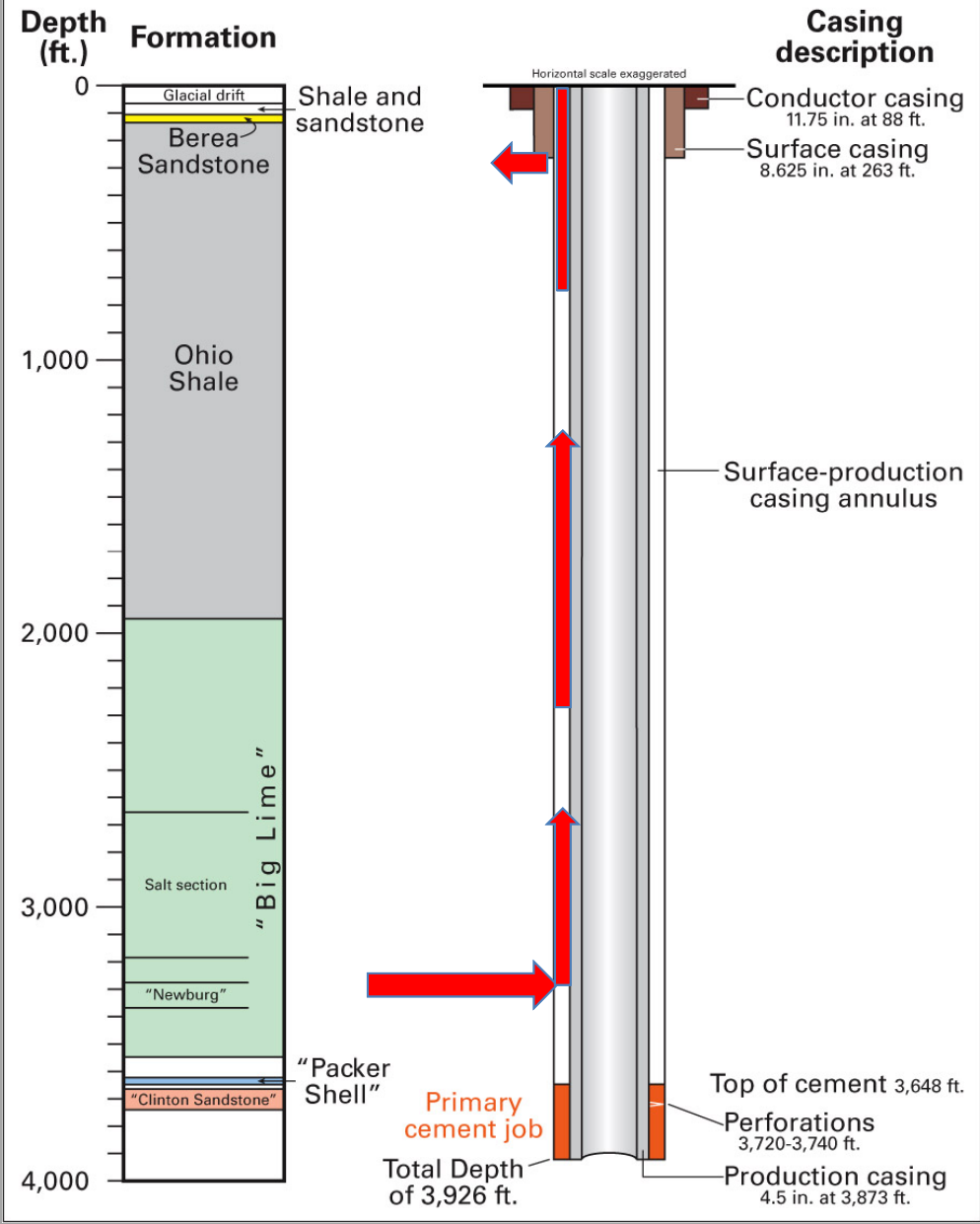


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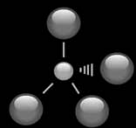
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Wellbore Schematic English No. 1 Well



Statutory Performance Objectives (SB-165)

- Protecting and isolating all USDWs with cement
- Isolating all hydrogen sulfide-bearing zones
- Preventing over-pressurization of the surface-production casing annulus



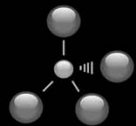
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Annular Over-Pressurization Defined

- “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)



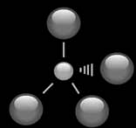
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Well Construction Rules

- 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



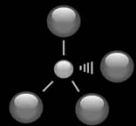
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Next Steps

- 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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