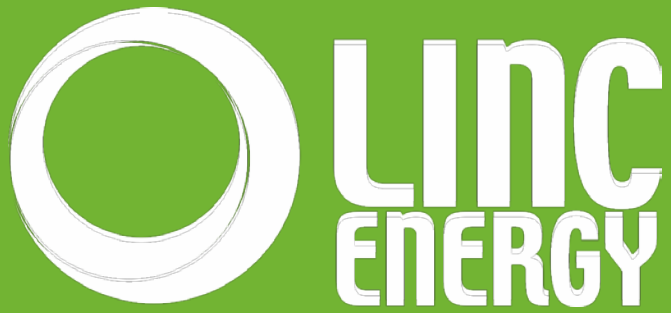

Environmental Quality Council
UCG Briefing
November 2013

Summary

- About Linc Energy
- Underground Coal Gasification (UCG)
- Decommissioning
- UCG Site Selection
- History of UCG in USA and Wyoming

About Linc Energy

- Diversified energy company
- Resource holdings (4 continents)
- Corporate office: Brisbane, Australia
- Public Listings: ASX and OTCQX
- Global leader in Underground Coal Gasification (UCG)
- Recognized Gas to Liquids (GTL) capabilities.

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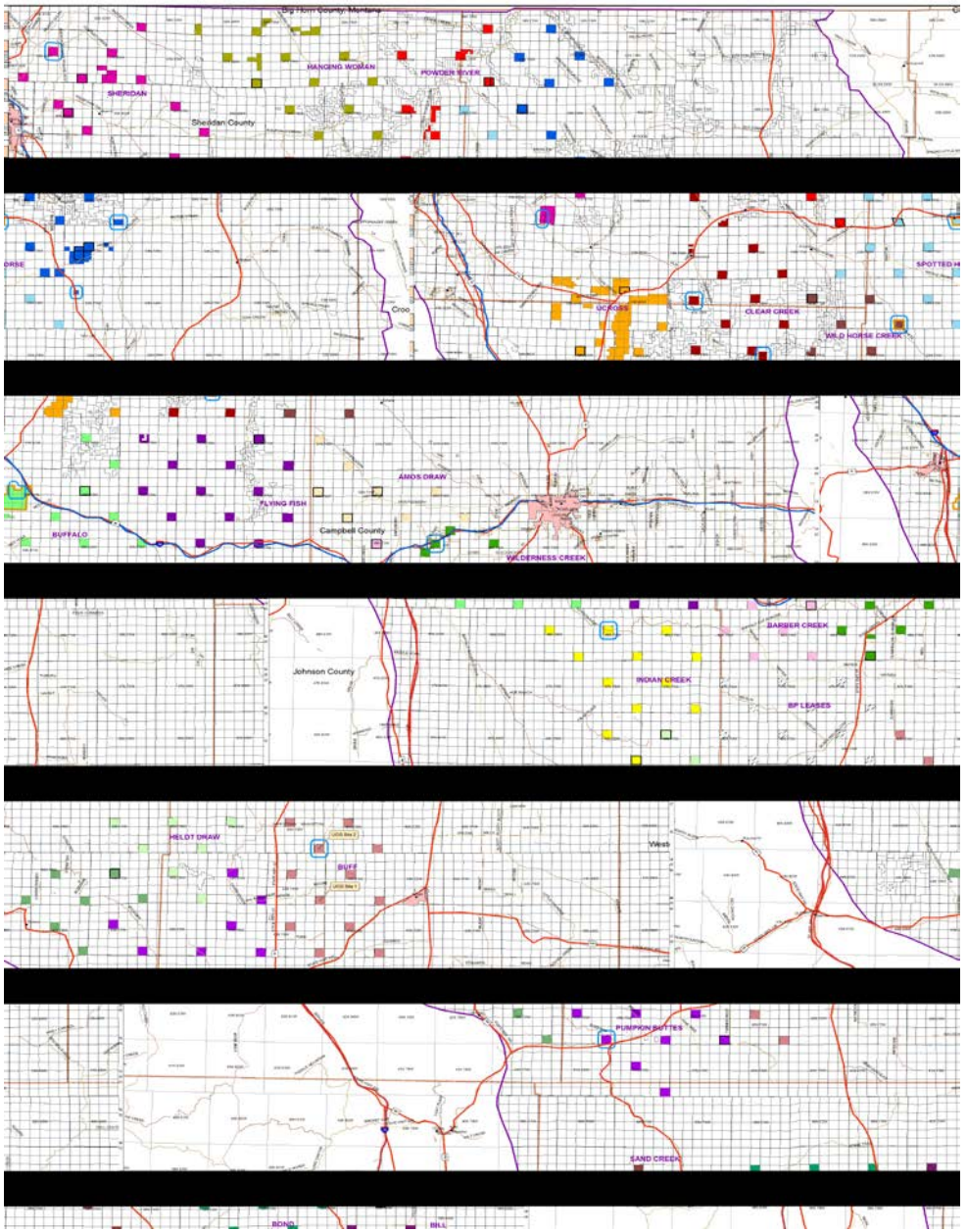
Clean Energy Division

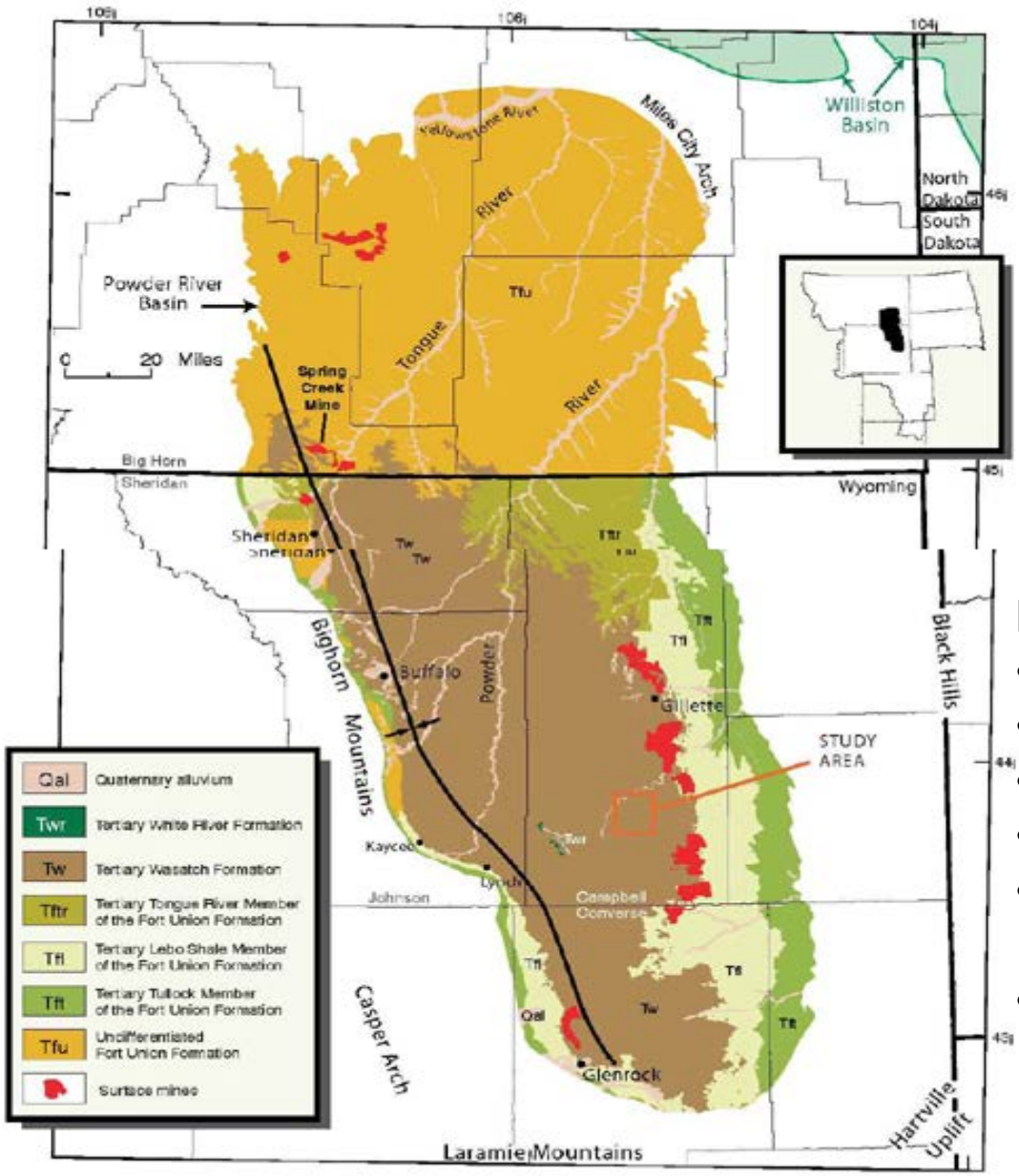
Focus:

- Commercial UCG projects using proprietary technology
- UCG and GTL integration to produce ultraclean transportation fuels
- Alternative syngas uses (Electric Power, Synthetic Natural Gas, Chemicals)
- CO_2 for Enhanced Oil Recovery (EOR)

Linc Energy's Lease Position
Powder River Basin, Wyoming

- 333 State parcels
- 184,000+ acres





Geologic map of Powder River Basin (after Flores and Bader, 1999), with study area

Powder River Basin

- Length ~230 miles (avg.)
- Width ~75 miles (avg.)
- Total Area = 17,325 sq.mi.
- Total Area = 11,087,000 acres
- Requested Aquifer Exemption Area = 80 acres
- Aquifer Exemption Area = 0.0007% of PRB total area

Overview of Underground Coal Gasification

What is UCG?

- Underground Coal Gasification, or UCG, converts coal to a gas while still in the ground, or in situ
- Two wells, injection and production, are drilled into the coal seam and connected with a linking well
- Oxygen/air is injected, heat and steam are generated, creating a chemical reaction
- Produces synthesis gas (known as syngas) of mainly hydrogen and carbon monoxide and to a lesser extent CO_2 and CH_4

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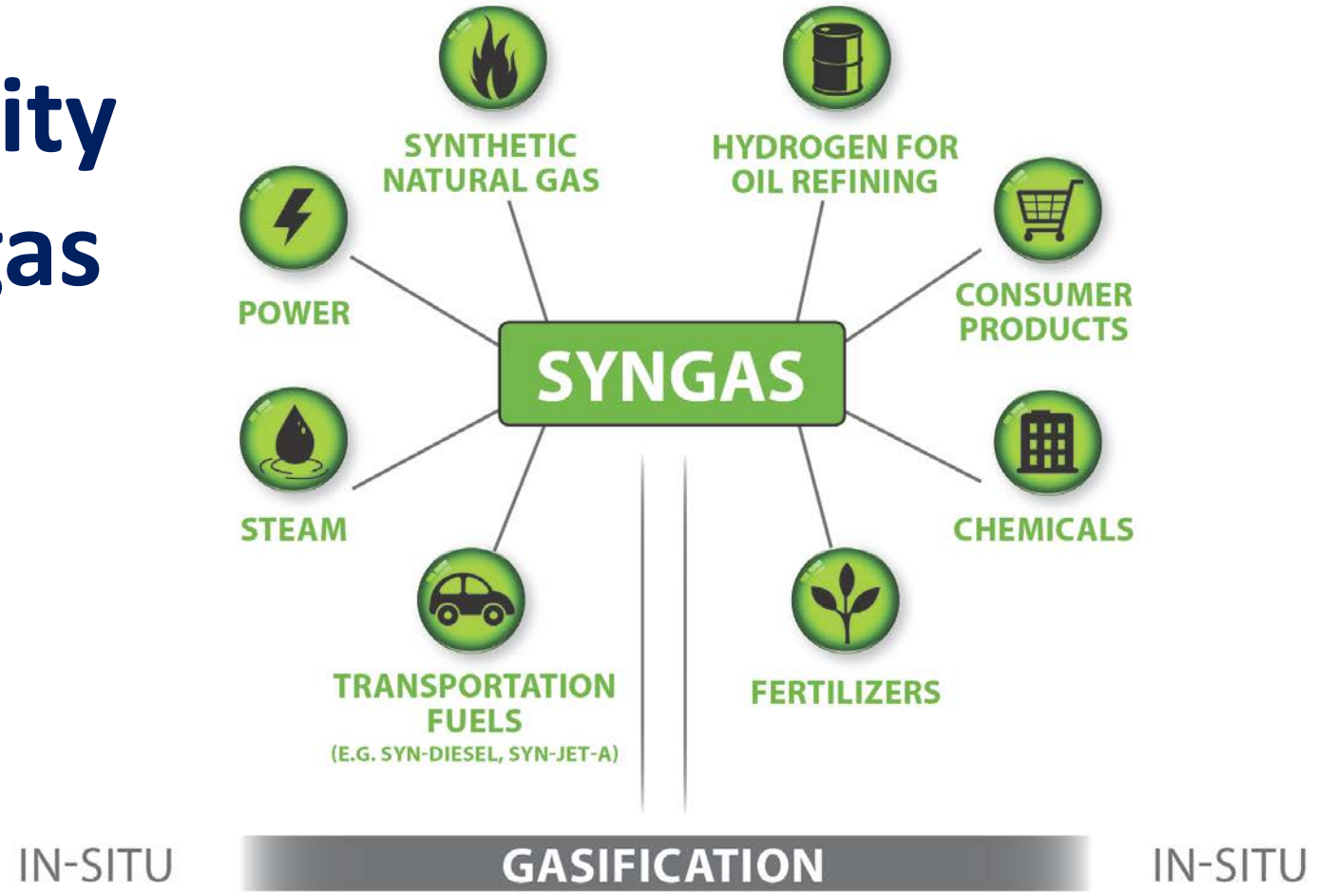
UCG Video

LincEnergyHD_edit_v12.mp4

Versatility of Syngas



Underground Coal Gasification

UCG the next unconventional oil and gas play . . . The value proposition:

Converts deep stranded hydrocarbons (coal) into syngas

Trillions of tons of coal worldwide are amenable to the UCG process

Suitable coal reservoirs are located on all continents

UCG process is controlled

Control maintained by the pressure & flow at the inlet and outlet surface facilities

Groundwater integrity is maintained by operating under hydrostatic pressure

Produced syngas equates to multiple downstream options

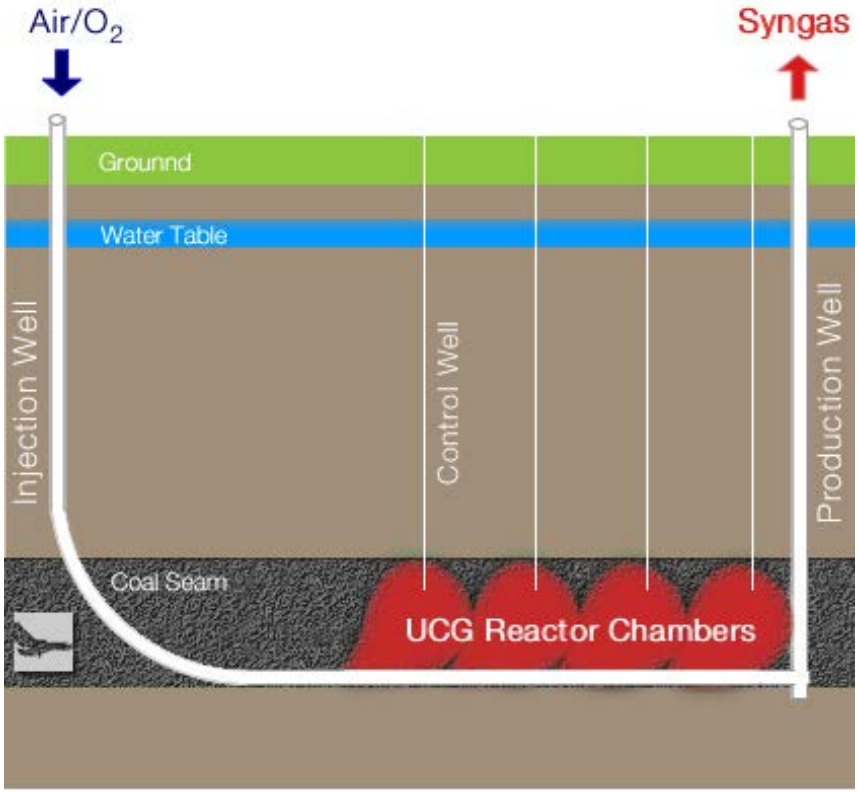
Syngas from UCG consists mostly of CO, H_2 and CH_4

UCG syngas can be used to create clean synthetic liquid fuels, chemicals, synthetic natural gas and power

CO_2 can be economically captured and applied for beneficial use, especially EOR

Syngas available at high pressure, making CO_2 capture one of the most cost competitive methods.

CO_2 is a highly valued product for EOR



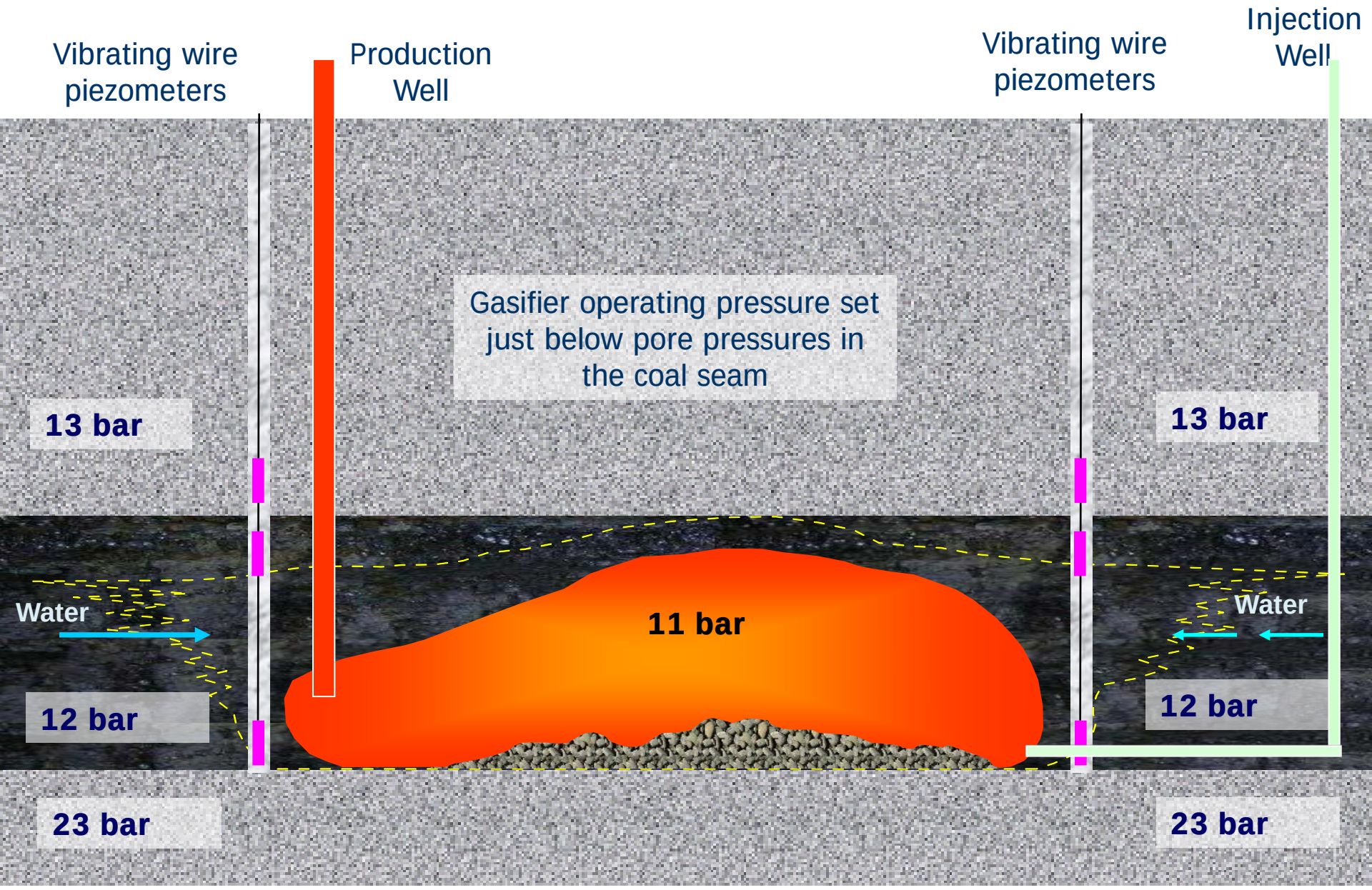
UCG Decommissioning Process

Clean Cavern Concept

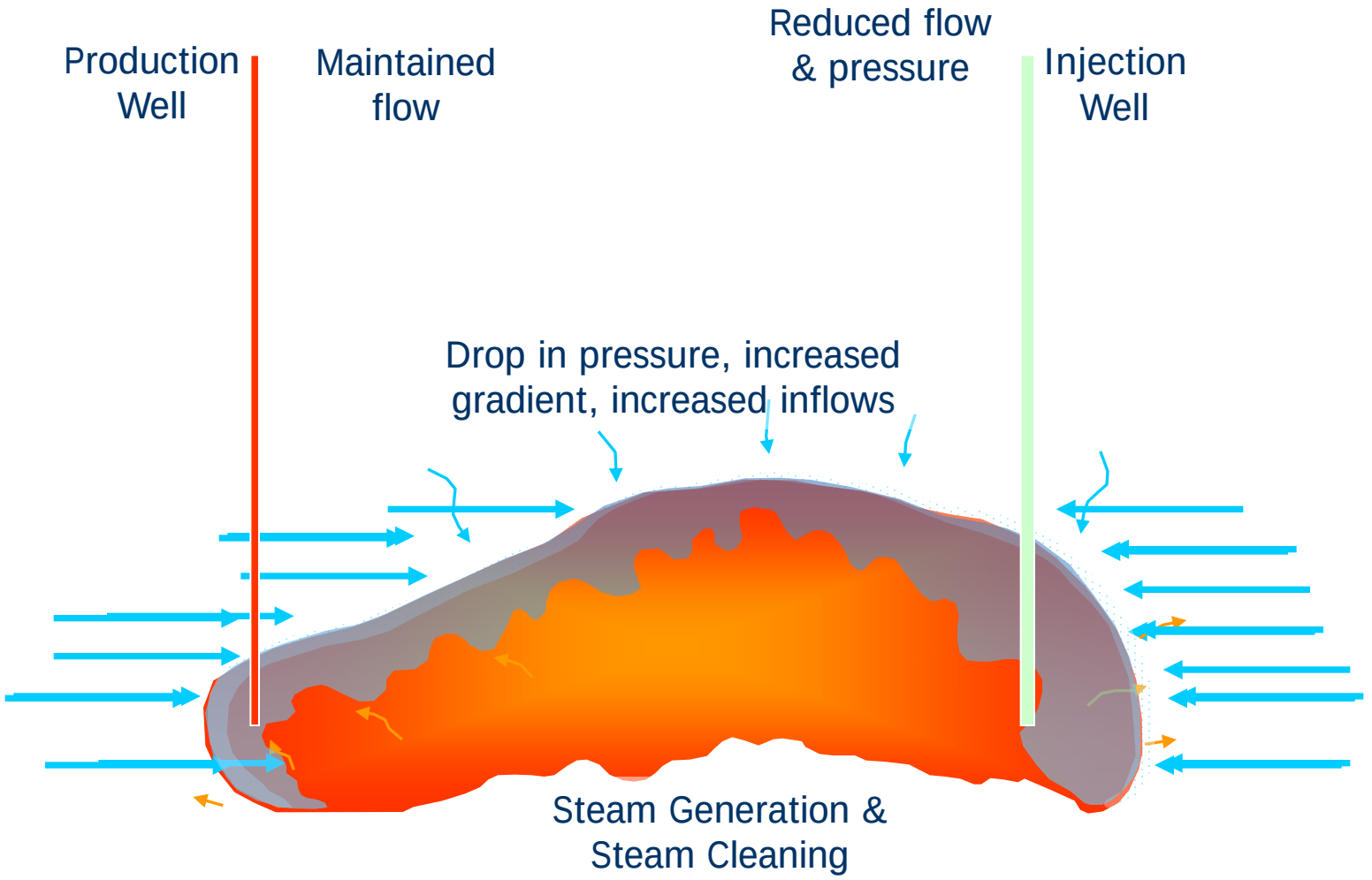
- Stage 1 Decommissioning – Stop oxidant injection and rapidly cool cavity by steam injection and depressurizing to allow groundwater ingress.
- Stage 2 Decommissioning – Vent cavity until gasification ceases, and maintain depressurized state to allow groundwater to recover in the cavity (periodic venting may be required)
- Stage 3 Decommissioning – Pump and treatment of recovered cavity waters (required at RM1 to recover groundwater quality to pre-operation levels).
- Ongoing monitoring is important to gauge success.

- Clean Cavern Concept was an operating philosophy developed by Western Research Institute (Laramie, WY) during the 1980s.
- It was successfully demonstrated at Rocky Mountain 1, which had full environmental compliance (Bond released by WDEQ).
- The success of decommissioning is proportional to the management of contamination risk during operations.

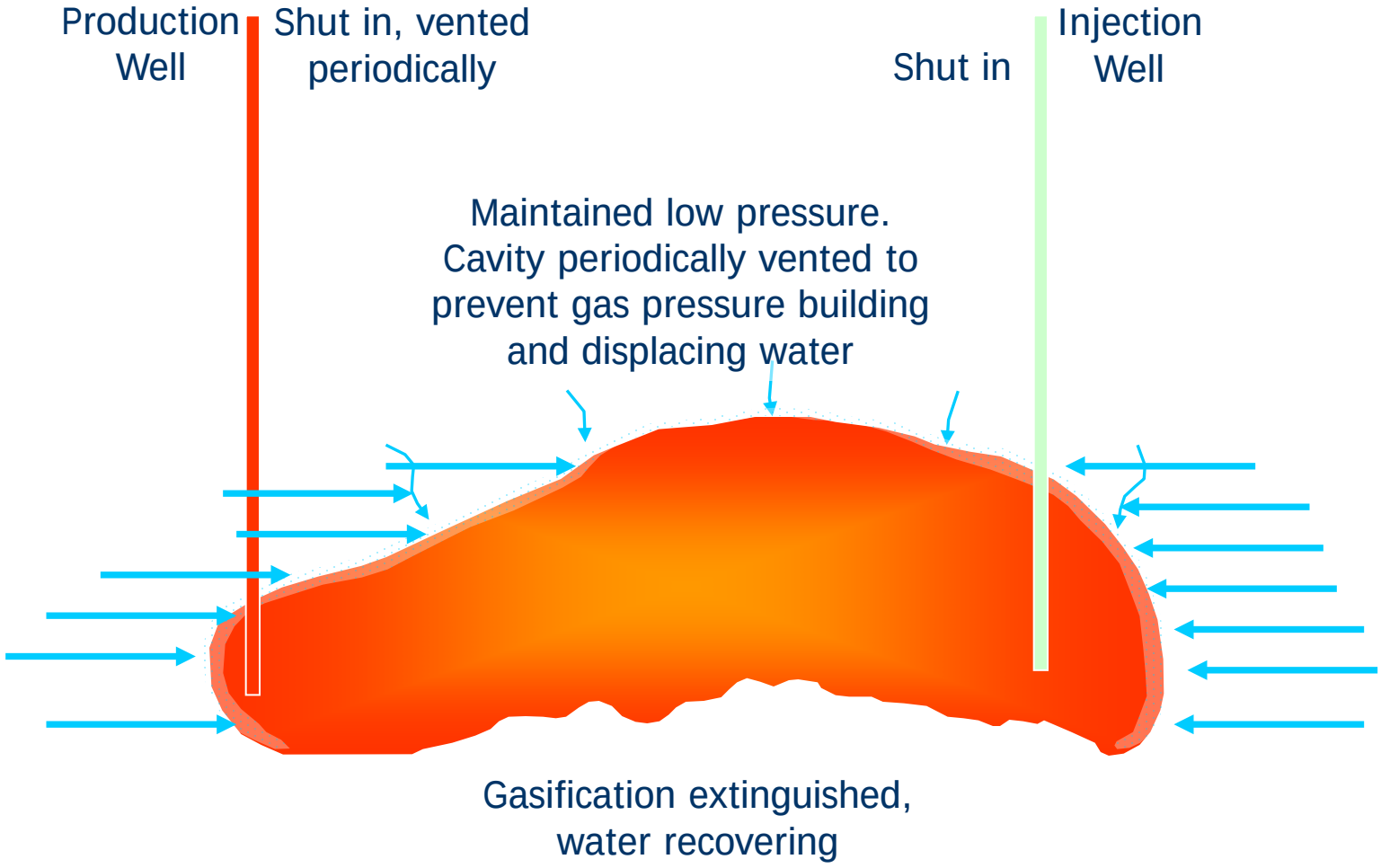
Gasifier Snapshot



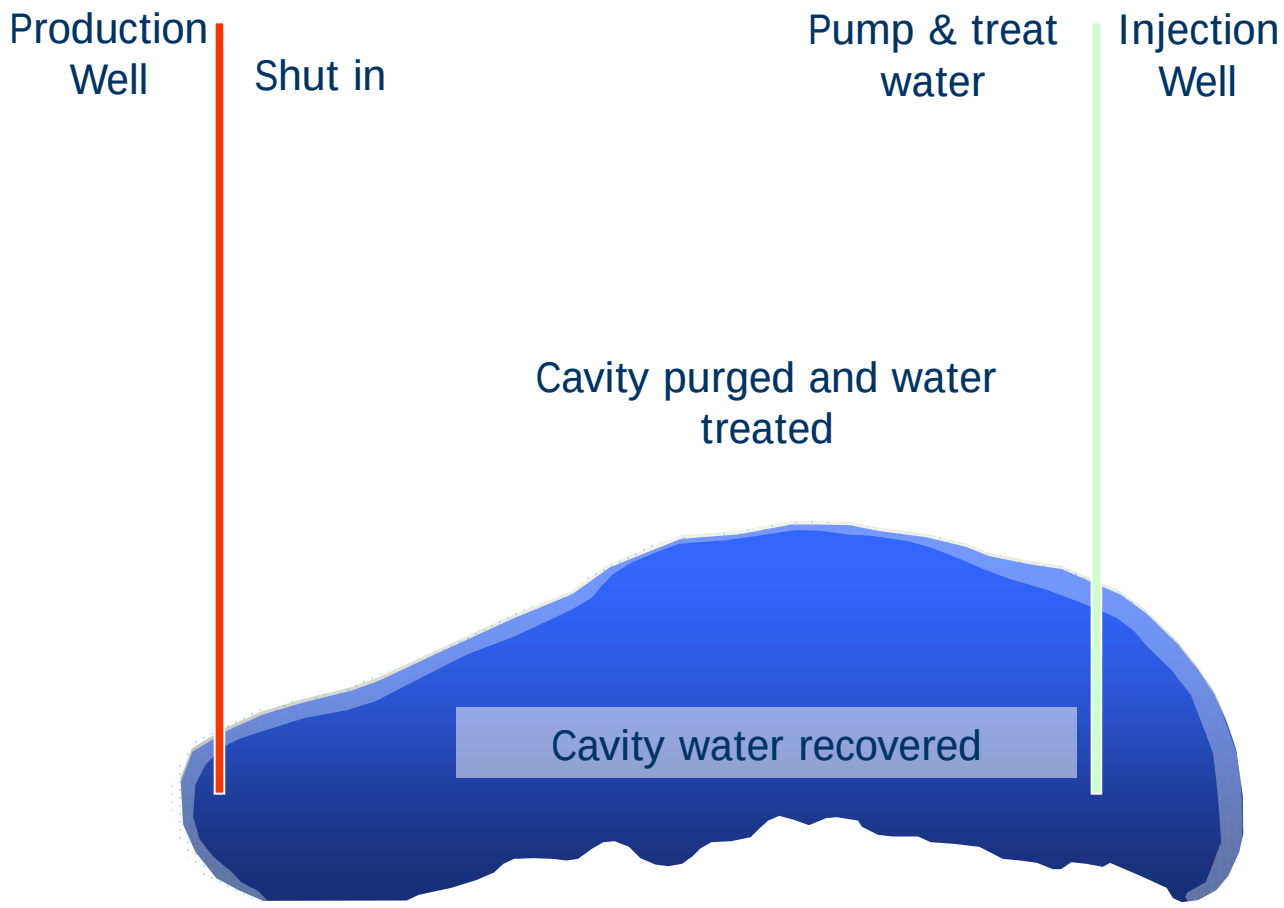
Decommissioning: Phase I



Decommissioning: Phase II



Decommissioning: Phase III



Decommissioning Objectives

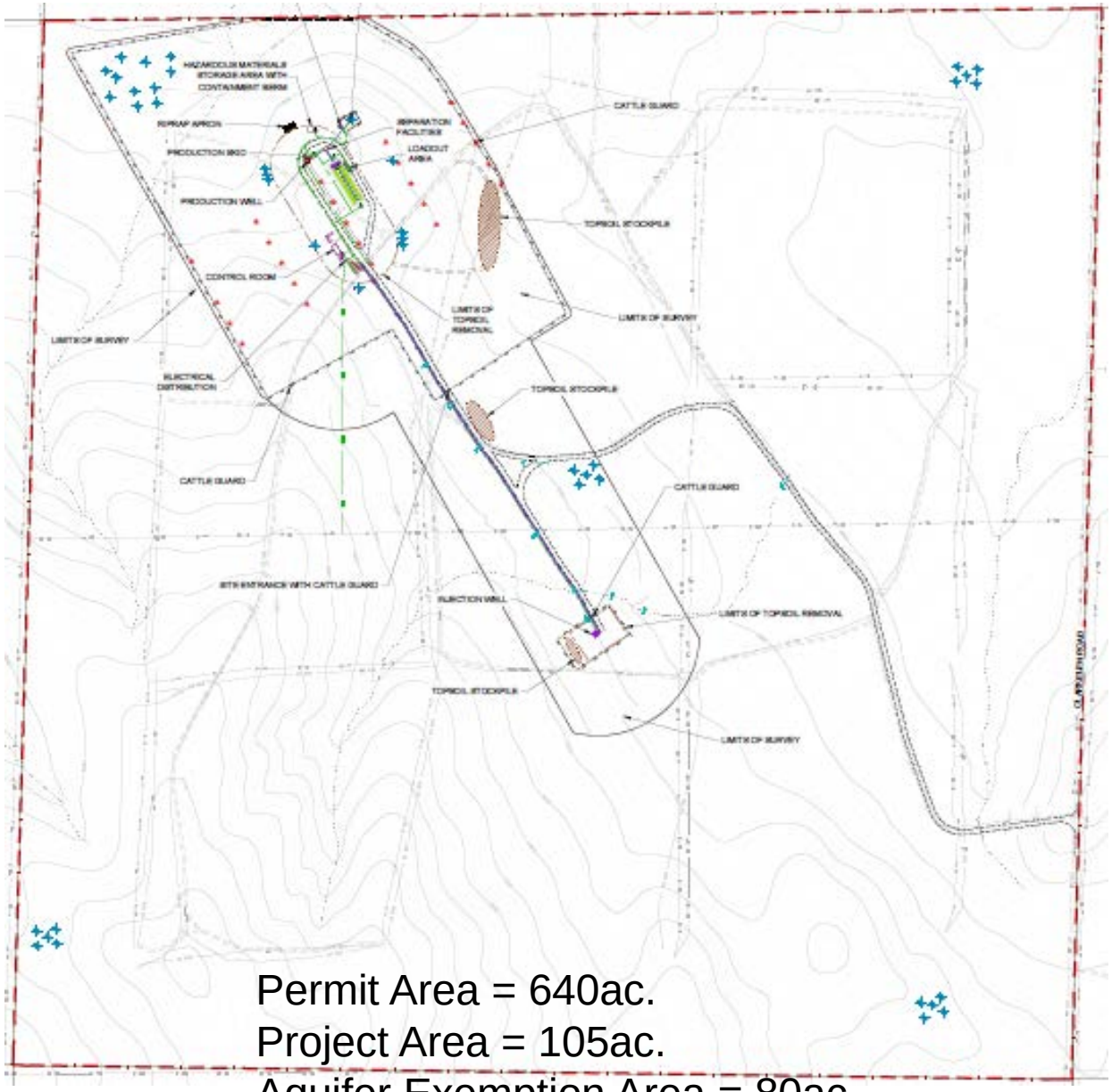
- Minimize post-gasification contamination production through accelerated cooling.
- Maximize removal of potential contaminants from the cavity and surrounds.
- Prevent migration of potential contaminants away from the cavity.
- Monitor post-burn conditions.
- Cooling the cavity as quickly as possible aims to stop the generation of pyrolysis products. - At RM1 this was done through a combination of steam injection and natural groundwater inflows.
- By stopping injection and venting the cavities the inward gradient is steepened and groundwater inflows increase – this is turned to steam by the residual heat and promotes cooling.
- Steam helps to strip pyrolysis products from the cavity walls, which can then be removed through the product wells.

UCG Site Selection Criteria

General UCG Site Selection Criteria

- Coal seam of sufficient depth = ~1100’ deep at G6 site
- Coal seam sufficiently thick to sustain gasification = 24-30’
- Rank of coal between lignite and non-swelling bituminous = non-swelling subbituminous coal
- Hydraulic head sufficient to contain gasification = 11bar (162psi)
- Coal seam capped by impermeable layer = shale
- Sufficient interburden separating target coal from surrounding coals = 150’ from Big George coal
- Absence of faulting or intrusions in vicinity = no evidence of faulting or intrusions in immediate area
- Sufficient distance from nearest town = ~13 miles from Wright & ~30 miles from Gillette

Characterization Wells & Monitoring



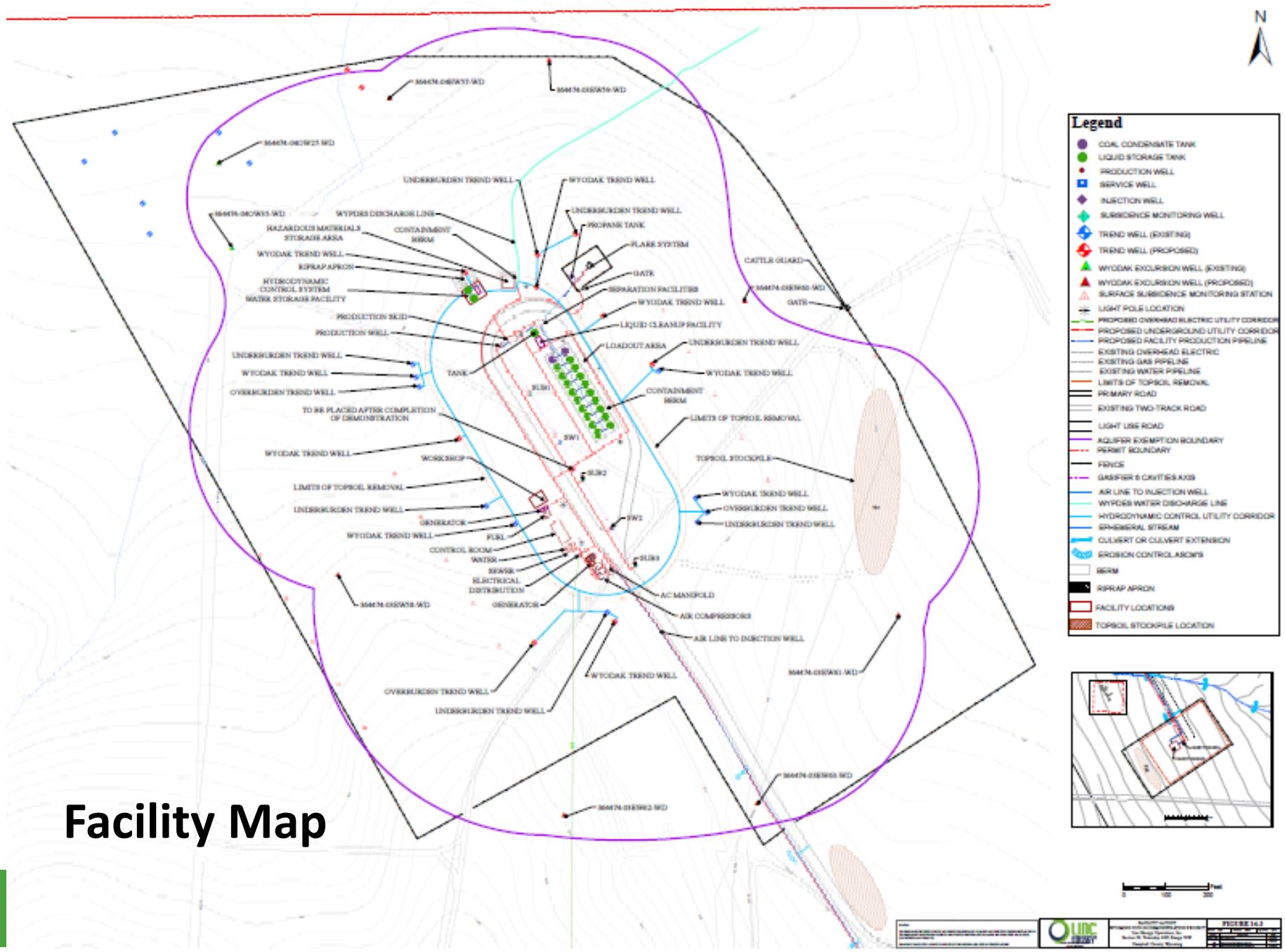
Permit Area = 640ac.
Project Area = 105ac.
Aquifer Exemption Area = 80ac.

<u>Wells Drilled</u>

- Baseline groundwater wells
  - Shallow x5
  - First groundwater x5
  - Overburden x5
  - Target coal x5
  - Underburden x5
- Core wells x4
- Pump tests observation wells x12
- Trend & Excursion wells x35 (proposed)

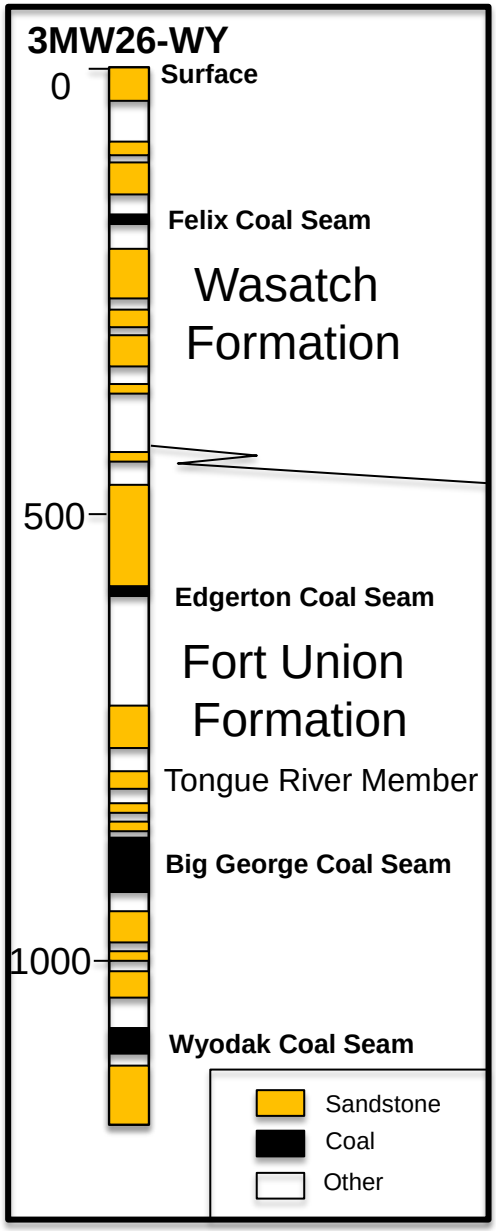
<u>Models Constructed</u>

- Subsidence (<2mm)
- Fate & Transport
- Regional groundwater
- Local groundwater
- Surface water
- Cavity Growth

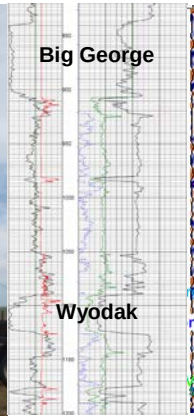


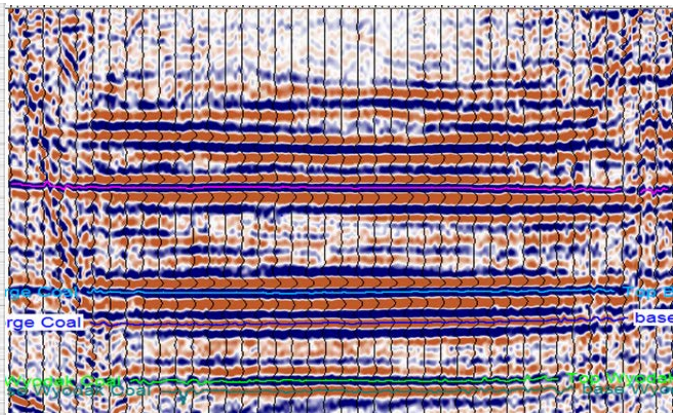
Facility Map

Gasifier 6 Site Geology Summary



- Tertiary Powder River Basin
- Simple structural geology setting
- Wasatch Formation overlies Fort Union Fm
- Wyodak Seam - Tongue River Mbr of Ft Union Fm
- Wyodak is approx. 1,060’ below land surface
- Wyodak Seam approx. 27’ thick and a Sub-bituminous coal
- Immediate burdens consist of shale, claystone & silty sandstone
- Interburden Big George/Wyodak about 150 feet
- No faulting has been identified, about 1^{O} dip
- Site characterized by drilling, testing & geophysics
- Shale, claystone & silty sandstone with self-sealing properties overlying the coal
- Good overburden & underburden strength





Criteria for exempted aquifers

- Exploration and oil & gas development drilling has proven that commercial deposits of coal exist within the Aquifer Exemption and R&D License Application areas.

- A groundwater of the State found closely associated with commercial deposits of minerals (coal) is a Class V Groundwater of the State (Mineral Commercial) per WQRR Ch VIII, Sec 4(d)(viii). A discharge into a Class V (Mineral Commercial) Groundwater of the State shall be for the purpose of mineral production.

- Linc Energy considers the Demonstration to be the initial commercial phase of the UCG project. Up to approximately 2,020 tons of coal is planned to be gasified in the Aquifer Exemption Area which is located within the R&D License Application area that contains 103,392,000 tons of coal (Goolsby, Finley & Associates, 2011). Coal tonnages within nearby Linc Energy holdings can potentially justify a major commercial facility.

- The UCG Demonstration project was requested by the DEQ to provide proof of Linc Energy's commercial UCG technology. The Aquifer Exemption area is planned to host a Class III injection well operation that would penetrate minerals (coal) of sufficient quantity to be commercially producible by Linc Energy's UCG process.

History of UCG in USA and Wyoming

A History of UCG in the USA

- Total of 33 trials in the USA
- 17 of these trials in Wyoming (1975-1995)
- First UCG trial in USA in 1946-1947 by the Bureau of Mines and the Alabama Power Company
- Many successful ventures and some unsuccessful ventures
- In 1980's, UCG was considered ready for commercialization, 1990's curtailed that with low gas prices

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Summary of US UCG Trials

UCG Trial Name	Year	Duration (days)	Quality (BTU/scf)	Dry Gas Production (10^6 scf/day)	Coal Gasified (tons)
Hanna I	1973/74	180	126	1.6	4000
Hanna II-I	1975	38	152	1.7	1260
Hanna II-II	1975	25	175	8.5	2520
Hanna II-III	1976	38	138	12.0	4200
Hanna III	1977	38	130	10.0	2850
Hanna IV	1977/79	24	133	8.3	1500
Hoe Creek I	1976	11	102	1.2	129
Hoe Creek II	1977	58	108	3.3	2480
Hoe Creek III	1979	47	217 (oxygen)	3.4	3950
Easterwood	1977	1	35-114	0.3	2
Rocky Hill	1978	60	200	4.7	3600
Tennessee Colony	1978/79	197	81	2.5	-
		10	230 (oxygen)	1.0	212
Pricetown I	1979	12	127	3.4	350
Rawlins I	1979	30	150	3.8	1020
		5	250 (oxygen)	3.4	200
Rawlins II	1981	65	350 (oxygen)	7-12	8600
Tono Basin	1982	20	-	-	140
	1983	28	255	-	2000
Rocky Mountain I (ELW)	1986/88	57	261	-	4443
(CRIP)		93	287	-	11227

Courtesy; GasTech, Inc. 2007

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Hoe Creek UCG Summary

Test	HC I	HC II	HC III
Well Spacing	10m	18m	40m
Linking Method	Explosive Fracturing	Reverse Combustion	Drilled Link
Feed Gas	Air	Air	O2 Steam
Gas loss	7%	20%	14%
Days	11	48	54
Coal Gasified	130t	2300t	4200t
Chimneying Subsidence	No	Yes	Yes

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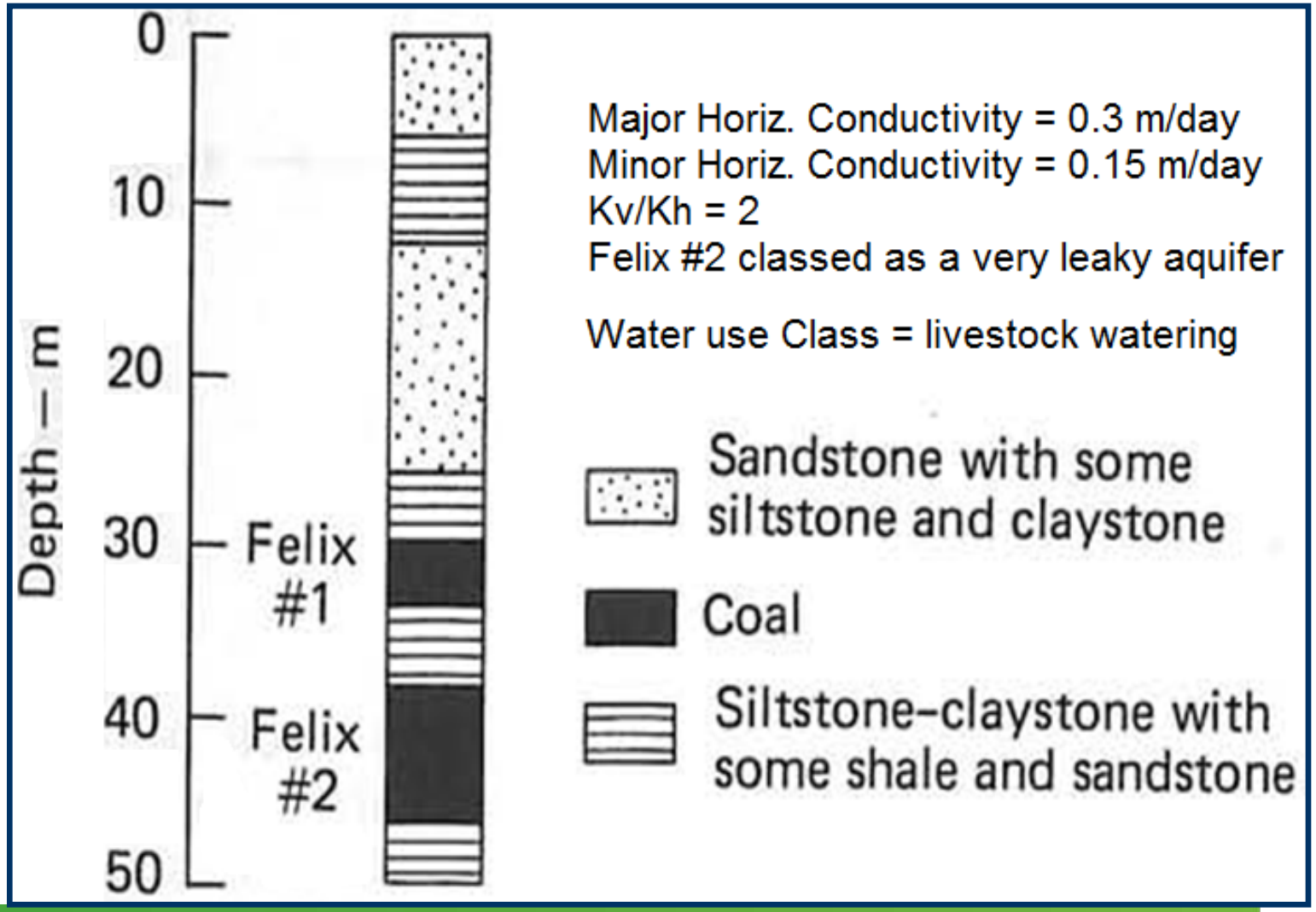
Hoe Creek hydrogeology



Source: 9th UCG Symposium, Snoeberger, et. al

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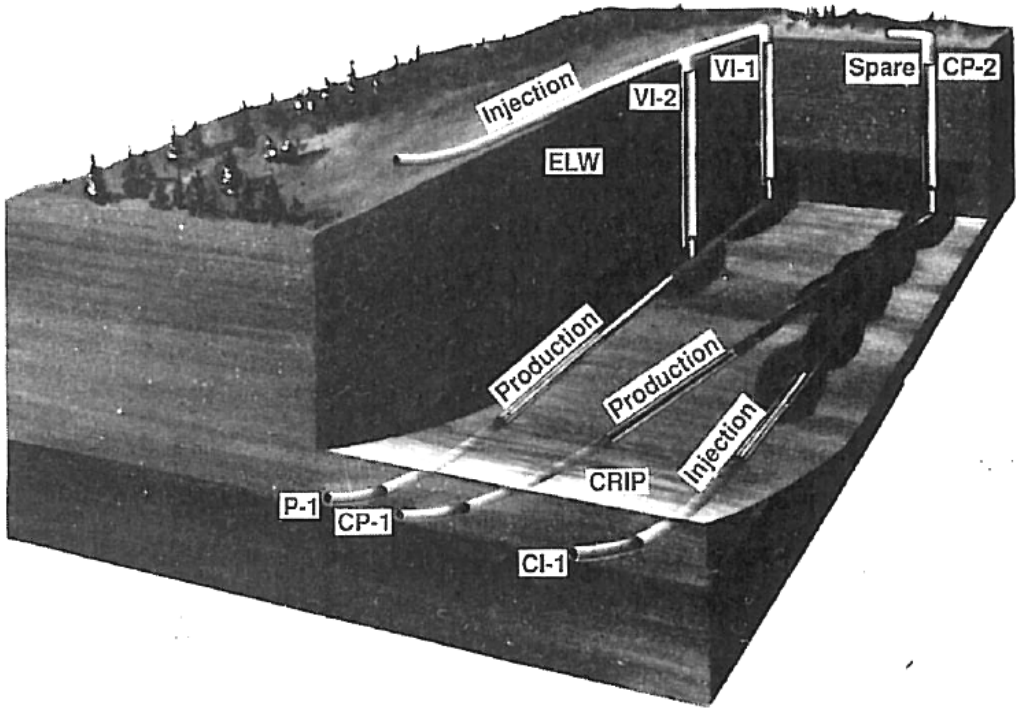
What have we learned from Hoe Creek UCG Trials?

- UCG site selection is critical
- Don’t use high explosives to fracture coal
- Over pressurizing gasifier can lead to environmental impact.
- Target deep coals with sufficient interburden separating coals
- Target coals of sufficient depth
- It is easier and less expensive to prevent environmental impact than to remediate.

Rocky Mountain I

- The most successful US UCG trial to date
- Good site selection
- Demonstrated CRIP gasifier alongside a ELW gasifier simultaneously.
- Demonstrated Clean Cavern Concept
- Full environmental compliance.



Linc Energy Operations

- Global leader in UCG operations
- Proven UCG technology
- 90 -120 day UCG operations for Gasifier 6
- Robust site characterization program
- Adhered to proven site selection criteria
- 14 years of sustained UCG operations with environmental compliance
- Linc Energy has taken key learnings from past UCG trials and improved upon the successes by applying sound engineering and best management practices.