The Evolution of Drilling Techniques at the Camden Gas Project

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Camden Gas Project Status

- AGL acquired operatorship from Sydney Gas February 2006
- 106 production wells drilled since 02/99, of which 71 producing (9 deviated, 4 SIS, 93 vertical)
- PPL 5 granted 27th February 2007
- Completed 82km 2D Mini-SOSIE seismic program late 2006
- 3 compressors now installed at Rosalind Park Gas Plant
- Currently producing ~14.5TJ/day, ramping up to 20 TJ/day by year end
- Evaluating potential of tight conventional gas sandstones
- Second campaign of SIS pilots to spud 07/07
- Current 17 well frac program with BJ services

Current Project Constraints

- Surface
  - Land Access & Regulatory Approvals
  - Encroaching & existing developments
  - Noise & light emitted during 24hr operations

- Sub-surface
  - Bulli seam split
  - Relatively untested Balgownie production potential
  - EM steering tools : Signal strength diffusion
  - Data control for inaccessible areas

Reservoir Characterisation

- Full field geostatistical analysis and production history matching undertaken in 2006 for the Bulli seam wells
- 3 sub economic reservoir provinces identified and classified based upon key reservoir characteristics and production
  - Under saturated coal ($<11 m^3/t$ indicated by $>1\%$ ethane)
  - Lower effective permeability coal (lower kh relationship)
  - Lower kh & under saturated coal (combination)
- Remaining acreage identified as priority drilling until production can be proven within sub economic provinces
- SIS drilling proposed as most likely completion method

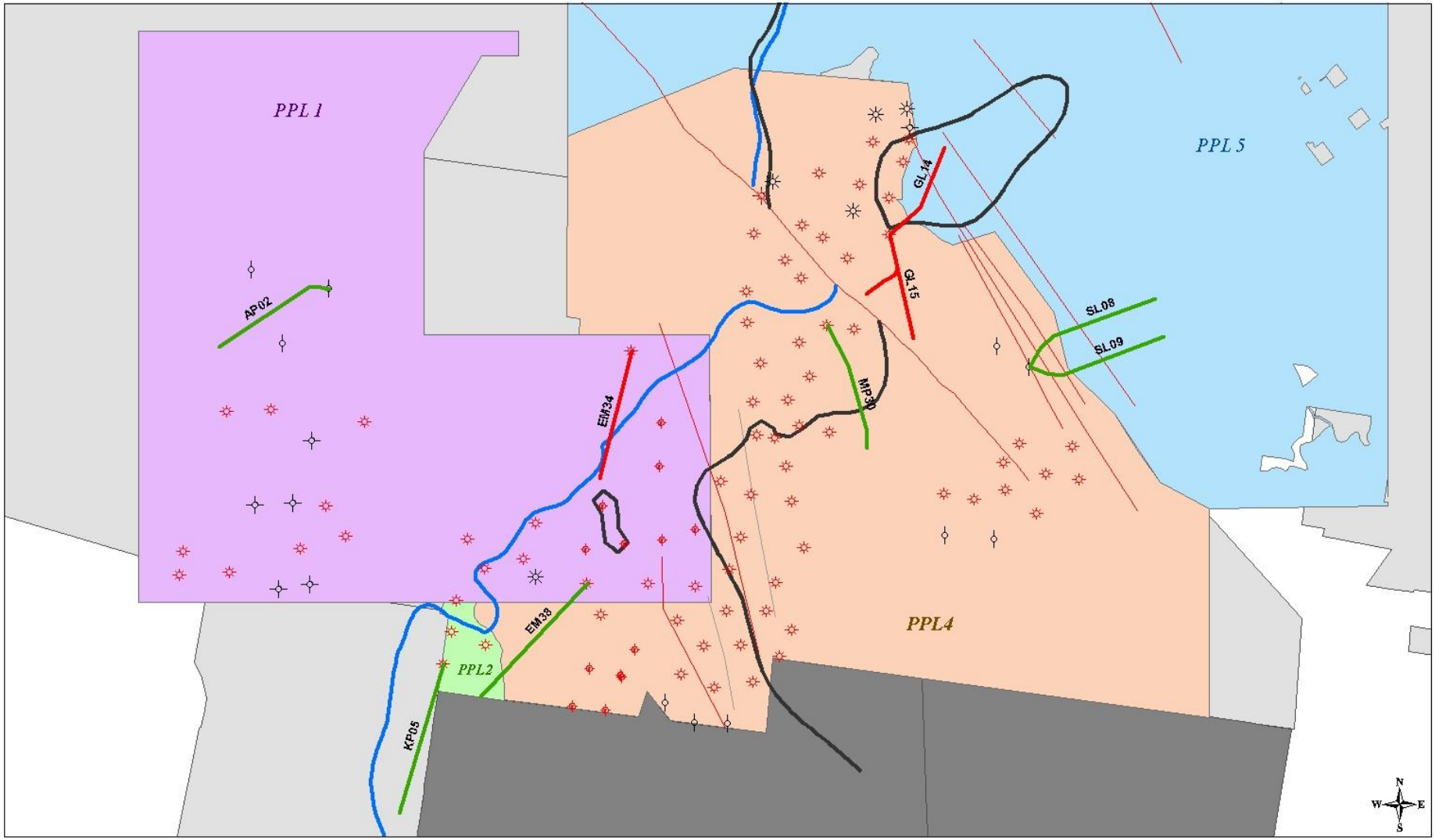
to achieve the greatest reservoir coverage and establishing economic production from within these provinces

SIS Pilot Program

- EM21/22 trial SIS well online for ~3½ years
  - Producing only marginally more than offset verticals
  - Final well geometry deemed unfavourable (spoon & dome)
  - Geologically unfavourable location
  - Barefoot completion maintaining stable wellbore conditions

- A 9 well pilot program was proposed to further test the horizontal production potential of the Bulli seam

- Initially, one well offset from a proposed horizontal Bulli completion will be drilled to test the Balgownie seam production potential



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DATE: 13/06/07

REFERENCE: 1496

SCALE: 1:50,000

SIS Pilot Well Locations

0 500 1,000 2,000 3,000 4,000 Meters

Legend

AGL Camden Wells

- SUSPENDED
- DRILLED
- P & A
- PRODUCING
- BH LOC

- Bulli Ethane (1%)
- Balgownie Ethane (1%)

CAV06 Major Structure

- Fault Cut
- Disturbed Zone
- Colliery Holding
- Coal Exploration Licence

SIS Pilot Program – initial trials

- Three wells of the pilot program have been successfully completed to date

GL14

- 25 days drilling
- 1994m TD
- Slotted PVC liner run
- No sump drilled

GL15

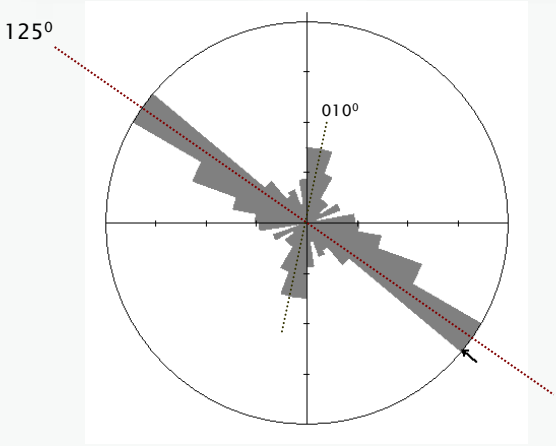
- 29 days drilling
- 2031m TD (main)
- 1634m TD (sidetrack)
- Barefoot completion
- Sump drilled

EM34

- 30 days drilling
- 1965m TD
- Barefoot completion
- Sump drilled

SIS Pilot Program
– initial trials

- GL14 & GL15 drilled based upon
  - optimal reservoir and geological conditions
  - highest average offset vertical production
- EM34 based upon
  - need to test higher risk well location
  - no proximal offset production

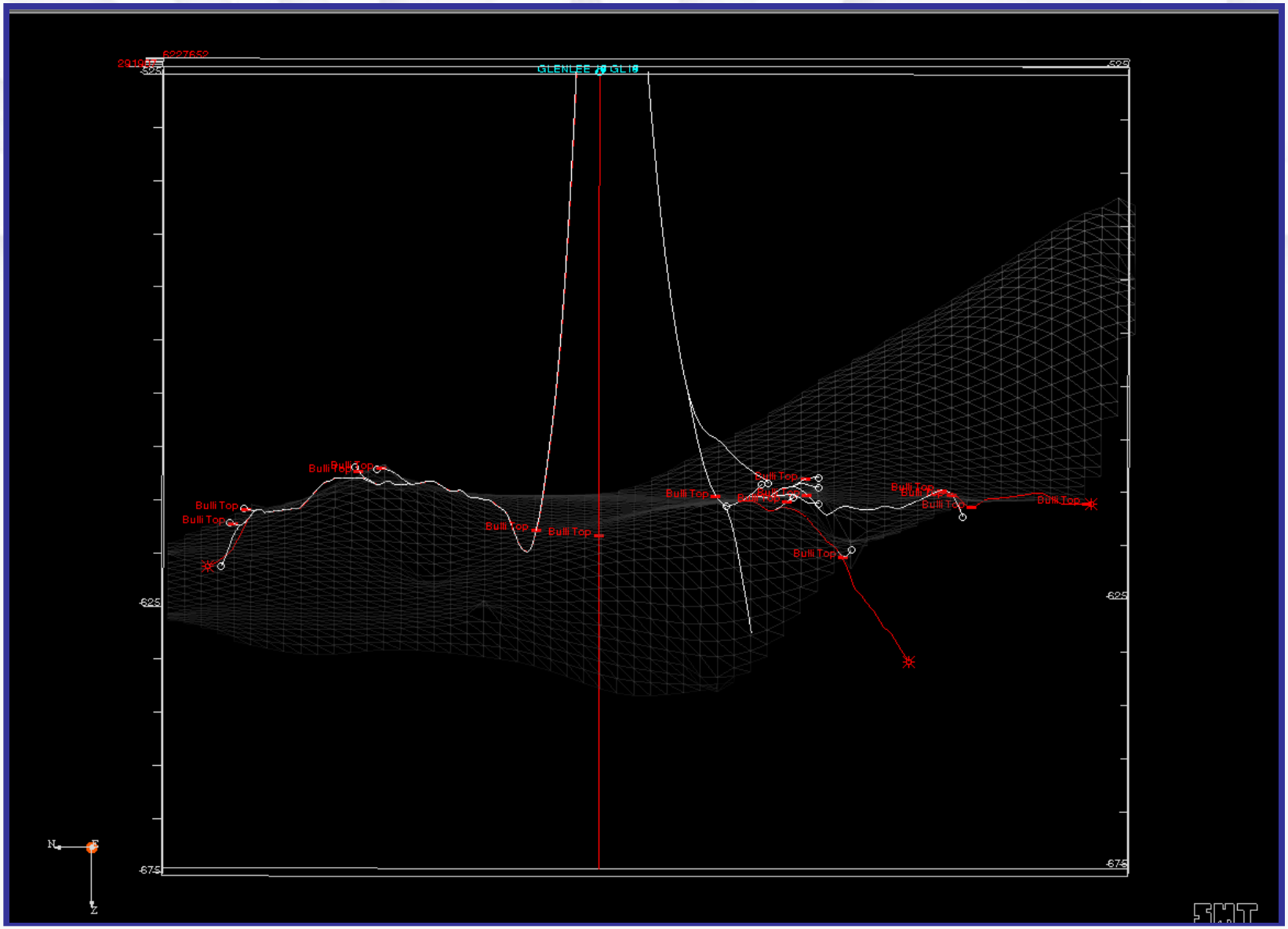


Glenlee Field Dominant Fracture Orientations

- Well paths oriented ~50⁰ orthogonal to face cleat & fractures
  - intersecting maximum number of cleat & fractures whilst maintaining well bore stability
  - drilling up dip or slightly up dip eliminating the need for a vertical intersect well. Water production is historically very low

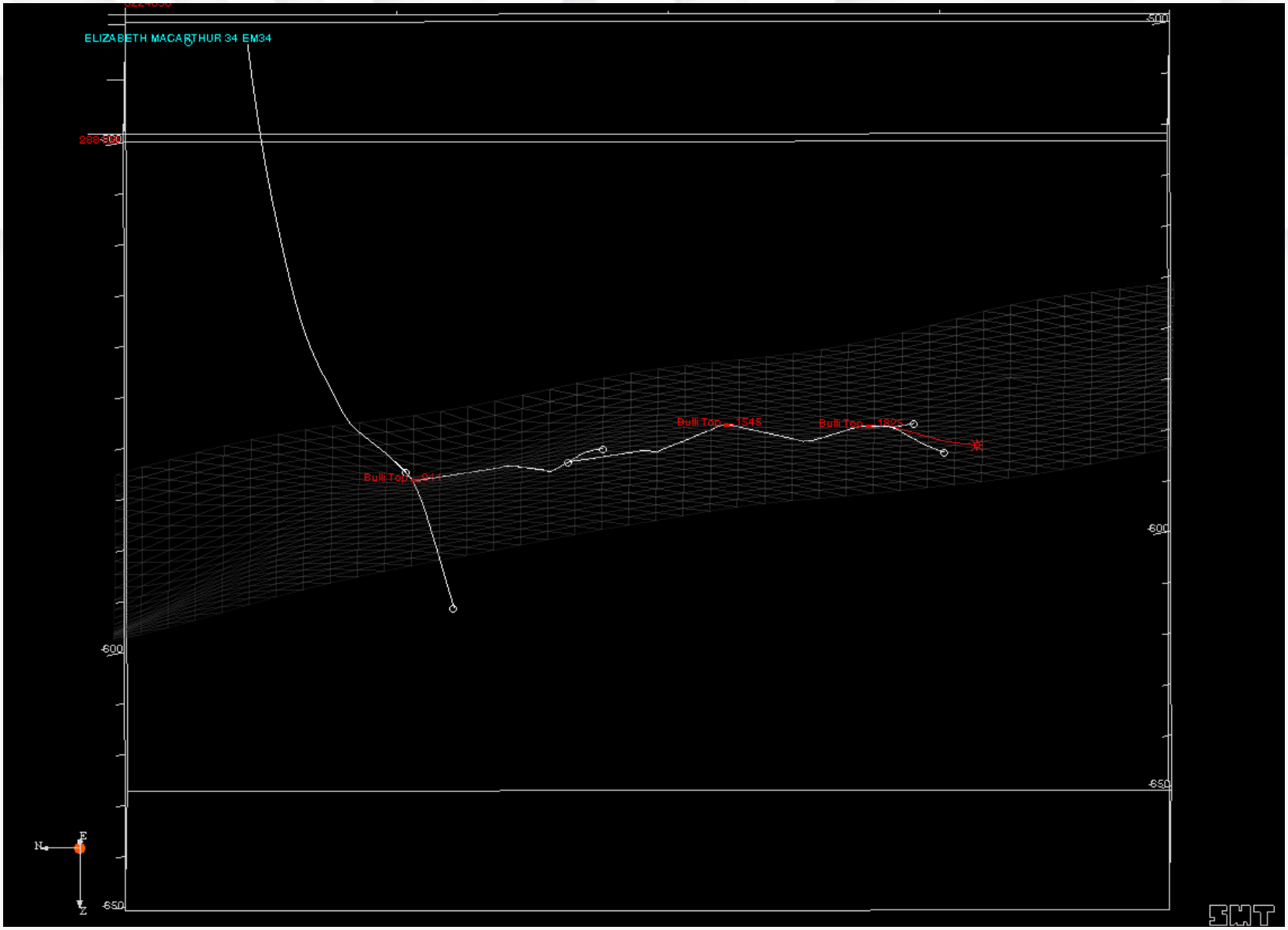
GL14 & GL15 Well Paths

VE = 1:18



EM34 Well Path

VE = 1:12



Results To Date

- GL14
  - Initial completion failed & required early workover
  - Early production signs excellent
    - Spikes over 2.1 MMcfd (688 L/s)
    - Now steadily increasing from 0 – 700 Mcfd (0 – 229 L/s)
    - Water production via a velocity string
- GL15
  - High losses to formation upon drilling
  - Still producing relatively high amounts of water via velocity string
  - Steady production increase now over 1.2 MMcfd (393 L/s) and climbing
- EM34
  - Under saturated province boundary closer than anticipated
  - Well currently cleaning up, not expected to see production rates in excess of 500 Mcfd (163 L/s)

AGL Drilling
Current Applications & Methods

- Under-balanced air drilling vertical wells
- Over-balanced mud drilling deviated wells
- Over-balanced, long radius surface to inseam (SIS) horizontal wells
- CBM & tight conventional gas exploration
- Tight radius drilling (TRD) trials- Moranbah field

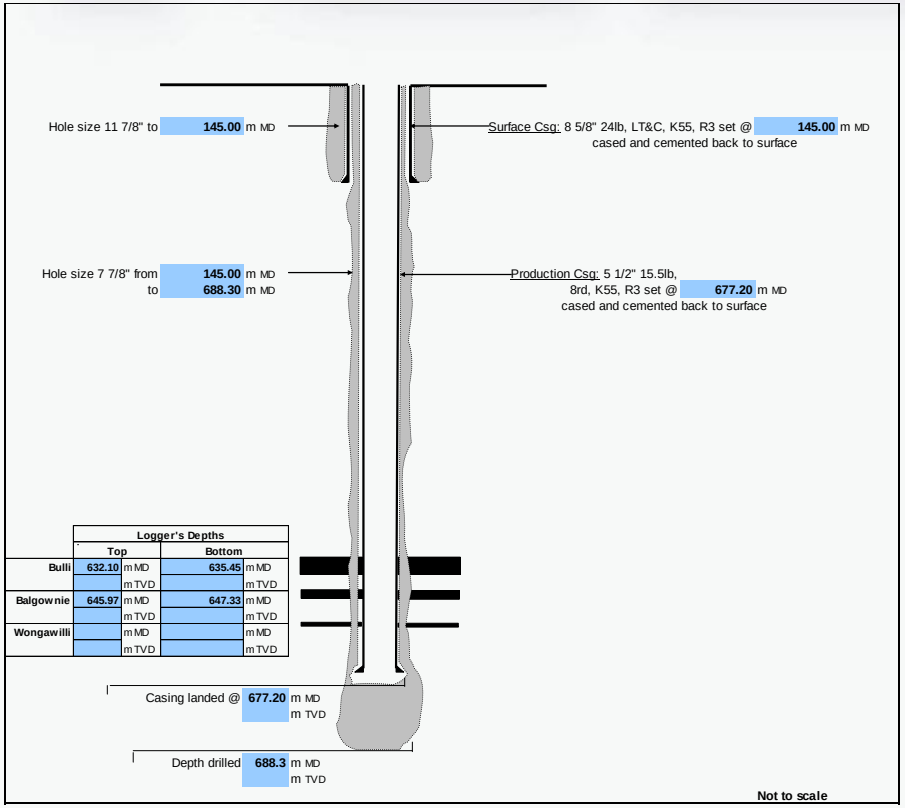
MCDD Rig28

MCDD Rig15

MCDD Rig16

Vertical Air Drilled Well Profile

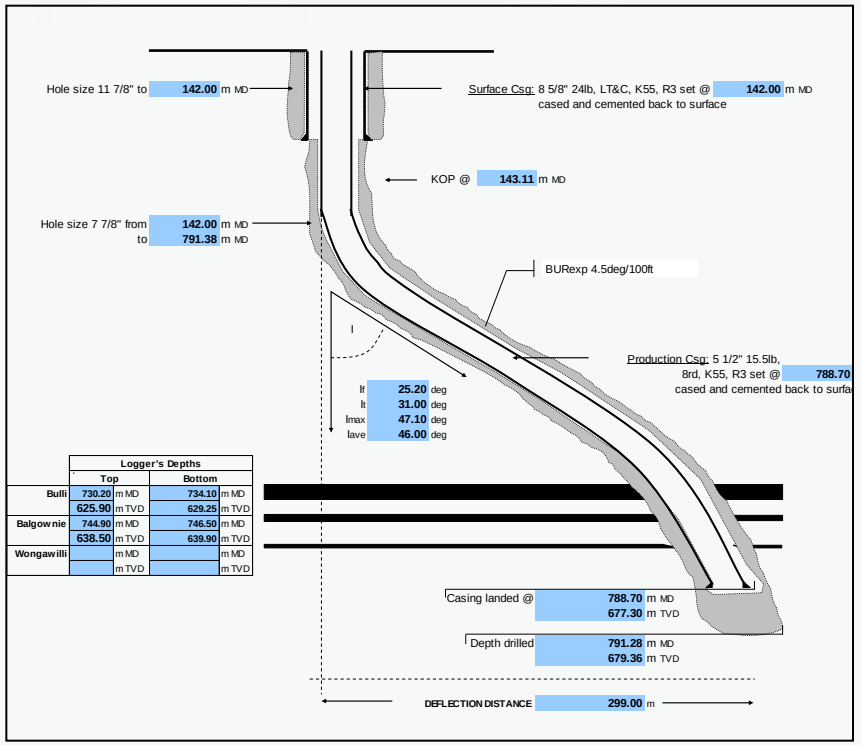
- Rig 15# assigned well type and drilling method
- Drill 15” conductor hole to 10m
- Air drill 11 7/8” Hole to 140m
- Install & cement 8 5/8” surface casing
- Air drill 7 7/8” Hole to +700m
- Install & cement 5 ½” production casing
- Allow drift of no greater than 3 degrees verticality



Vertical Well Schematic

Deviated Mud Drilled Well Profile

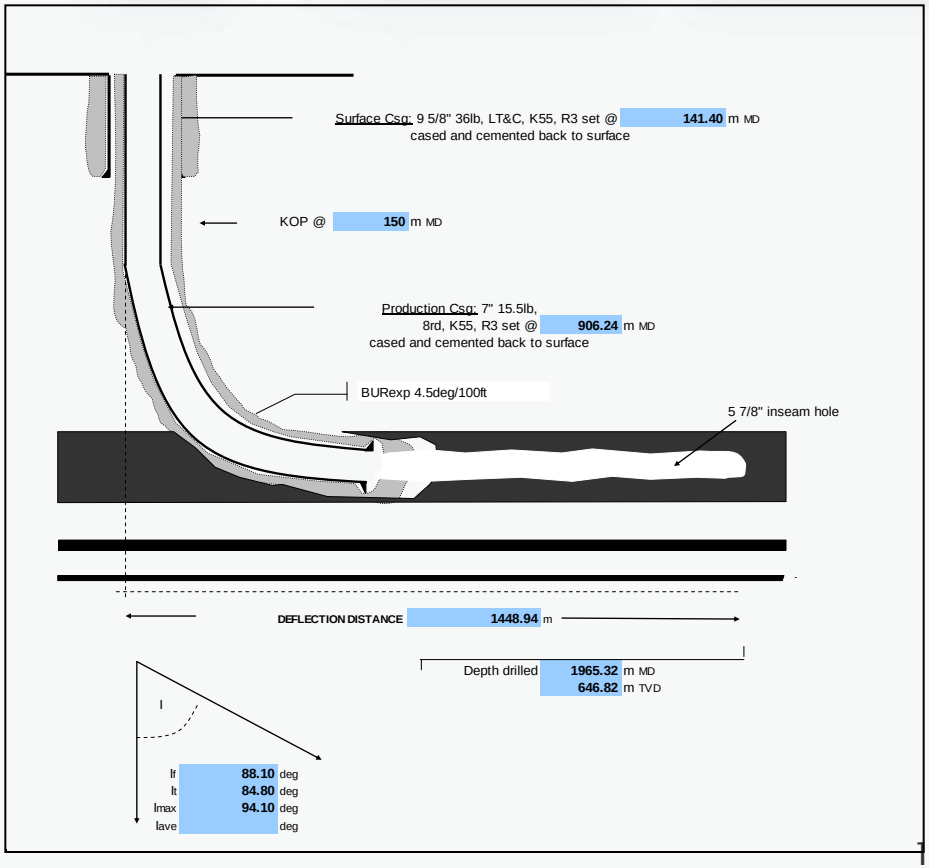
- Batch drill surface hole with air (Rig #15)
- Install 8 5/8” surface casing to 100m
- Rig up circulating system Rig #16 and drilling assembly
- Drill deviated hole at 4.5 degrees/100ft build rates
- Drill 7 7/8” bit to build and hold / build, hold and drop well paths
- Deflection distance from hole centre ~400m
- 30-45hrs of actual drilling time for deviated section
- Using continual electro-magnetic (EM) steering systems



Deviated Well Schematic

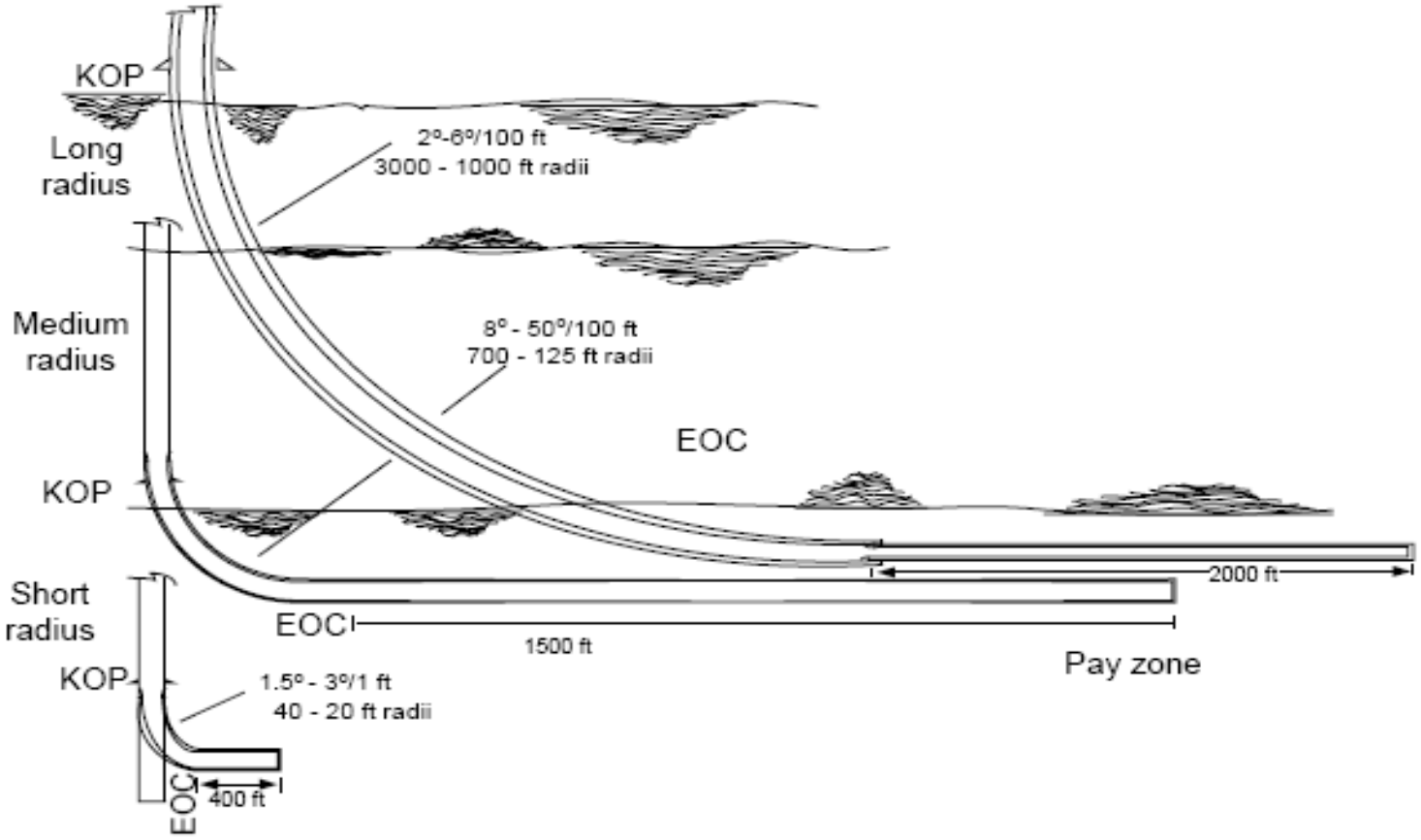
SIS Horizontal Well Profile

- 12 ¼” surface hole to 100m cased & cemented 9 5/8” casing
- 8 ½” intermediate hole deviated to ~85 degree inclination
- Cased & cemented with 7” casing after tagging top of target seam
- 5 7/8 ” hole horizontally through target seam +1500m
- Total +2300m MD



SIS Well Schematic

Long, Medium & Tight Radius Well Paths



Future Drilling Methods
Applications & Constraints

- Multi-lateral and multi-seam wells
  - accessing Bulli & Balgownie seams utilising the same build section
  - reduced incremental costs
- Medium radius drilling with coil tubing
- Batch drilling multiple wells on single sites
- 24hr/7 day operations to support quality drilling contractors
- Sound levels and lighting requirements
- Fully automated drilling improves safety & reduces risks
- Continual monitored gas sampling including QED making
- Site access and approval for long term planning requirements

Future Drilling Methods
Considerations

- Wells drilled: reducing $ spent / days drilling / returns generated
- Equipment levels, training proficiencies, skill sets
- Down hole data acquisition while drilling
- Logging while tripping
- Closed loop circulating systems, solid control systems
- Low filtrate, low intrusive mud types, homogenous
- Chemically enhanced well stimulation trials at end of drilling
- Data management, data acquisition via digital Geolograph
- Satellite uploaded real time drilling parameters to all users
- Rig viability with 24hr 7 day/week operation induces critical mass

Implications for Successful Trials of SIS Drilling Technology

- Significantly reduce well density & overall footprint
  - alleviate up to 4 vertical surface locations per SIS drilled
  - multiple SIS from single well pad
  - access roads and gathering network less complicated
  - environmental impact minimised
- Access to stranded resource
  - considerable addition to booked reserves
- Effective resource management
  - multi-seam production
  - sub economic provinces, may include fracture stimulation
- Refined operational practise
  - drill fluid reclamation, flocculation, recycling
  - drill fluid programs to support environmental considerations as well as petrophysical constraints
  - drill cutting segregation and solid control systems

ADR- Super Single
ENSIGN AUSTRALIA

Semi-Conventional Coiled Tubing Rig