The Argyle Diamond Deposit

Current Status and Where's the Next One?

Grant Boxer

Consultant Geologist

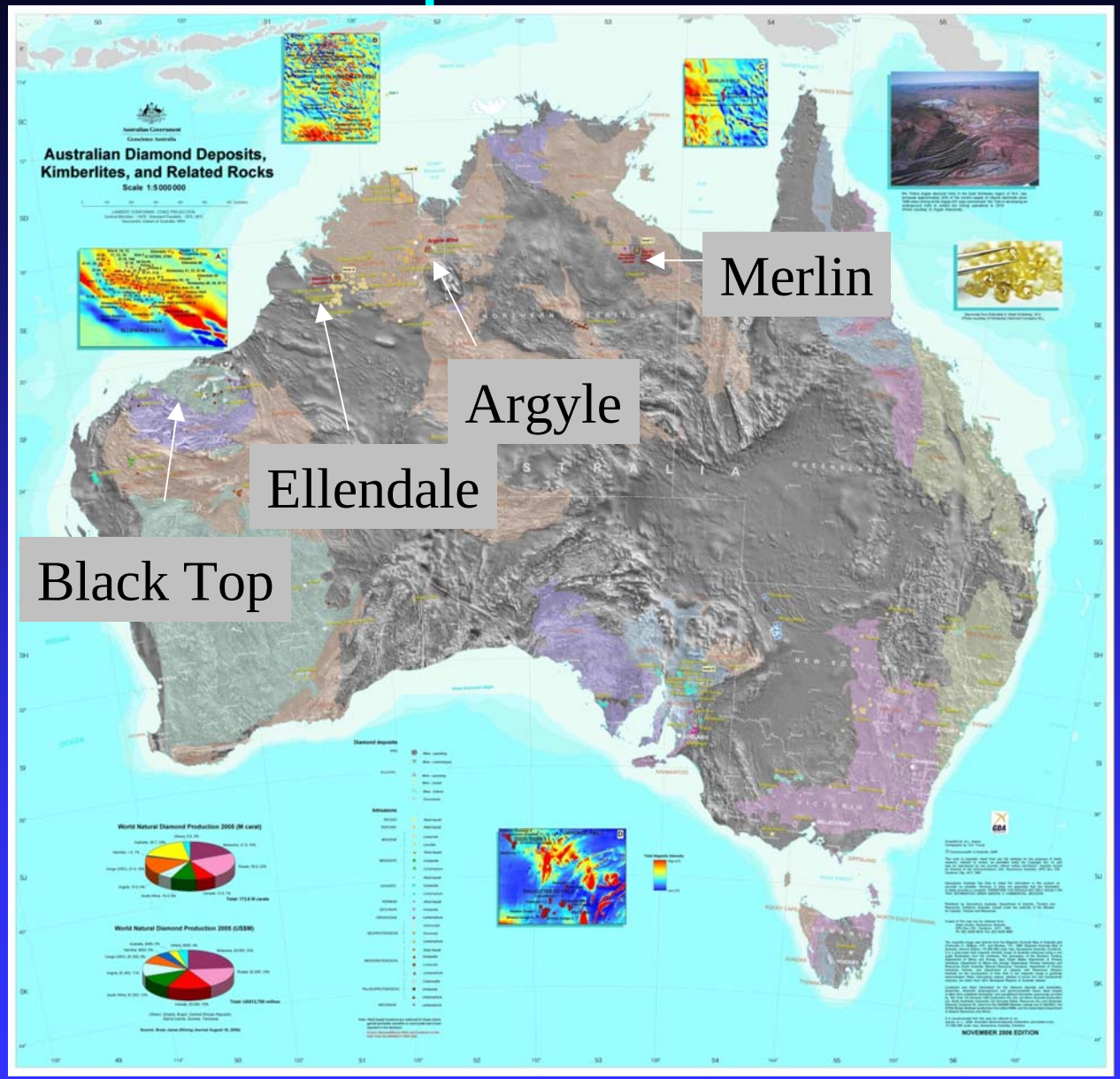
June 11th 2007

Outline

- Discovery
- Geology
- Resources
- Open Pit Mining
- Underground Development
- Discovery Factors
- Where is AK2?

Acknowledge assistance of Ian Bell, Mike Erickson, Murray Raynor and Chris Smith (Argyle Diamonds and Rio Tinto)

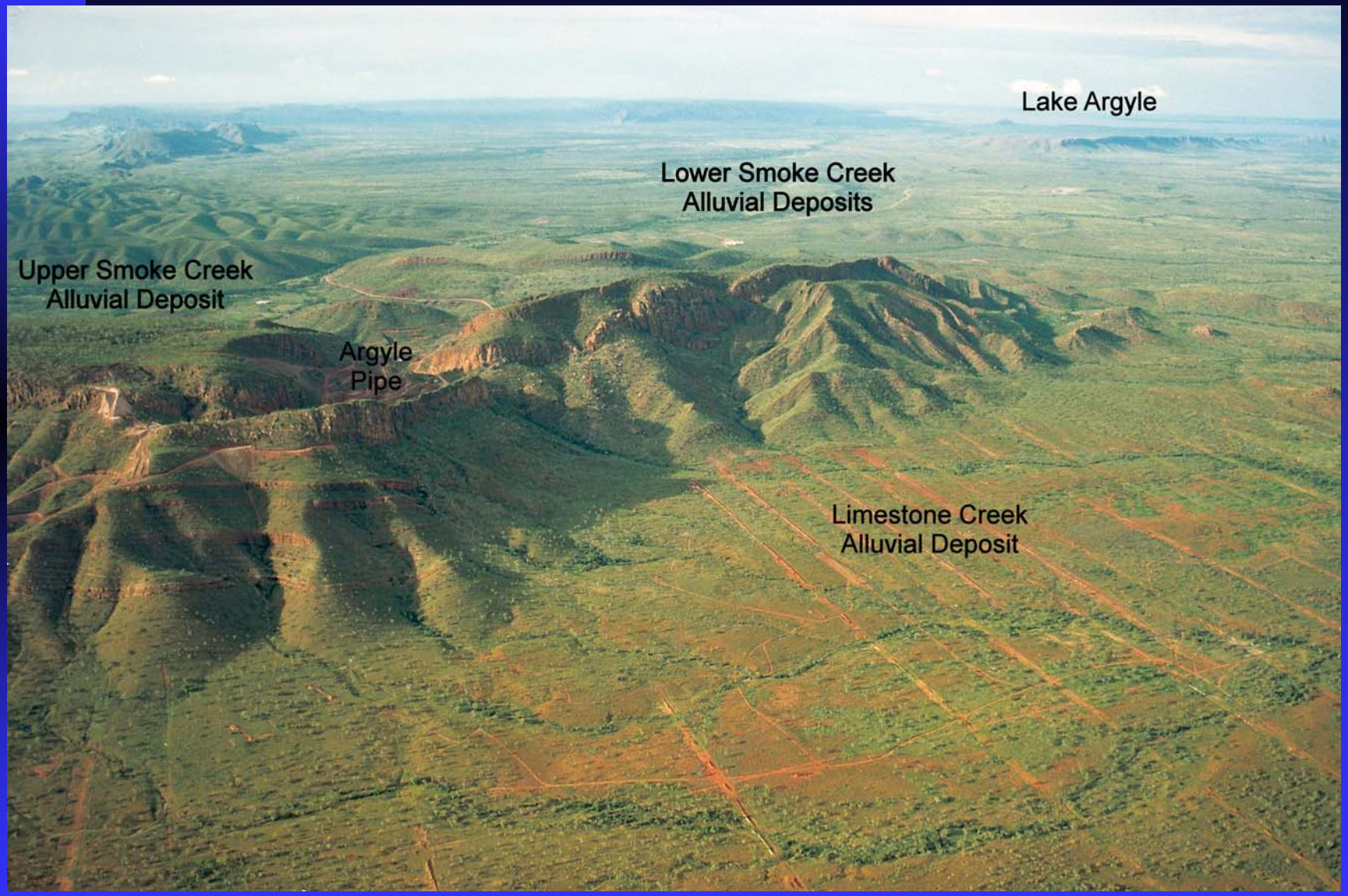
Location Map



Discovery & Evaluation

- Regional sampling program for KIM
- 2 samples contained diamonds
- Follow-Up Discovered AK1 pipe in Oct 79
- Adjacent alluvial deposits recognised
- Feasibility Study 1982 – 83
- Ministerial approval November 1983
- Production began late 1985

Argyle Area


Lake Argyle
Lower Smoke Creek
Alluvial Deposits
Upper Smoke Creek
Alluvial Deposit
Argyle
Pipe
Limestone Creek
Alluvial Deposit

World Class Resource

- 1982 – Proven Reserves of 61 Mt at 6.8 ct/t @ US$6.50/ct (5% Gem, 40 % Near Gem, 55% Industrial).
- Reserves Dec 2006 – 105.9 Mt at 2.1 ct/t.
- Tonnes Mined to end 2006, 1 Billion t
- Ore Mined to Dec 2006, 167 Mt
- Carats Recovered to end 2006 = 681 Mcts
- Initial deposit mineralisation ~ 1 Billion cts (GB estimate)

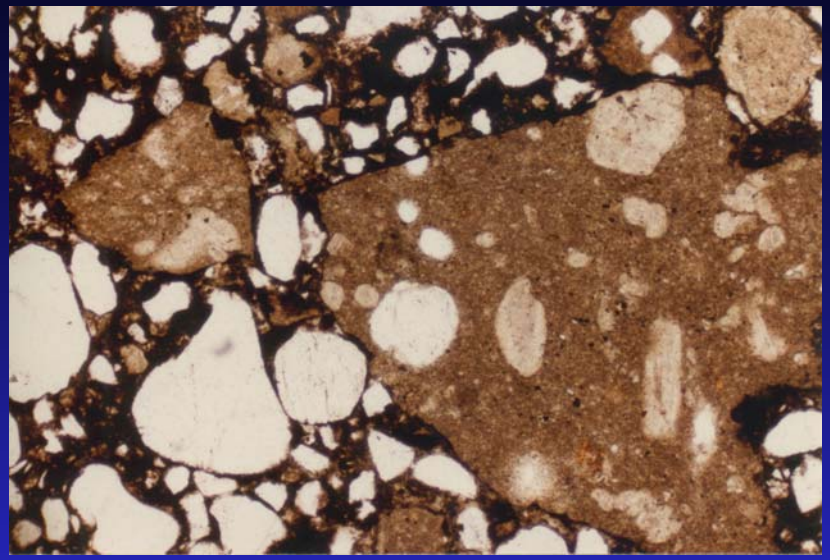
Argyle Geology

- Age 1178 Ma, Upper Mid Proterozoic.
- Volcanoclastic filled vent, 50 ha.
- Olivine lamproite tuffs and intrusives.
- Phreatomagmatic and Strombolian eruption styles.
- Probable shallow water environment.
- Water escape structures, soft sediment deformation, clastic dykes.

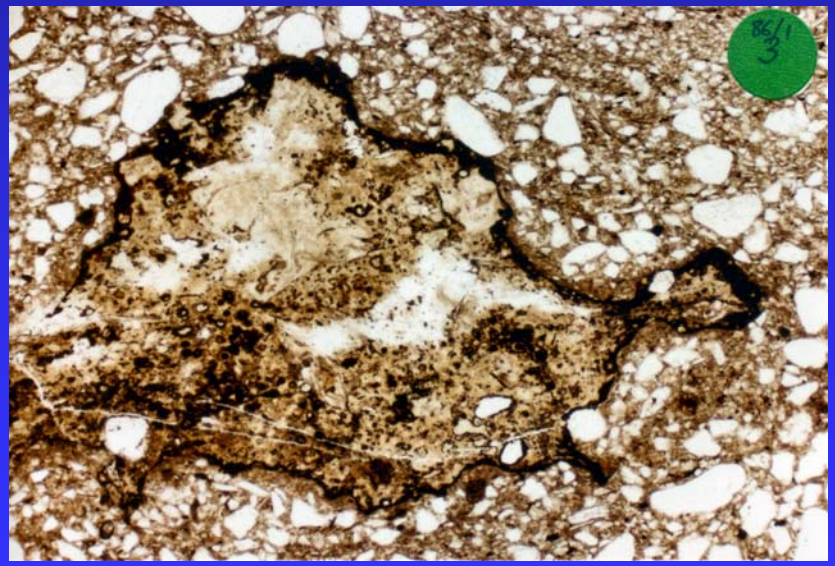
Geology

- Three Main Facies
- Quartzose lapilli ash tuff (“Sandy Tuff”)
- Lapilli ash tuff (“Non-Sandy Tuff”)
- Olivine lamproite dykes (“Magmatic dykes”)

Argyle Sandy Tuff



Blocky fine grained (chilled) clasts, typical of phreatomagmatic deposits, set in a matrix of quartz grains and ash.



Irregular “fiamme” shaped clasts, some highly vesicular, set in a matrix of quartz grains and ash.

Phreatomagmatic Features

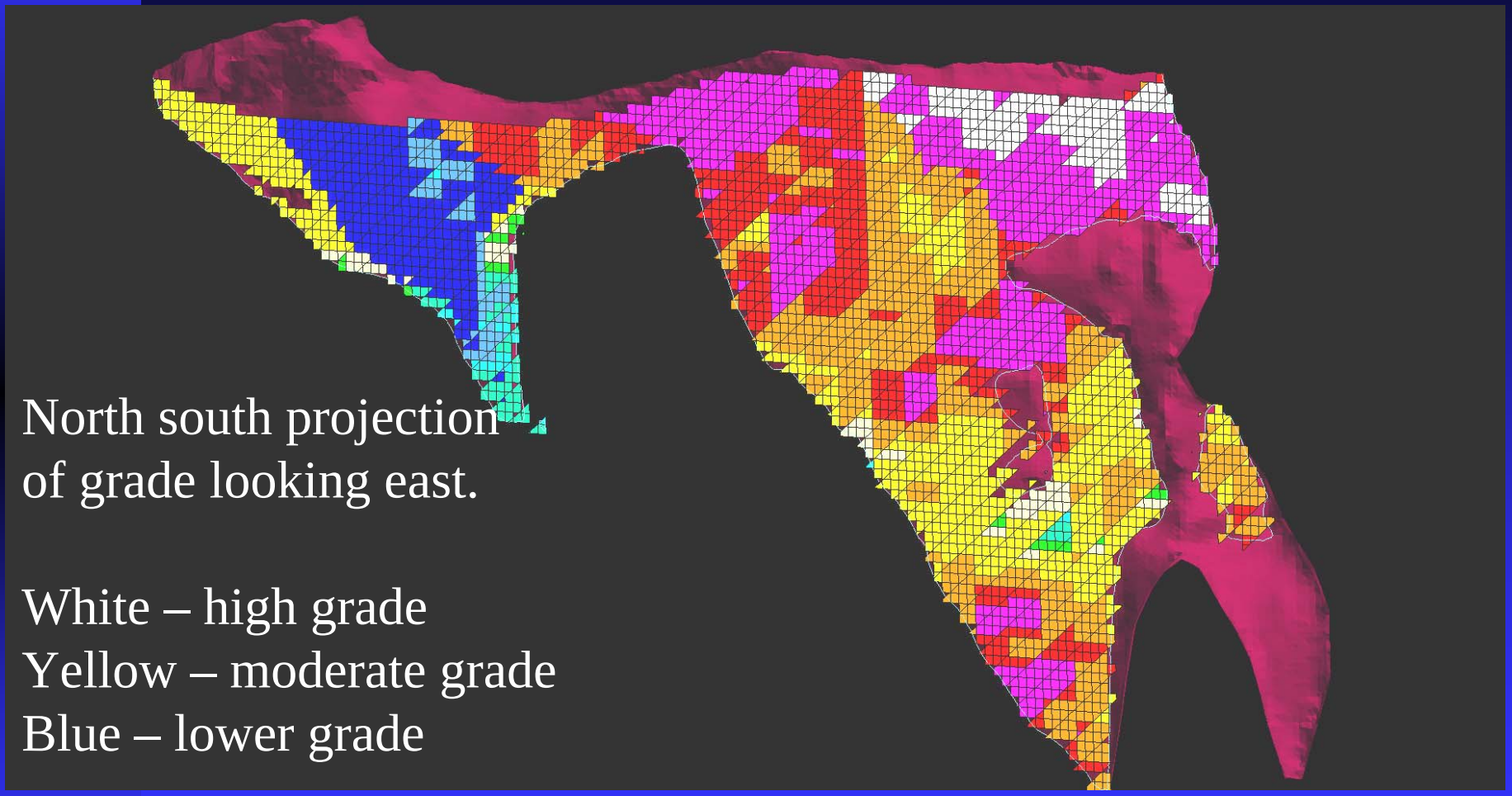
Clastic Dyke, sandstone dyke with rare volcanic fragments, cutting Sandy Tuff.

Accretionary lapilli layer in bedded Sandy Tuffs

Mineralisation

North

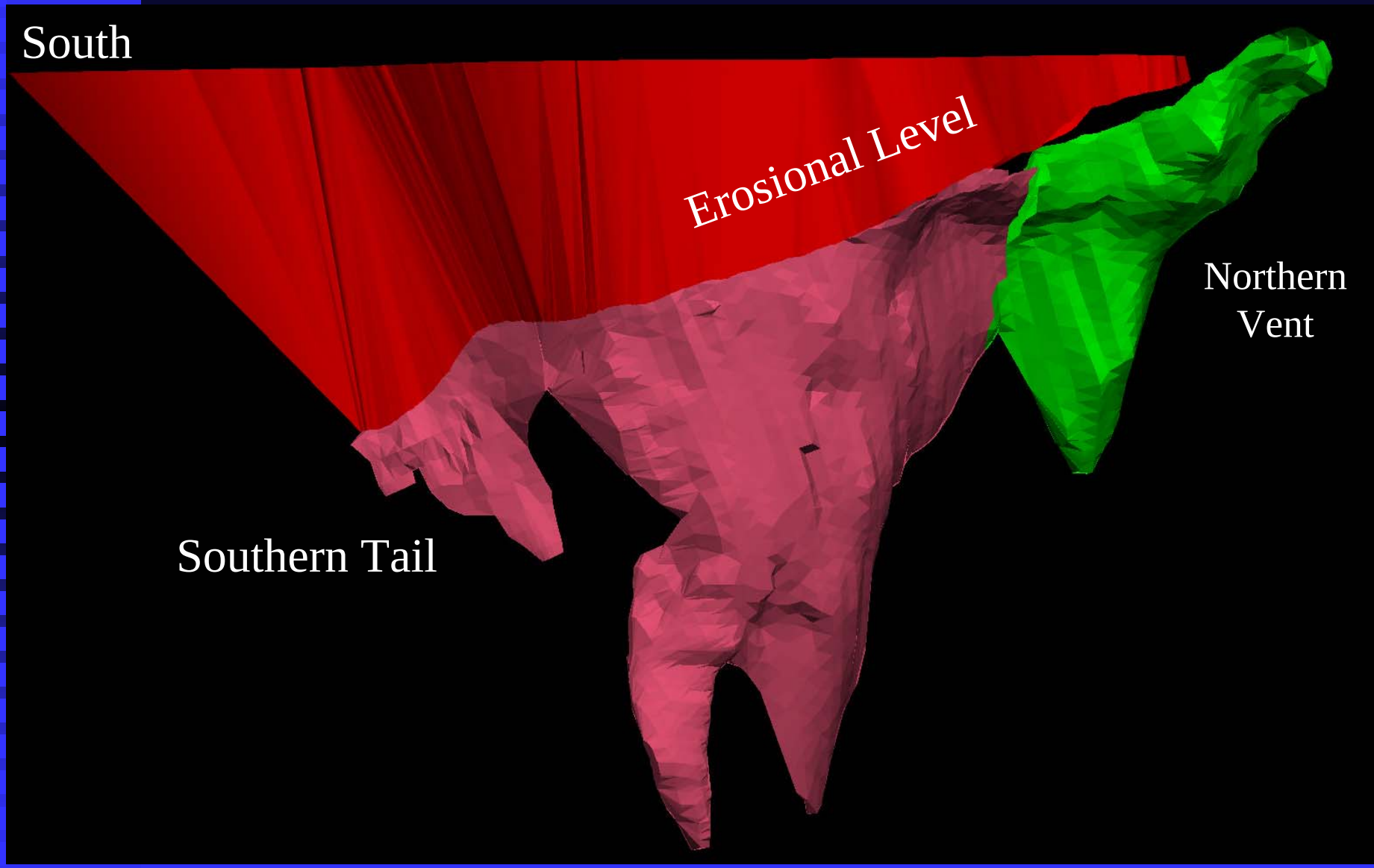
South



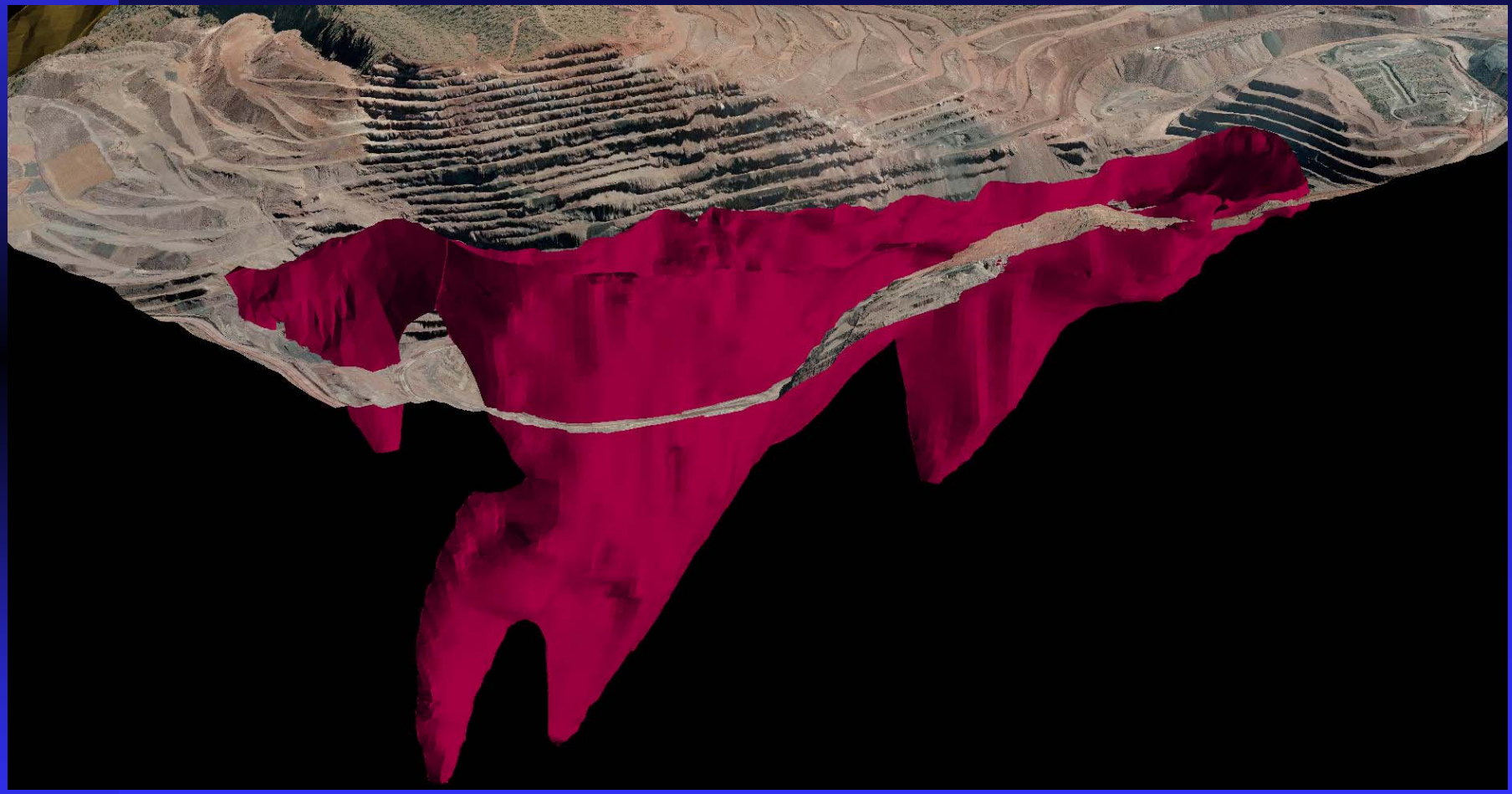
North south projection of grade looking east.

White – high grade
Yellow – moderate grade
Blue – lower grade

Argyle in 3D



Argyle Pit and AK1 Pipe



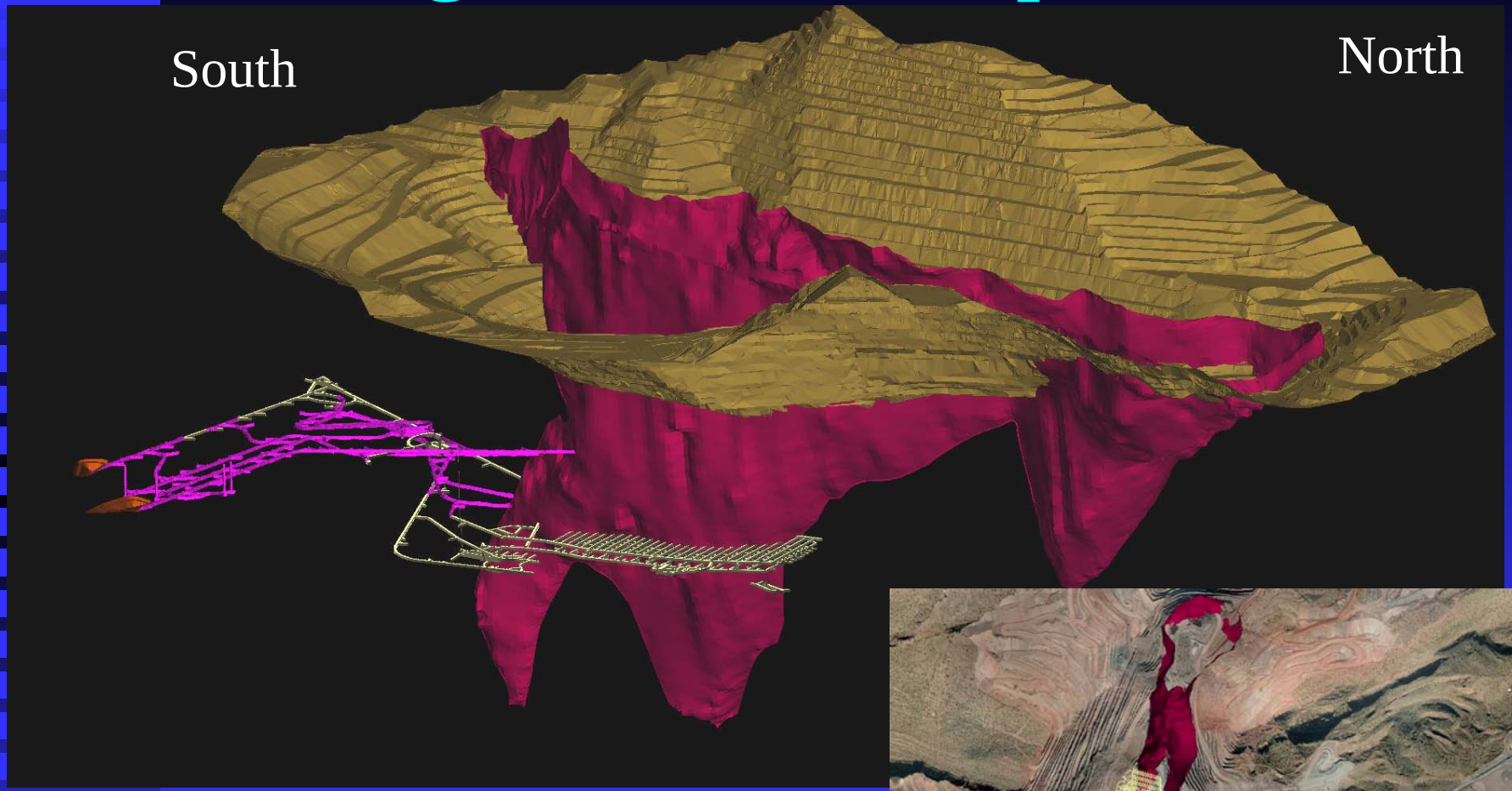
Transition to Underground

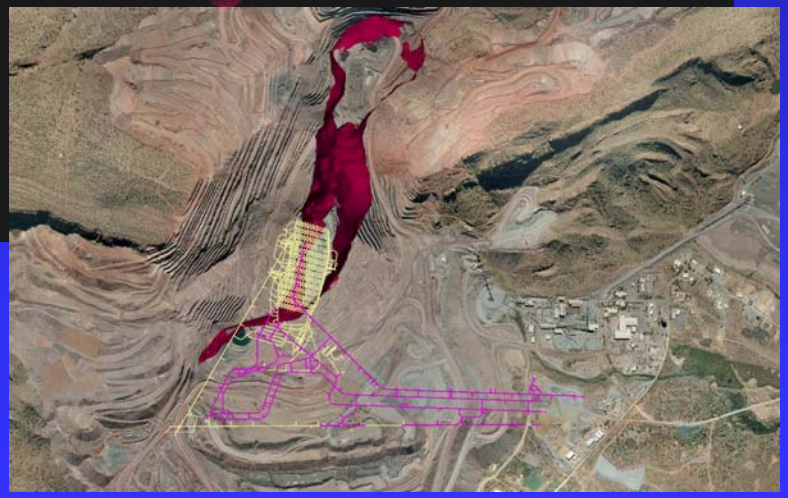
- Southern open pit closure 2008
- Full underground production in 2011.
- 13.6 km of UG development (end May 2007)
- Total development required 35 km.
- Mine life to 2018.
- Depth of block cave below pit bottom is 245 m and 480 m below the plain level.

Underground Development

South

North

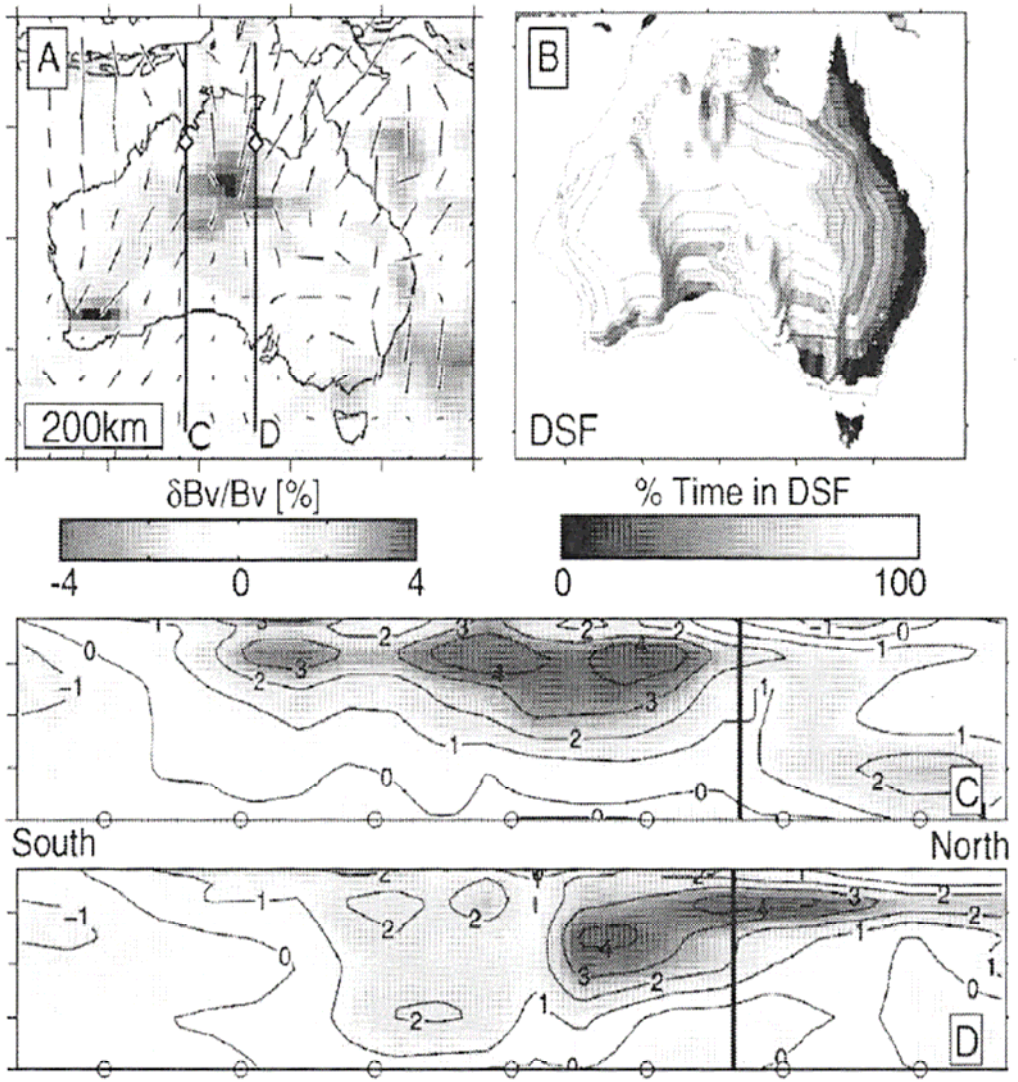




Geological Setting

- Archaean lithosphere at depth (Re-Os depletion date 2.3-3.0 Ga, Luguet et al, in press).
- Eclogitic diamonds Sm-Nd age 1580 Ma.
- Archaean Sturt Block down-thrust beneath Halls Creek Mobile Zone to west.
- Host Rocks 1200 Ma sediments.
- Intrusion age 1178 Ma.

Seismic Tomography



Discovery Factors

- Window of exposure (Lower to mid Prot)
- Large dispersion of alluvial diamonds over 350 km^2.
- High quality field sampling supervised by geologists
- Systematic coverage
- Well trained field and laboratory staff
- Good support, well funded
- Exploration model (Argyle was in low priority area!)

Where is AK2?

- Many people would like to know!
- Old cold lithosphere (seismic tomography)
- Diamond stability field (>150km depth)
- NAC diamondiferous intrusives over 1 Ga (Argyle 1200 Ma thru to Ellendale 25 Ma)
- Periodicity of diamond intrusion
- Levels of stratigraphic exposure

Geology, geology & geology

- At depth
- Near surface structure
- Geological age windows
- Surface environment
- Weathering
- Good office and geological field work!

Thank you for your attention

Let’s hope the funding is there to find another major diamond deposit in Australia!