



## Direct Hydrocarbon Mapping in the Cooper- Eromanga Basin of Australia

### Western Flank Oil Play has plenty of Distance to Run...

#### 1. The Emerging DHM and Industry Performance Pattern

Scotforth has been Direct Hydrocarbon Mapping (DHM) surveying in the Cooper-Eromanga Basin (C-E) during the past five years and has now reached a high level of DHM effectiveness across most of the region despite its arid, complex, heterogeneous landscape of salt lakes, low level dunes and ephemeral streams. It considers that **most high quality untested DHM prospects in C-E have a 70% chance of becoming discoveries.**

DHM identifies with good to excellent resolution almost all of the known fields and recent discoveries as significant spectral Hydrocarbon Lead Indicator anomalies (“HLIs”). Similarly, it observes that most dry holes and failed prospect test locations are HLI non-anomalous.

In a good number of cases DHM appears to define the gross areal extent and the high net:gross in-field sub areas of the accumulations as well as or better than 3-D seismic. Indeed, it is providing inventories of new field extension and field optimisation locations that should add to both EURs and deliverability profiles of known pools. This is quite remarkable especially in Eromanga where much of the petroleum habitat comprises subtle low relief, stratigraphic plays.

More specifically, **in the active Western Flank oil play**, DHM surveying is showing high success performance statistics. A recent “back test” review of industry drilling results versus DHM findings showed:

- **75% DHM success** on a 41 well population of **solely** new prospect tests that resulted in 23 discoveries and 18 dry holes (56% success)
- **74% DHM success** on 69 wells drilled on all **exploration wells plus the first two subsequent wells on the discoveries**
- **73% DHM success** on 129 wells drilled in all categories of wells – exploration, appraisal and development.

This suggests that **mapped new DHM prospects will have an overall success rate in this play fairway and proven petroleum habitat of at least 70%** if drilled in effective central prospect locations. Scotforth recognises numerous such untested HLI anomalies and predicts substantial petroleum resource additions from them as new discoveries, as and when drilled in the coming decade.

## 2. FIELDS

**Two field examples** illustrate such DHM results:

**1. Bauer** – the Western Flank’s largest oilfield so far – EUR probably 20+mb from an initial prospect that was considered to be just 0.75mb when first mapped. Its size and shape has migrated increasingly towards that first identified by DHM in 2011. Currently producing at 6,900 bopd it has considerable further potential. Early access to DHM might well have refined the early appraisal and production drilling campaign of the Operator.

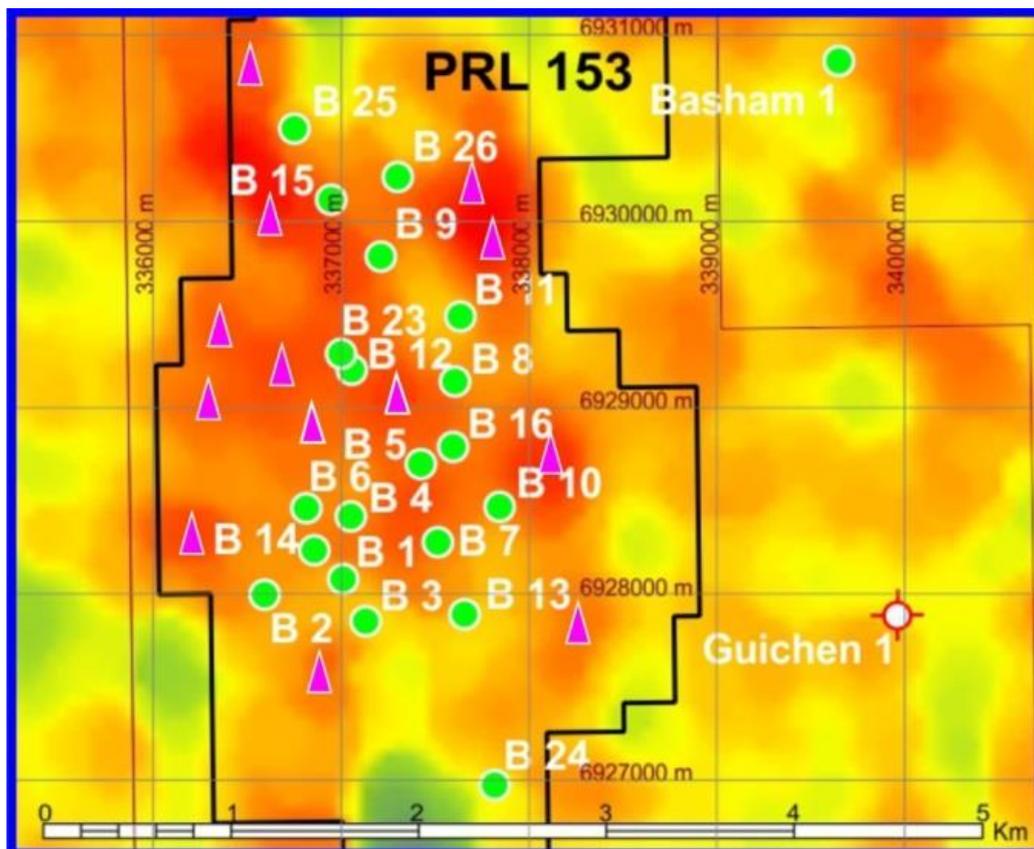


Figure 1. IPD Image display of the Bauer Oilfield.

Current wells (green circles) plus incremental / alternative possible producer locations (Magenta triangles) based on HLI / DHM observations (as at the date of discovery). Note that well B-24 in the south locates on an area of negative landscape interference in proximity to the lake margin – signal masked there.

**2. Spitfire:** A relatively compact field with expected EUR of 2+mb, with current gross production of 500 bopd, displaying clearly as an HLI in both IPD and RBU format. The Stanleys-1 and Fulcrum- 1 wells locate on a separate HLI trend to the SW whilst “show wells” Spitfire -1 and G-12 are

off-anomaly versus the main Spitfire HLI prospect area. It is notable also that no wells have been drilled in sub-areas that are at “regional background” non-anomalous spectral response values.

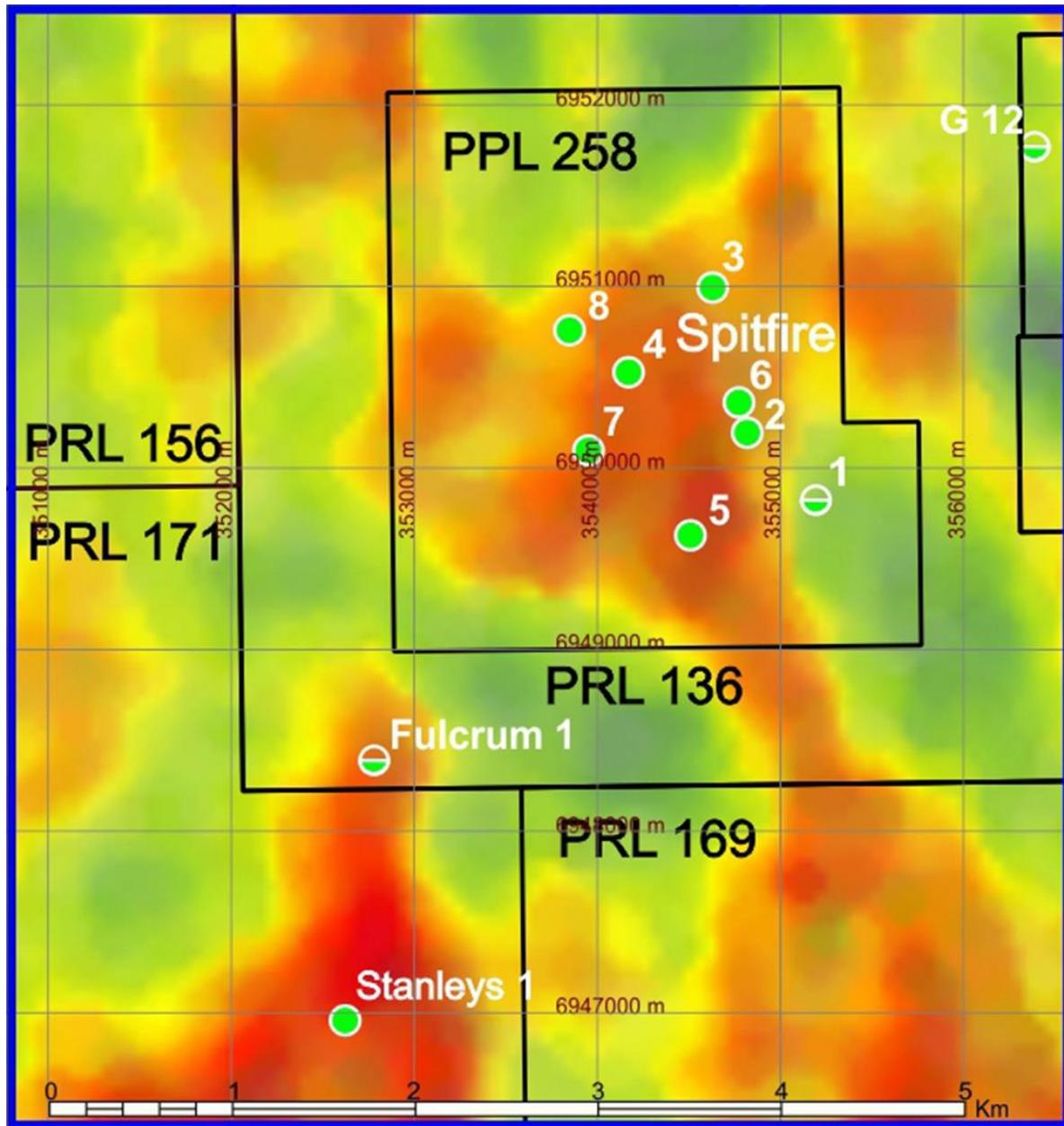


Figure 2. IPD image display of the Spitfire-Stanleys field area.

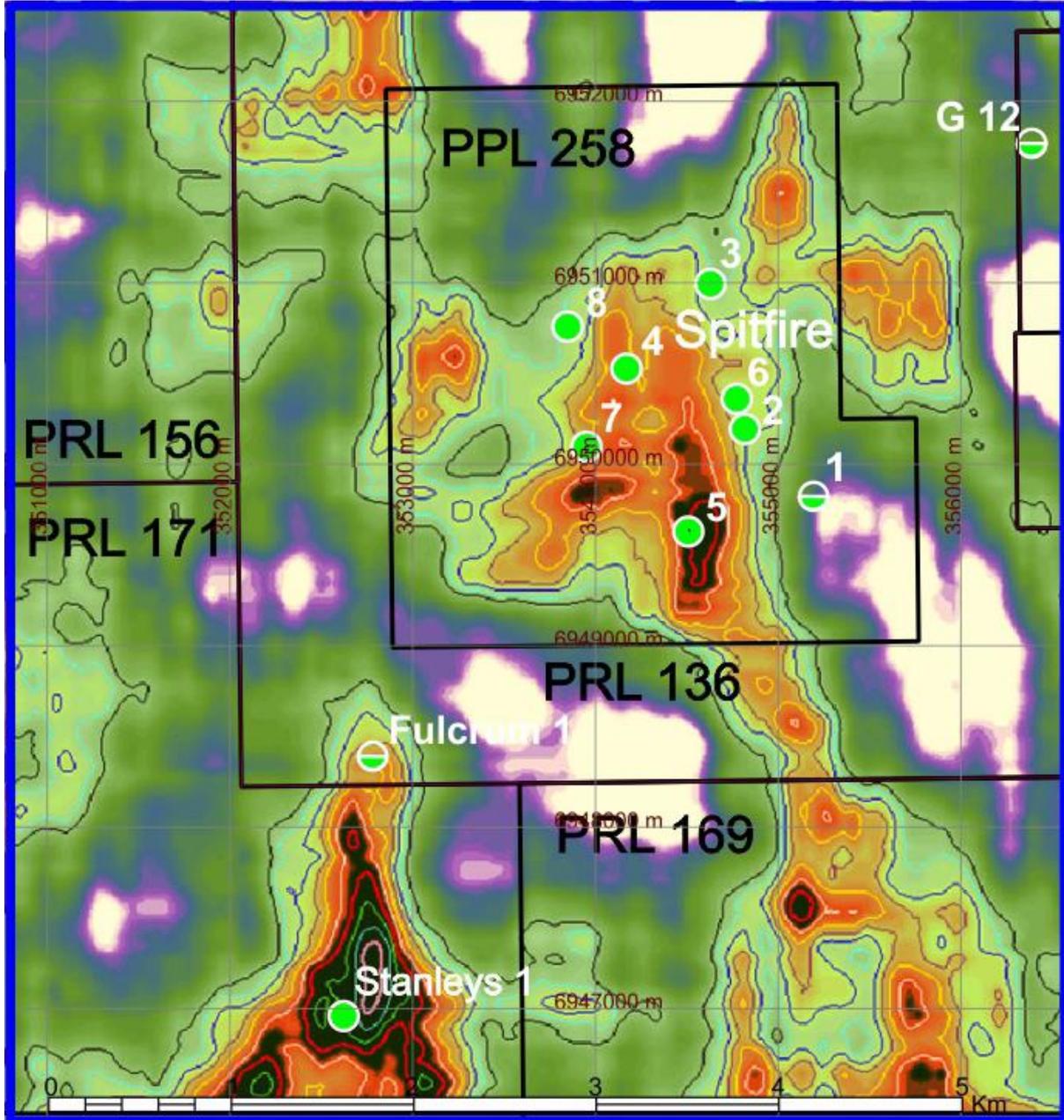


Figure 3. RBU spectral image display of the Spitfire-Stanleys field area.

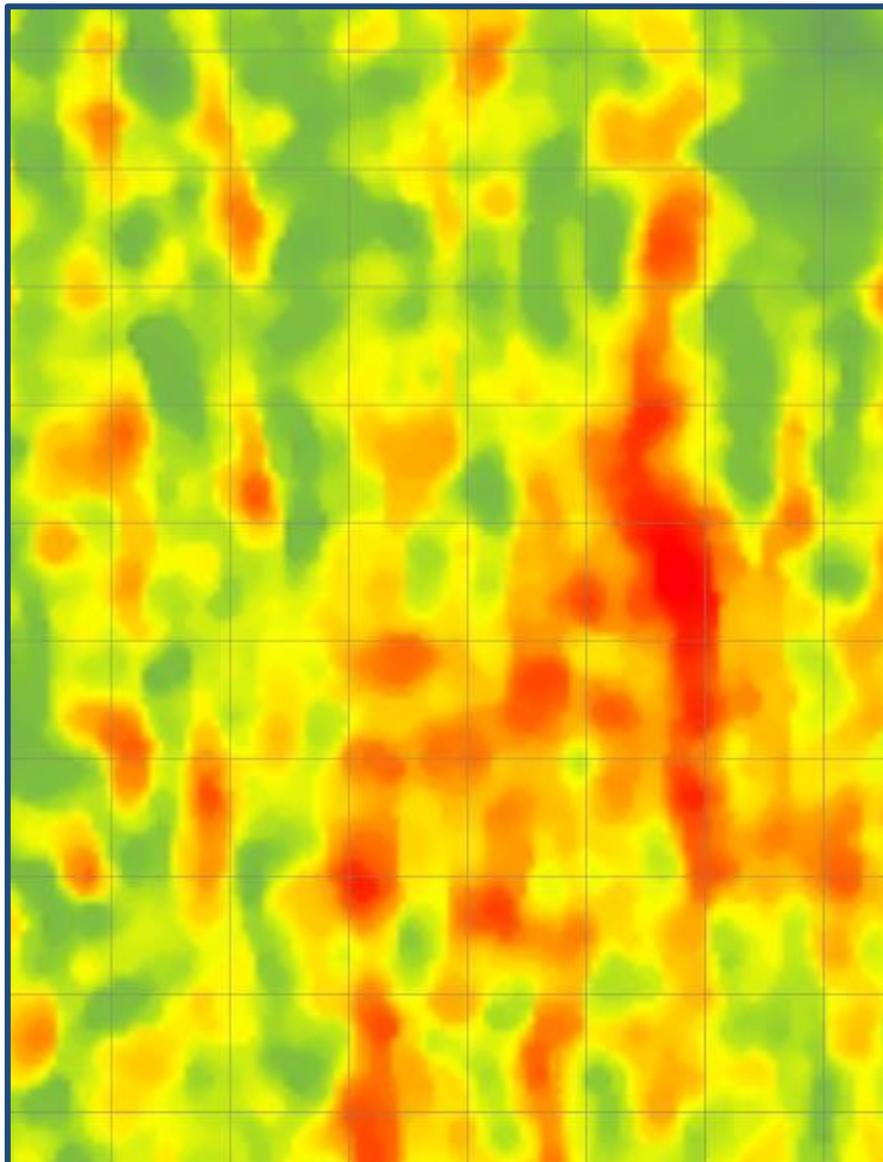
These DHM/HLI displays suggest further Petroleum Resource Potential (PRP) in “Greater Spitfire”:

- A southern extension fairway within PRLs 136 and 169
- A north-eastern field extension between Spitfire wells 2,3 ,6 and off- field well G-12
- A small western main field extension within PPL 258 and
- A new (separate?) North-Western prospect in PRL 136.

### 3. NEW PROSPECTS

Scotforth has now developed a very large prospect inventory of new DHM-based prospects that await exploration progression and drilling in C-E. These are analogous to the known fields and discoveries in HLI spectral response terms under equivalent RSDD-H processing routines, often on the same specific satellite images. By empirical definition, the large majority of these prospects will convert to discoveries when drilled.

#### Example: New Western Flank Prospects Area



**Figure 4. IPD image display of new untested DHM prospects and Leads**

**in an approximate 75km<sup>2</sup> search area (1km UTM grid)**

**–main prospect (approx. 6 x 1 kms).**



#### 4. Future Expectations

It now seems from DHM that the ultimate conventional hydrocarbon potential of C-E is considerably more than currently / conventionally perceived. A concerted exploration campaign deploying the best of HLI and CLI surveys can optimally achieve this success on an accelerated, lower cost basis. Scotforth suggests that:

- “blanket bombing” area-wide 3D surveying is not necessary and does not adequately discern high versus low discovery probability prospects
- DHM area-wide surveys can develop low risk total prospect inventories and rank prospects by expected size and success probability
- Best of DHM prospects supported by local area 3-D seismic can lead to optimal exploration and appraisal drilling programs – both for maximum success and for early high net pay / high deliverability results.

This new exploration approach can increase industry’s success performance in C-E as follows:

- New Prospect Discovery rates of 75+% (HLI + CLI combined)
- More effective appraisal and early field mapping
- Higher early field production profiles and better production revenue streams
- Higher and more rapid reserves progression
- Improved and accelerated NAV build on all discoveries
- Reduced Write-off expenditures.

**Scotforth is ready to engage with new partners and allies in C-E to create this enhanced success.**