

PETROLEUM OPPORTUNITIES



energyNT|2015

Energy activities for the Northern Territory, Australia

energyNT|2015

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Cover Photo:

Central Petroleum Limited's Brewer Estate City Gate Station processing facility flare during commissioning trials on 29 March 2015 for the Dingo Gas Field development project south of Alice Springs. Photo by Paul Moir of Central Petroleum Limited.

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About energyNT

energyNT focuses on petroleum, pipeline and geothermal energy activities in the NT's onshore and coastal waters (up to the 3 nautical mile limit) areas only. Enquiries on petroleum activities in Commonwealth offshore areas previously administered by the NT should be directed to the National Offshore Petroleum Titles Administrator (NOPTA) and the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

EXECUTIVE SUMMARY

Petroleum Exploration in the Northern Territory (NT) remained steady despite a challenging world economy and falling commodity prices especially in the resources industry. Origin Energy Resources Limited, Pangaea (NT) Pty Ltd, Tom Oates, Mosman Oil and Gas Ltd, Hancock Prospecting Pty Ltd and Beach Energy Ltd all completed on-ground activities. We thank our operators for yet another year of safe and responsible exploration operations that have been carried out in harmony with pastoralists and Traditional Owners.

The Amadeus Basin saw the temporary shut-in of the Surprise oil field due to a low oil price as well as a change in operatorship from Santos QNT Pty Ltd to Central Petroleum Limited of the Mereenie oil and gas field. Central Petroleum is to be congratulated on its achievement of a safe and efficient transition to operator of the combined fields and their efforts to increase Indigenous and local employment.

Pipeline activity was up during 2015 with completion of the Dingo Gas Pipeline at Alice Springs and a lateral to the Bonaparte Gas Pipeline at Wadeye to supply Power and Water Corporation power stations. Construction is ongoing for the 889 km x 42-inch INPEX Gas Export Pipeline from the Ichthys Field located off the northern coast of Western Australia in the Browse Basin to Darwin, which will supply the INPEX LNG Plant being constructed at Bladin Point, Darwin. The Ichthys Project is due to commence operation in 2017.

In 2015, INPEX was awarded the first NT acreage release EPNT14-1 under the 2014 provisions of the *Petroleum Act*. INPEX have commenced Native Title negotiations under the Petroleum Exploration Permit Application (EP318) and we look forward to the grant of this application in the near future.

The Energy Directorate continues to build capacity to ensure it can meet the demands of regulating and administering a growing industry with two key positions recruited in 2015. Mr. Jop van Hattum, Senior Director Petroleum Technology and Operations was appointed in May 2015. Jop brings substantial industry, technical and management experience to the Department. The second key appointment was that of Ms. Debby James as Director Petroleum Tenure. Debby has been with the Department since 2008 and has of recent times acted in this newly created position before her appointment in October 2015. Debby brings a wealth of knowledge and understanding of the legislative and policy settings for petroleum titles management in the Territory. Both Jop and Debby continue to drive a culture of service excellence in the Directorate. There will be further recruitment in 2016 to support both the Operations and Tenure management areas.

The Hydraulic Fracturing Inquiry Report was delivered to the Chief Minister of the NT, the Hon Adam Giles MLA, on 28 November 2014 by the Commissioner Dr. Allan Hawke AC. The Energy Directorate provided detailed information to the Inquiry about existing legislation and well established regulatory processes.

The Energy Directorate has carriage of implementing the NT Government's response to the Hawke Inquiry with progress being made across the board. Some specifics include:

- Reaching out to interstate and international regulators as far as North America to gather information that will support the implementation of a best practice regulatory regime for onshore oil and gas in the NT
- Finalising the drafting of *Petroleum Environment Regulations* ready for release for public comment
- Developing a comprehensive Petroleum Environment Regulation Guideline
- Finalising the Onshore Oil and Gas Guiding Principles ([Link](#))
- In consultation with Industry and the Northern Territory Cattlemen's Association, finalised the agreed land access arrangements, providing certainty and setting out the rights and obligations of all parties. The new process establishes a land access agreement between resource exploration companies and land owners for resource exploration and development activities ([Link](#))
- Formalising its already robust processes and implementing the Petroleum Inclusion Zone Policy, providing the community certainty that residential and environmentally and culturally sensitive area as well as areas of intensive agriculture areas will be protected ([Link](#))
- Reviewing Petroleum Exploration applications to ensure they meet the new assessment criteria announced by the NT Government in November 2015 ([Link](#))

- Contributing to the development of:
 - the onshore oil and gas advertising program
 - the two onshore oil and gas websites
 - a comprehensive community engagement program
- Building community confidence by presenting accurate information to community meetings about the oil and gas industry and how the Energy Directorate regulates petroleum activities to ensure Industry meets legislative requirements and community expectations
- Continuing to implement or contribute to other government commitments in response to the Inquiry
- Development of a communications strategy to be implemented in 2016
- Implementation of the Oil and Gas Industry Development Strategy ([Link](#)).

The Energy Directorate has commenced the development of contemporary, risk/outcomes-based environment and resource management regulations, to replace the 'Schedule of Onshore Petroleum Exploration and Production Requirements' to the *Petroleum Act*. Concurrently a review of the *Petroleum Act* is underway to ensure that NT legislation meets contemporary standards and is able to support Government policy settings to promote investment and encourage a competitive and vibrant Oil and Gas development sector.

On 17 November 2015, the Chief Minister announced the award of the North East Gas Interconnector (NEGI) pipeline (now named Northern Gas Pipeline [NGP]) project to Jemena Northern Gas Pipeline Pty Ltd. The NGP will enable NT gas to be delivered from Tennant Creek to Mt Isa to supply eastern Australian markets. The pipeline will bring jobs and investment to the Territory during its construction phase and open up the onshore Basins to accelerated commercial development. The Energy Directorate welcomes Jemena to the Territory and is looking forward to the safe and responsible implementation of this exciting project.

The Energy Directorate also wishes to thank outgoing NT Director for APPEA, Steven Gerhardy for his efforts and welcome his replacement Matt Doman to the Northern Territory. The Energy Directorate is looking forward to continuing collaboration with Industry to build a sustainable and profitable oil and gas industry for Territorians.

Looking ahead to 2016 and beyond, the Energy Directorate expects exploration activity to increase. Whilst our focus remains on striving for leading contemporary regulation of onshore upstream and midstream energy activities and a high level of responsiveness to explorers and developers we are also focused on building capacity for the future. This includes investing in and expanding our staff, reviewing and improving our business systems and processes and reviewing and updating legislation to reduce unnecessary red tape whilst at the same time ensuring that oil and gas activities can occur in a safe and environmentally sustainable manner.

Victoria Jackson
Executive Director Energy

SUMMARY OF ACTIVITIES IN NT ONSHORE AND COASTAL WATERS

Petroleum

In 2015, despite a challenging world economy and a decline in commodity prices, exploration activity remained steady. Notwithstanding, the Department is pleased to report on an outstanding year for explorationists with encouraging results and safe and environmentally responsible operations. The following petroleum activities were conducted in the NT:

- **Beach Energy Ltd**
 - Re-entered Cullen 1 well in EP126 within the onshore Bonaparte Basin and conducted a Cement Bond Log. The results will assist in preparation for further evaluation of the well in 2016.
- **Central Petroleum Limited**
 - Acquired operatorship of the Mereenie Oil/Gas Field from Santos QNT Pty Ltd on 1 September 2015.
 - Completed the Dingo Gas Field Development Project with laying of 4" Fibrespar Gas Pipeline from the field to the Brewer Estate City Gate Station (BECGS) and commissioning of the BECGS processing facility. Full field production commenced in December 2015 with gas sales to the Owen Springs Power Station.
 - Completed the temporary shutdown the Surprise Oil Field in L6 due to the current low oil price. The Surprise 1 REH ST1 well was suspended and major equipment were dismantled and moved offsite.
 - Conducted a 3-well testing campaign in the Mereenie Oil/Gas Field to obtain data as part of studies to increase gas reserves and resources base.
- **Hancock Prospecting Pty Ltd**
 - Conducted ground gravity surveys in EP144, EP53 and EP154 within the McArthur Basin.
- **Mosman Oil and Gas Ltd**
 - Completed a geological field mapping and reconnaissance survey in EP145, which is located within the Amadeus Basin.
- **Origin Energy Resources Limited**
 - Drilling of Kalala South 1 exploration well in EP98, and then a diagnostic fracture injectivity test (DFIT) was conducted with pressure monitoring in progress at the time of compiling this report. The well will be suspended after sufficient pressure data have been acquired. The primary geological target of the well was the Middle Velkerri member in the Beetaloo Sub-basin. The well was drilled to a total measured depth of 2619 metres.
 - Drilling of Amungee NW-1 exploration well in EP98. The well was plugged back in the vertical section and then sidetracked to drill the lateral appraisal section. The well was renamed Amungee NW-1H after the lateral section was drilled along the Velkerri Member to a total measured depth of 3808 metres.
- **Pangaea (NT) Pty Ltd**
 - Conducted the Avago 2D seismic survey within EP167 and EP168. A total of 386.11 km of seismic line distance was surveyed.
 - Drilling of four appraisal wells in EP167 and EP168 within the McArthur Basin. Wyworrie 1 and Birdum Creek 1 out of the four wells were hydraulically fracture stimulated, tested and then suspended. Tarlee 2 well was drilled and then decommissioned while Tarlee 1 was drilled, a DFIT was conducted and then suspended. All four wells were targeting the Middle Velkerri Shale in the McArthur Basin.
 - Conducted a tiltmeter survey around two of its appraisal wells (Birdum Creek 1 and Wyworrie 1) within EP167.
- **Tom Oates**
 - Conducted a helicopter-supported magnetotellurics (MT) Survey within EP301.
 - Conducted helicopter-supported gravity surveys within EP304 and EP307.

Licensed pipelines

The pipelines completed or under construction include:

- The NT onshore and offshore portions of the 889 km 42 inch Ichthys Gas Export Pipeline from the Ichthys Gas Field in the Browse Basin to the Ichthys LNG Plant at Bladin Point in Darwin Harbour
- The Wadeye Lateral to the Bonaparte Gas Pipeline for supplying the new Wadeye Power Station
- The Ichthys Fuel Gas Pipeline within the Ichthys LNG Plant at Bladin Point
- The Wickham Point Pipeline / INPEX Fuel Gas Pipeline Interconnect Pipeline at Bladin Point
- The Dingo Gas Pipeline from the Dingo Gas Field south of Alice Springs to the Owen Springs Power Station at Brewer Estate.

Geothermal

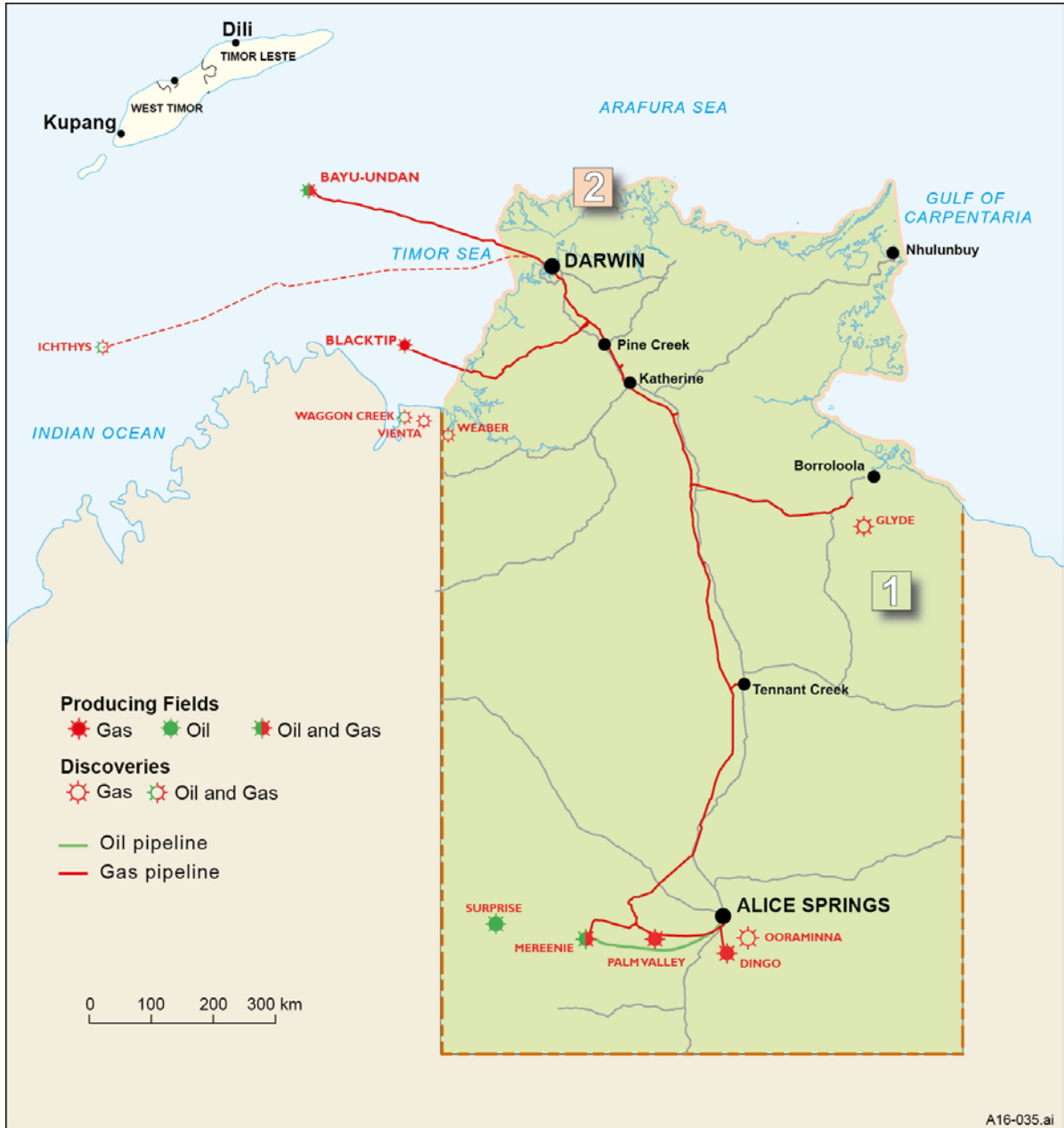
There are no granted geothermal permits in the NT at the time of producing this report. The last permit was surrendered in 2014.

PETROLEUM

PERMITS/TITLES/WORK PROGRAMS

Onshore

The NT onshore area is over 1.35 million km² (Figure 1) and as of December 2015, there were 54 active exploration permits, three retention licences and five production licences, where hydrocarbons have been produced since the early 1980s. Table 1 contains a list of granted Onshore Titles and Titleholders.



1 Area 1: Onshore Area: 1.35 million km²

2 Area 2: Coastal Waters: including the new release area three nautical miles around the Northern Territory coastline

Figure 1. Areas administered by NT Department of Mines and Energy in 2015

Table 1. NT Petroleum Titles 2015

NT Onshore Title	Title Holders	Title Operators	Date Awarded
EP76 (R1)*	Falcon Oil & Gas Australia Limited	Origin Energy Resources Limited	1-Jan-14
	Sasol Petroleum Australia Limited		
	Origin Energy Resources Limited		
EP82 (R1)*	Helium Australia Pty Ltd [Central Petroleum Limited]	Santos QNT Pty Ltd	30-Jan-13
	Santos QNT Pty Ltd		
EP93 (R1)*	Merlin Energy Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	30-Jan-13
EP97 (R1)*	Merlin Energy Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	23-May-11
EP98 (R1)*	Falcon Oil & Gas Australia Limited	Origin Energy Resources Limited	1-Jan-14
	Sasol Petroleum Australia Limited		
	Origin Energy Resources Limited		
EP105	Merlin Energy Pty Ltd [Central Petroleum Limited]	Santos QNT Pty Ltd	28-Sep-07
	Santos QNT Pty Ltd		
EP106	Merlin Energy Pty Ltd [Central Petroleum Limited]	Santos QNT Pty Ltd	28-Sep-07
	Santos QNT Pty Ltd		
EP107 (R1)*	Merlin Energy Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	28-Sep-13
EP112	Frontier Oil & Gas Pty Ltd [Central Petroleum Limited]	Santos QNT Pty Ltd	21-Jul-05
	Santos QNT Pty Ltd		
EP115 (R1)*	Frontier Oil & Gas Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	7-Jul-15
EP117 (R1)*	Falcon Oil & Gas Australia Limited	Origin Energy Resources Limited	1-Jan-14
	Sasol Petroleum Australia Limited		
	Origin Energy Resources Limited		
EP125	Ordiv Petroleum Pty Ltd [Central Petroleum Limited]	Santos QNT Pty Ltd	7-Dec-05
	Santos QNT Pty Ltd		
EP126	Territory Oil and Gas Pty Limited	Beach Petroleum (NT) Pty Ltd	15-Jun-11
	Beach Petroleum (NT) Pty Ltd		
EP127	Statoil Australia Theta B.V	Baraka Energy and Resources Limited	14-Dec-07
	Baraka Energy and Resources Limited		
	Petrofrontier (Australia) Pty Ltd		
EP128	Statoil Australia Theta B.V	Baraka Energy and Resources Limited	14-Dec-07
	Baraka Energy and Resources Limited		
	Petrofrontier (Australia) Pty Ltd		
EP134	Tri-Star Energy Company	Tri-Star Energy Company	26-Feb-08
EP136	Sweetpea Petroleum Pty Ltd	Paltar Petroleum Limited	28-Aug-12
	Paltar Petroleum Limited		
EP143	Sweetpea Petroleum Pty Ltd	Paltar Petroleum Limited	28-Aug-12
	Paltar Petroleum Limited		
EP144	Mineral Australia Pty Ltd	Hancock Prospecting Pty Ltd	21-May-13
	Jacaranda Minerals Limited		
EP145	Trident Energy Limited	Mosman Oil and Gas Ltd	22-Aug-14
EP153	Mineral Australia Pty Ltd	Hancock Prospecting Pty Ltd	1-Jul-13
	Jacaranda Minerals Limited		
EP154	Mineral Australia Pty Ltd	Hancock Prospecting Pty Ltd	20-Mar-15
	Jacaranda Minerals Limited		
EP156	Oilco Pty Ltd	Mosman Oil and Gas Ltd	7-Nov-11
EP161	Tamboran (Beetaloo) Pty Ltd	Santos QNT Pty Ltd	21-May-12
	Santos QNT Pty Ltd		
EP162	Tamboran (Beetaloo) Pty Ltd	Santos QNT Pty Ltd	21-Aug-12
	Santos QNT Pty Ltd		
EP164	Tamboran (Ngalia) Pty Ltd	Tamboran Resources Pty Ltd	23-Aug-13
EP165	Tamboran (Ngalia) Pty Ltd	Tamboran Resources Pty Ltd	15-Jul-13
EP166	Tamboran (Ngalia) Pty Ltd	Tamboran Resources Pty Ltd	23-Aug-13
EP167	Pangaea (NT) Pty Ltd	Pangaea (NT) Pty Ltd	10-Jan-13
	EMG Pangaea Holdings Pty Ltd		
EP168	Pangaea (NT) Pty Ltd	Pangaea (NT) Pty Ltd	10-Jan-13
	EMG Pangaea Holdings Pty Ltd		
EP169	Pangaea (NT) Pty Ltd	Pangaea (NT) Pty Ltd	4-Apr-13

Table 1. NT Petroleum Titles 2015

NT Onshore Title	Title Holders	Title Operators	Date Awarded
	EMG Pangaea Holdings Pty Ltd		
EP171	Armour Energy Pty Ltd	Armour Energy Pty Ltd	29-Jun-11
EP174	Armour Energy Pty Ltd	Armour Energy Pty Ltd	11-Dec-12
EP176	Amour Energy Pty Ltd	Amour Energy Pty Ltd	29-Jun-11
EP184	Imperial Oil & Gas Pty Ltd	Imperial Oil & Gas Pty Ltd	21-Aug-13
EP187	Imperial Oil & Gas Pty Ltd	Imperial Oil & Gas Pty Ltd	20-Mar-15
EP189	Tamboran (Beetaloo) Pty Ltd	Santos QNT Pty Ltd	21-Aug-12
	Santos QNT Pty Ltd		
EP190	Armour Energy Pty Ltd	Armour Energy Pty Ltd	11-Dec-12
EP191	Armour Energy Pty Ltd	Armour Energy Pty Ltd	3-Oct-13
EP192	Armour Energy Pty Ltd	Armour Energy Pty Ltd	3-Oct-13
EP198	Pangaea (NT) Pty Ltd	Pangaea (NT) Pty Ltd	10-Jan-13
	EMG Pangaea Holdings Pty Ltd		
EP200	Wiso Oil Pty Ltd	Blue Energy Limited	16-Feb-12
EP205	Wiso Oil Pty Ltd	Blue Energy Limited	16-Feb-12
EP207	Wiso Oil Pty Ltd	Blue Energy Limited	16-Feb-12
EP222	Wiso Oil Pty Ltd	Wiso Oil Pty Ltd	22-Aug-12
EP231	Paltar Petroleum Limited	Paltar Petroleum Limited	5-Sep-12
EP232	Paltar Petroleum Limited	Paltar Petroleum Limited	3-Oct-13
EP234	Paltar Petroleum Limited	Paltar Petroleum Limited	5-Sep-12
EP237	Paltar Petroleum Limited	Paltar Petroleum Limited	5-Sep-12
EP301	Tom Oates	Tom Oates	15-May-13
EP304	Tom Oates	Tom Oates	26-Nov-14
EP305	Pangaea (NT) Pty Ltd	Pangaea (NT) Pty Ltd	8-Aug-14
	EMG Pangaea Holdings Pty Ltd		
EP307	Tom Oates	Tom Oates	26-Nov-14
EP309	Tamboran (Ngalia) Pty Ltd	Tamboran Resources Pty Ltd	15-Jul-13
RL1	Onshore Energy Pty Ltd	Onshore Energy Pty Ltd	9-Jul-13
RL3	Helium Australia Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	6-Mar-13
RL4	Helium Australia Pty Ltd [Central Petroleum Limited]	Central Petroleum Limited	6-Mar-13
OL3	Central Petroleum (NT) Pty Ltd	Central Petroleum Limited	6-Nov-03
OL4	Santos QNT Pty Ltd	Santos QNT Pty Ltd	6-Nov-02
	Santos Limited		
OL5	Santos QNT Pty Ltd	Santos QNT Pty Ltd	6-Nov-02
	Santos Limited		
L6	Frontier Oil & Gas Pty Ltd	Central Petroleum Limited	25-Feb-14
L7	Central Petroleum (NT) Pty Ltd	Central Petroleum Limited	7-Jul-14

*R means Renewal

The total nominated petroleum exploration expenditure for onshore titles for the period 2015-2020 is estimated to be A\$471.3M. The work commitment for the period includes the drilling of ninety wells and the acquisition of 4762 line km of 2D seismic data.

Two exploration permit applications were granted in 2015 and one exploration permit was renewed (**Table 1**). The reported expenditure for onshore petroleum exploration activities in the NT in 2015 was approximately A\$121.2M. The proposed work program expenditure for the petroleum exploration permits granted and renewed in 2015 is A\$41M.

Coastal Waters

Coastal Waters include all waters between the mean low water mark and a line 3 nautical miles seaward of the Australian Territorial Sea Baseline (**Figure 2**). This area was first released for applications in 2009 and is approximately 15 000 km². There are no granted exploration permits in the Coastal Waters.

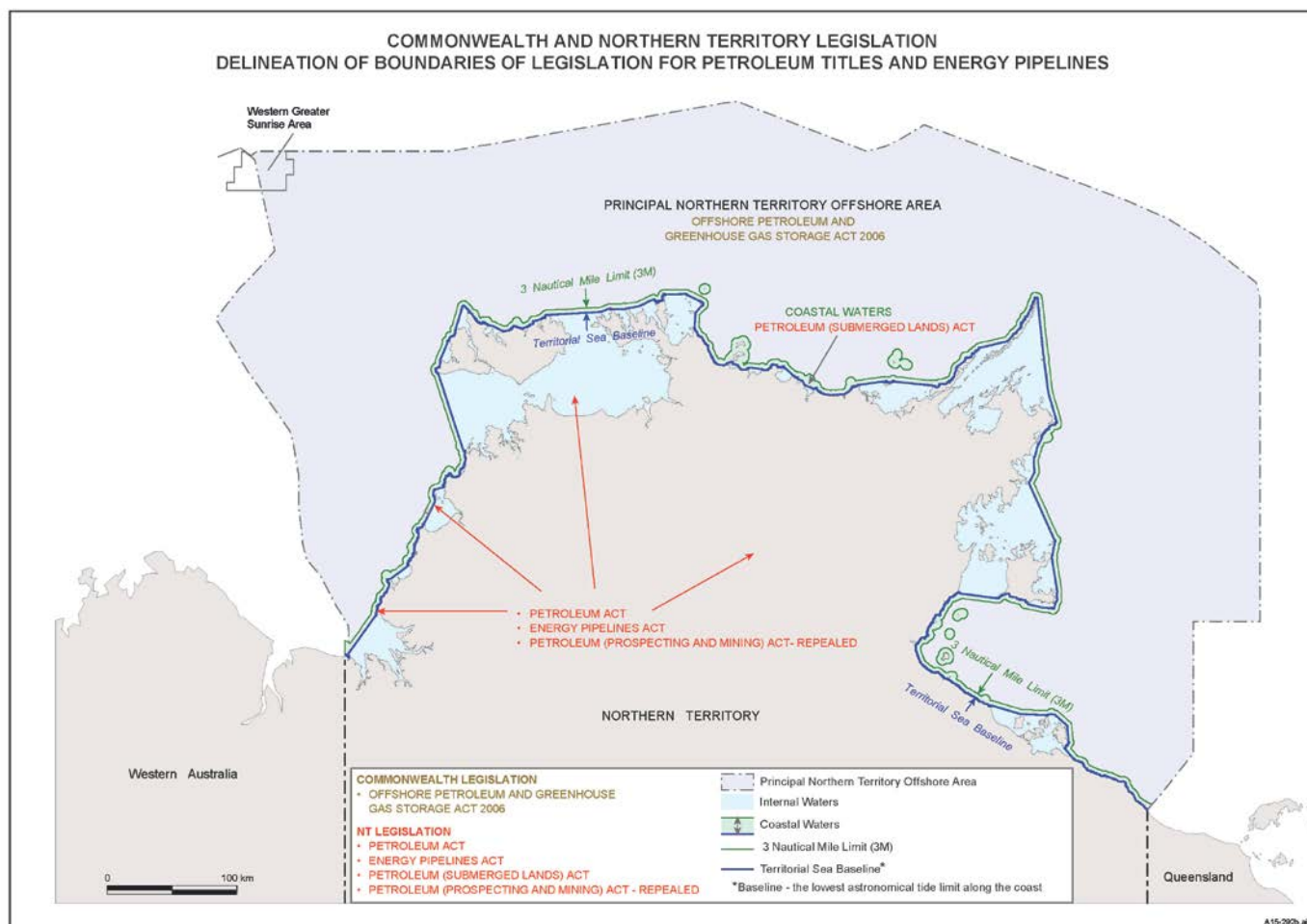


Figure 2. Coastal Waters areas administered by NT Department of Mines and Energy in 2015

Acreege Release

The amendments to the *Petroleum Act* (1 January 2014) now allow for the controlled release of vacant land and the government to accept multiple applications for exploration permits on the same acreage, providing for a more competitive assessment process.

The release areas vary in size and may be covered by the *Aboriginal Land Rights (NT) Act 1976* or the *Native Titles Act 1993*. Release areas are supported by existing well and seismic data together with regional geological data.

Acreage will not be released over areas based on the following criteria:

- Urban living areas including rural residential areas
- Areas of intensive agriculture
- Areas of high ecological value
- Areas of cultural significance
- Areas that include assets of strategic importance to nearby residential areas

There was no petroleum acreage release in 2015 in the NT.

EXPLORATION OPERATIONS

Geological, Geophysical and Seismic Surveys

In 2015, there were three geophysical surveys, a geological field survey and one 2D seismic survey undertaken in the NT.

- **Hancock Prospecting Pty Ltd**

A helicopter-supported ground gravity survey was conducted by Hancock Prospecting Pty Ltd within EP144, EP153 and EP154 within the McArthur Basin (**Figure 3**). The survey was conducted from September to November 2015 to in-fill existing wide-spaced NTGS gravity survey data over selected parts of the permits to provide a better understanding of the basin's structure.

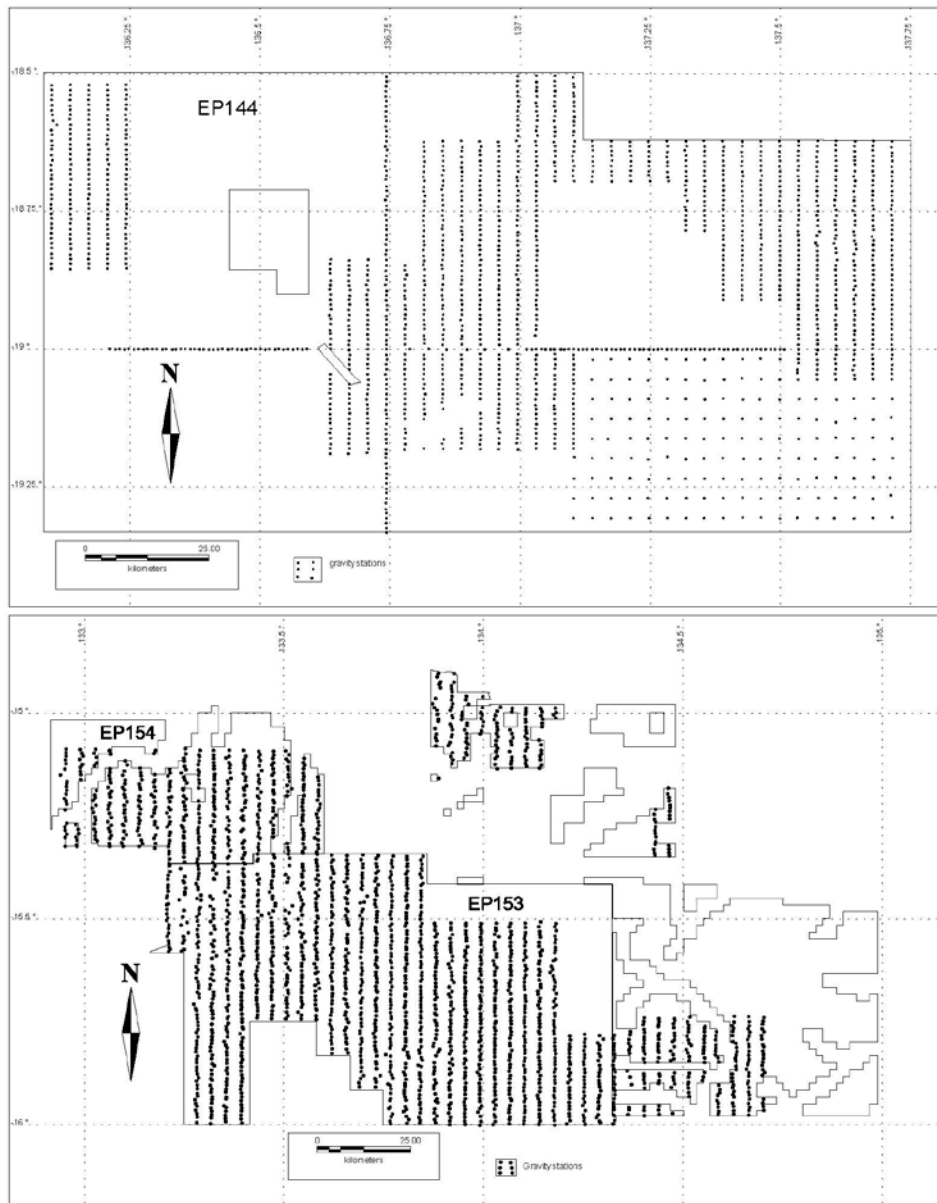


Figure 3. Hancock Prospecting Pty Ltd's EP144, EP153 and EP154 helicopter-supported ground gravity survey stations

- Mosman Oil and Gas Limited

Mosman Oil and Gas Limited conducted a geological field mapping and reconnaissance survey within EP145 in the Amadeus Basin (**Figure 4**). The geological field mapping and reconnaissance survey commenced in July and was completed in August 2015.

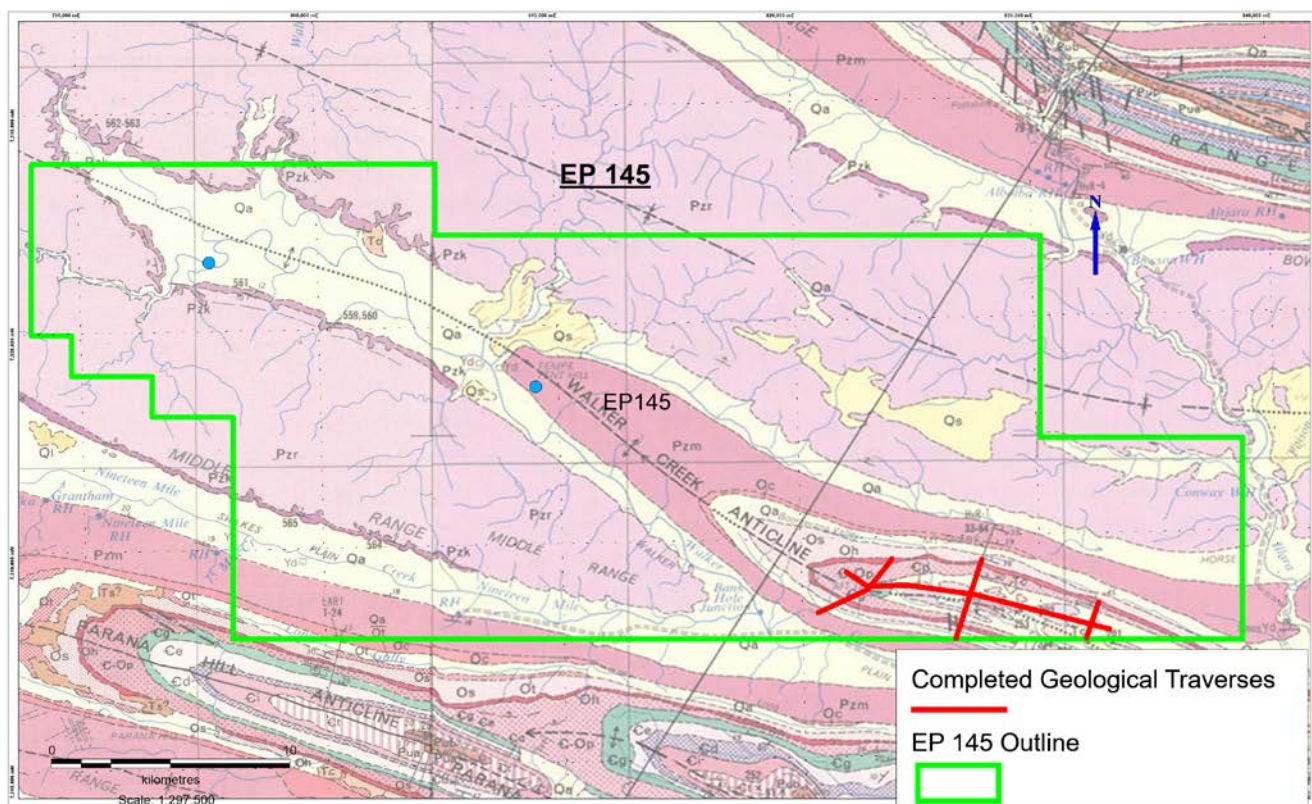


Figure 4. Mosman Oil and Gas Limited's geological field mapping and reconnaissance survey traverses within EP145

- Pangaea (NT) Pty Ltd

From July to August 2015, Pangaea (NT) Pty Ltd conducted the Avago 2D seismic survey within EP167 and EP168 in the McArthur Basin (Figure 5). A total of 386.11 line km of seismic data was acquired.

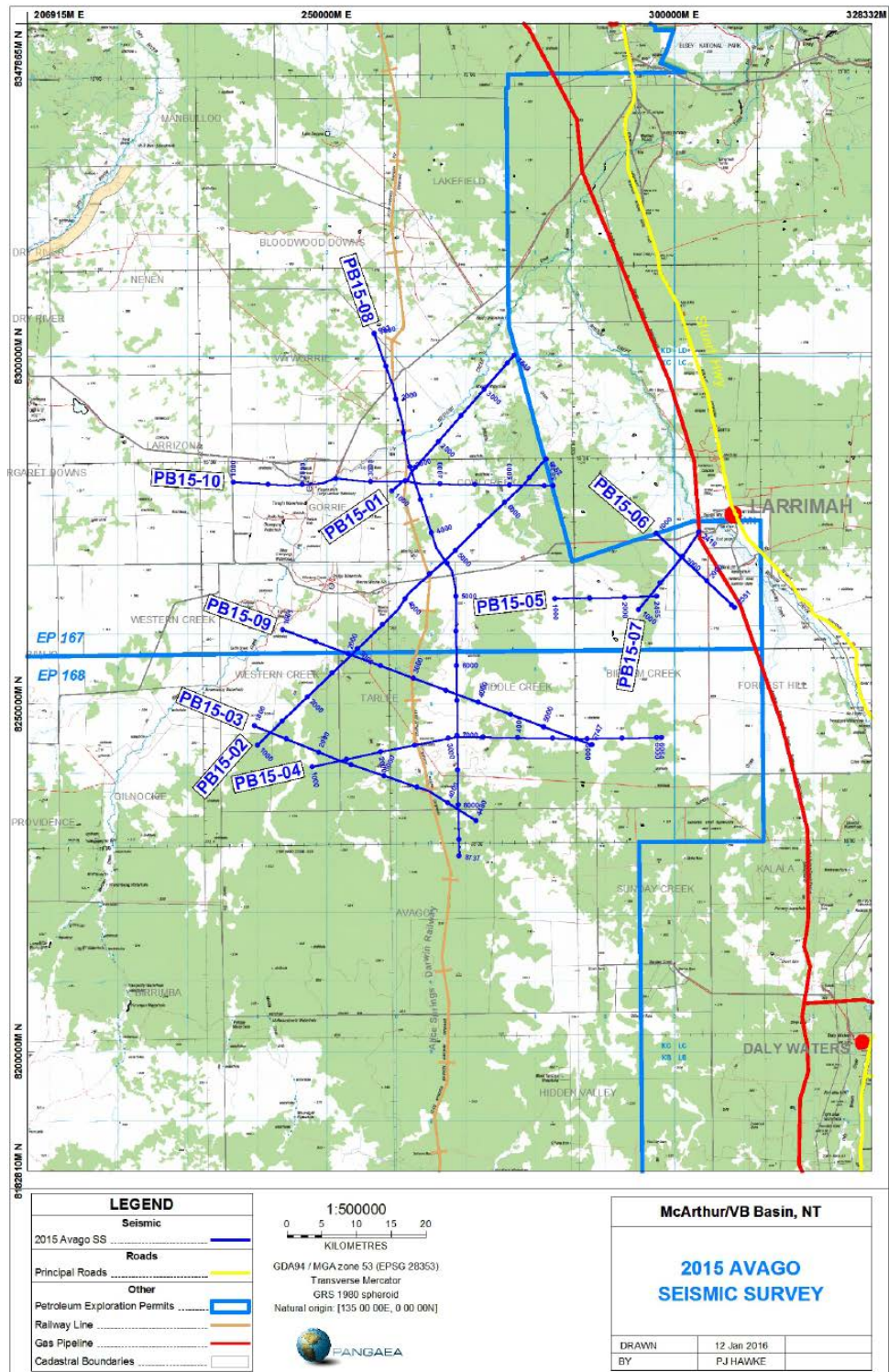


Figure 5. Pangaea (NT) Pty Ltd's Avago 2D seismic survey lines within EP167 and EP168.

- Pangaea (NT) Pty Ltd

Pangaea (NT) Pty Ltd conducted a tiltmeter survey around two of its appraisal wells (Birdum Creek 1 and Wyworrie 1) within EP167 in the western part of the McArthur Basin. The survey was conducted to gather stratigraphic and rock property data (Figure 6).

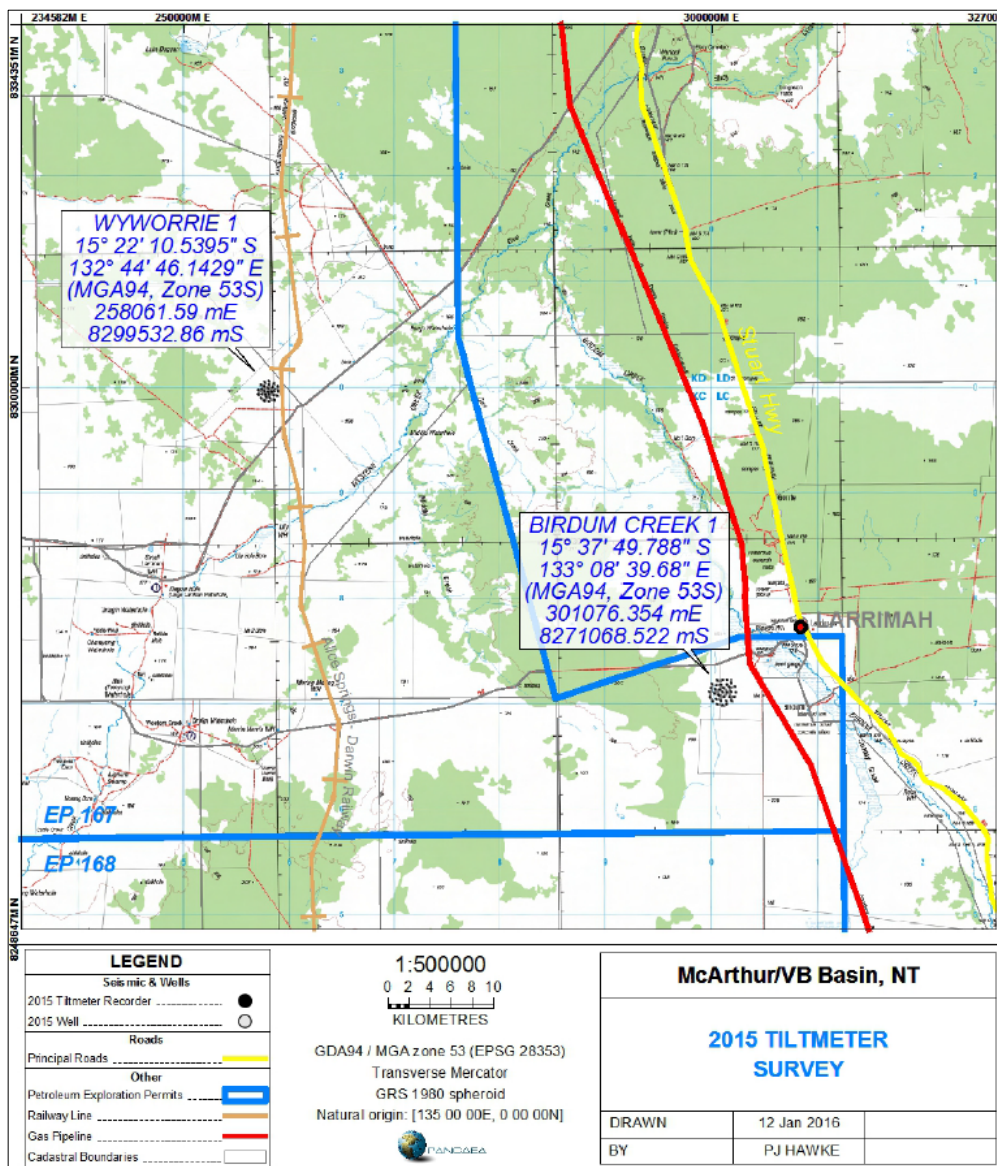


Figure 6. Pangaea (NT) Pty Ltd's tiltmeter survey stations in EP167

- Tom Oates

Tom Oates completed a helicopter-supported magnetotellurics (MT) Survey over EP301 in December 2015 (Figure 7).

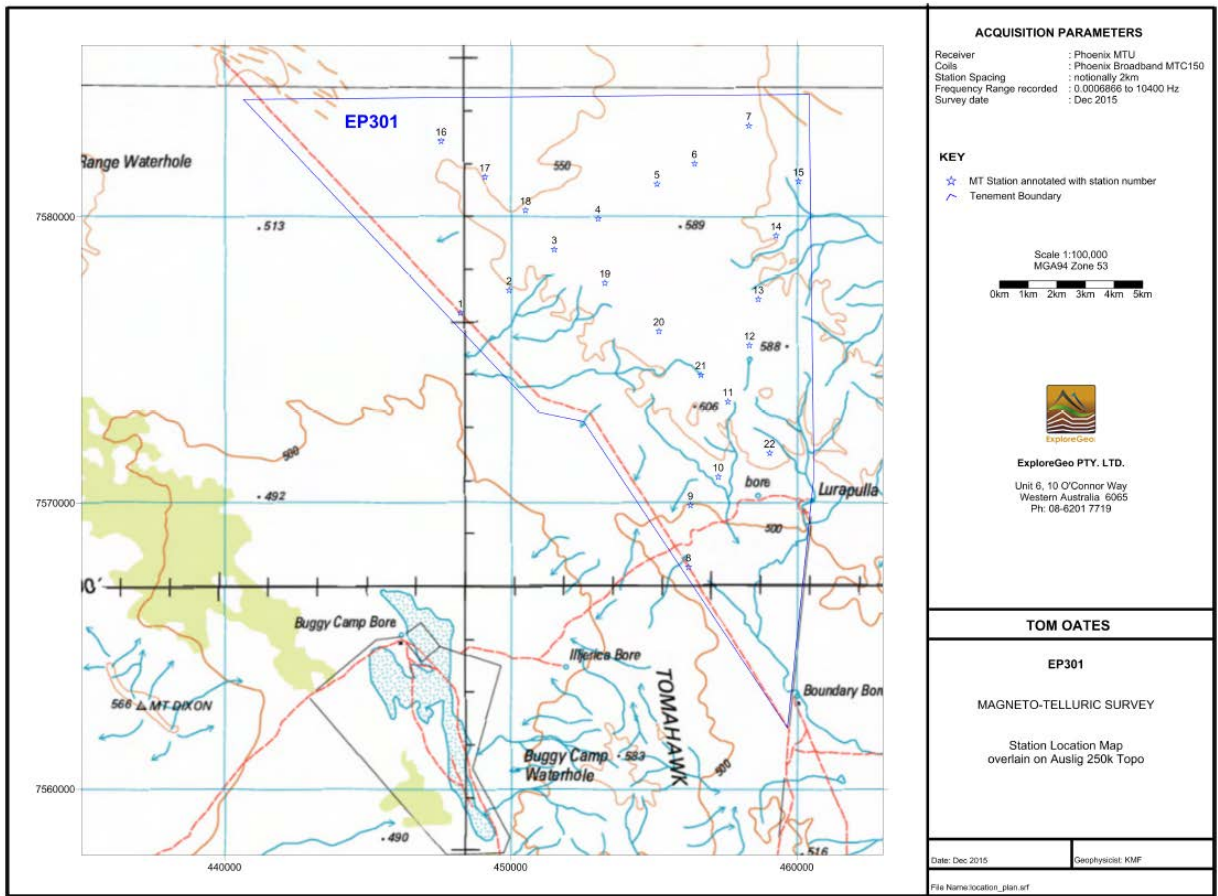


Figure 7. Tom Oates' helicopter-supported MT survey stations in EP301.

- Tom Oates

Tom Oates completed helicopter-supported gravity surveys over EP304 and EP307 in August 2015 (Figure 8).

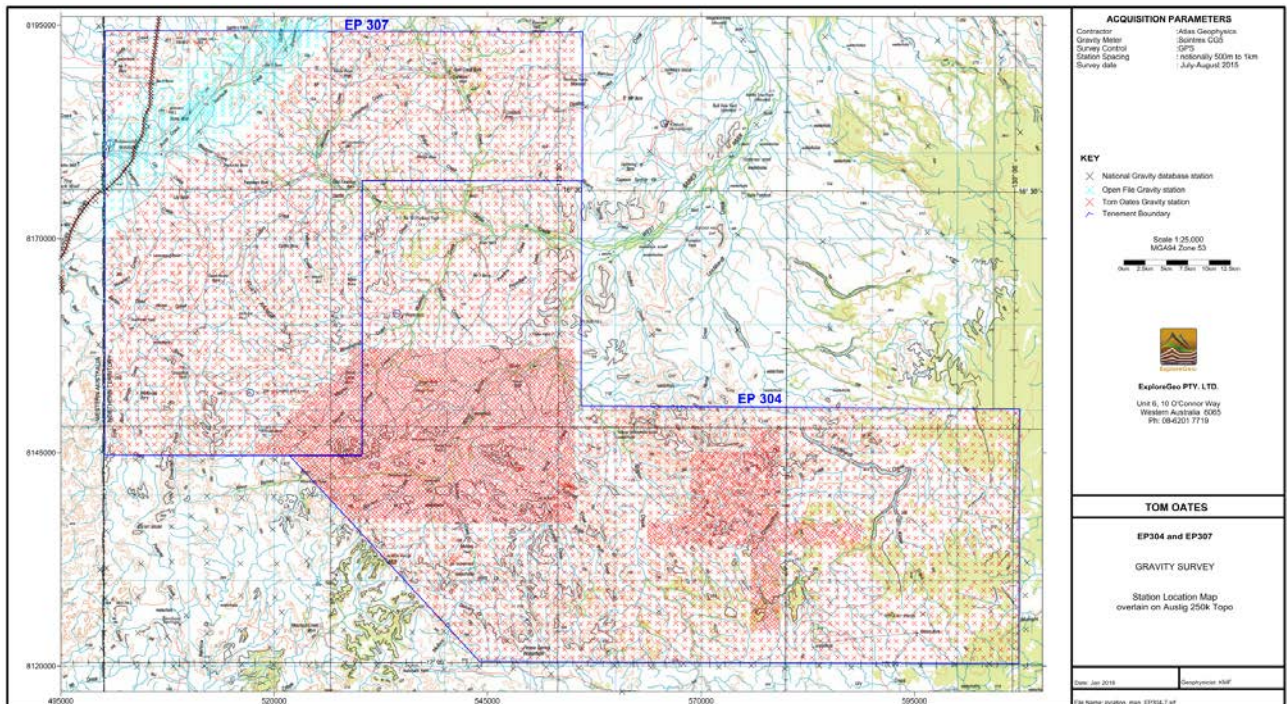


Figure 8. Tom Oates' helicopter-supported gravity survey stations in EP304 and EP307.

Well Activities

In 2015, a total of six wells were drilled out of the originally proposed 25 in the NT (*Figure 9*). One of the wells was sidetracked and a lateral section was drilled as shown in *Table 2* below.

Table 2. NT Onshore Drilling and Testing Activities 2015								
Well Name	Operations	Operator	Permit	Well Status	Drill Rig	Well Spud Date	Rig Release Date	Total Depth (mMD)
Amungee NW 1	Exploration drilling	Origin Energy Resources Limited	EP98	Drilled; Plugged back; Side-tracked for Amungee NW 1H	Saxon Energy Services Rig 185	07/09/2015	21/10/2015	2611
Amungee NW 1H	Appraisal drilling; Horizontal hole	Origin Energy Resources Limited	EP98	Drilled; Suspended	Saxon Energy Services Rig 185	28/10/2015	24/11/2015	3808
Birdum Creek 1	Appraisal drilling	Pangaea (NT) Pty Ltd	EP167	Drilled; Hydraulically Fractured; Flow Tested; Suspended	Saxon Energy Services Rig 187	03/06/2015	19/07/2015	1931.9
Kalala South 1	Exploration drilling	Origin Energy Resources Limited	EP98	Drilled; DFIT conducted; Suspended	Saxon Energy Services Rig 185	14/07/2015	02/09/2015	2619
Tarlee 1	Appraisal drilling	Pangaea (NT) Pty Ltd	EP168	Drilled; DFIT conducted; Suspended	DDH1 Rig 31 (WEI 75)	10/06/2015	23/07/2015	1335.5
Tarlee 2	Appraisal drilling	Pangaea (NT) Pty Ltd	EP168	Drilled; Plugged and Abandoned	DDH1 Rig 31 (WEI 75)	30/07/2015	18/08/2015	1180
Wyworrie 1	Appraisal drilling	Pangaea (NT) Pty Ltd	EP167	Drilled; Hydraulically Fractured; Flow Tested; Suspended	Saxon Energy Services Rig 187	26/07/2015	28/08/2015	1385

From the six wells that were drilled in 2015, two of the wells were hydraulically fracture stimulated and flow tested (*Table 2, Figure 9*). In 2016, it is expected that a total of 25 new wells will be drilled in the NT as per the granted work program for the current exploration permits (*Table 1*).

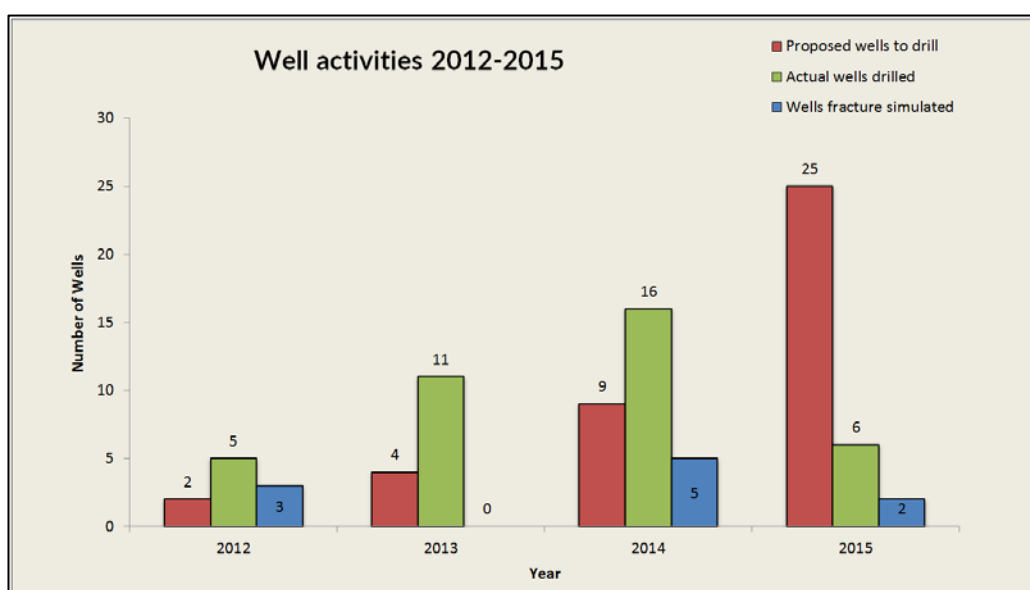


Figure 9. Well activities 2012-2015

Appraisal & Development Operations

Central Petroleum Limited

Central Petroleum Limited completed the field development of Dingo Gas Field in L7 within the Southern Amadeus Basin. The pipeline from the field to the Brewer Estate City Gas Station (BECGS) low temperature separation (LTS) facility in Alice Springs has been completed and commissioned together with the facility. Full production commenced at the close of 2015 with gas sales to the Owen Springs Power Station.

Origin Energy Resources Limited

Origin Energy Resources Energy drilled the horizontal appraisal well, Amungee NW 1 in EP98 after plugging back the vertical section of the Amungee NW 1 well. The well will be re-entered in 2016 for further evaluation. The primary geological target was the Middle Velkerri Member of the Beetaloo Sub-basin.

Pangaea (NT) Pty Ltd

In 2015, Pangaea (NT) Pty Ltd continued an appraisal campaign to build on 2013 and 2014 exploration activities by gathering more stratigraphic and rock property data within EP167 and EP168 in the McArthur Basin. Pangaea (NT) Pty Ltd drilled four appraisal wells (Table 2), hydraulically fracture stimulated and flow tested two wells, conducted a 386 line km 2D seismic survey and a tiltmeter survey.

PRODUCTION OPERATIONS

Oil

The NT’s total onshore oil production comes from the Central Petroleum Limited and Santos QNT Pty Ltd-owned and Central Petroleum Limited-operated Mereenie Field in operating licences OL4 and OL5 and Central Petroleum Limited’s Surprise Field in operating licence L6, all located west of Alice Springs. Central Petroleum Limited took over operatorship of the Mereenie Field from Santos QNT Pty Ltd on 1 September 2015. Up until December 2015, Mereenie produced 278,000 bbl of oil (Figure 10), a 4.5% increase from the 266,000 bbl produced in 2014. Before the Surprise Field was shut-in on August 2015, a total of 24,000 bbl (Figure 10) was produced, a 57% decrease from the 56,000 bbl produced in 2014. The field was shut-in due to the decline in oil price. Transportation of oil from both the Surprise and Mereenie Fields to South Australia was by road.

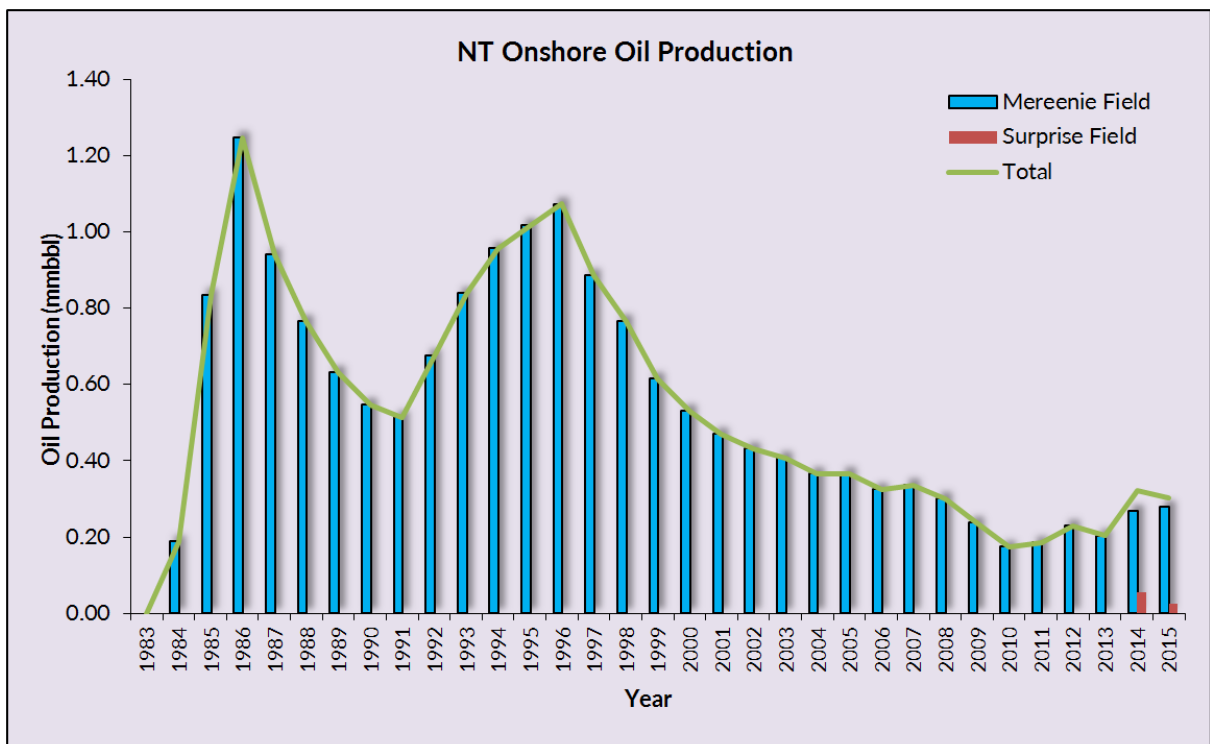


Figure 10. NT onshore oil production for period 1983-2015

Gas

Up until November 2015, the onshore gas production in the NT came from the Mereenie and Palm Valley Fields in the Amadeus Basin, west of Alice Springs. In December 2015, the Dingo Field in operating licence L7 completed commissioning and began producing gas. This now brings the total to three gas producing fields in the NT. In 2015, 3,703 mmscf of gas was produced from the three fields (**Figure 11**). Mereenie produced 2,395 mmscf, Palm Valley produced 1,282 mmscf while Dingo produced 26 mmscf of gas at the end of 2015.

Gas produced at Mereenie currently consists exclusively of solution gas associated with oil production. At present, the gas is being reprocessed and reinjected into the main oil production reservoir to assist in reservoir pressure maintenance. Central Petroleum Limited after taking over operatorship from Santos QNT Pty Ltd is now conducting field studies to determine the gas reserves and resource base within the field for future development.

Gas from Palm Valley Field, previously owned and operated by Magellan Petroleum (NT) Pty Ltd was supplied to Power and Water Corporation in Alice Springs for power generation until 16 January 2012 when the contract ended. However, Magellan Petroleum (NT) Pty Ltd was able to continue with limited production through working arrangements with Santos QNT Pty Ltd. Central Petroleum Limited after a company takeover of Magellan Petroleum (NT) Pty Ltd continues the same sales arrangement with Santos QNT Pty Ltd to date.

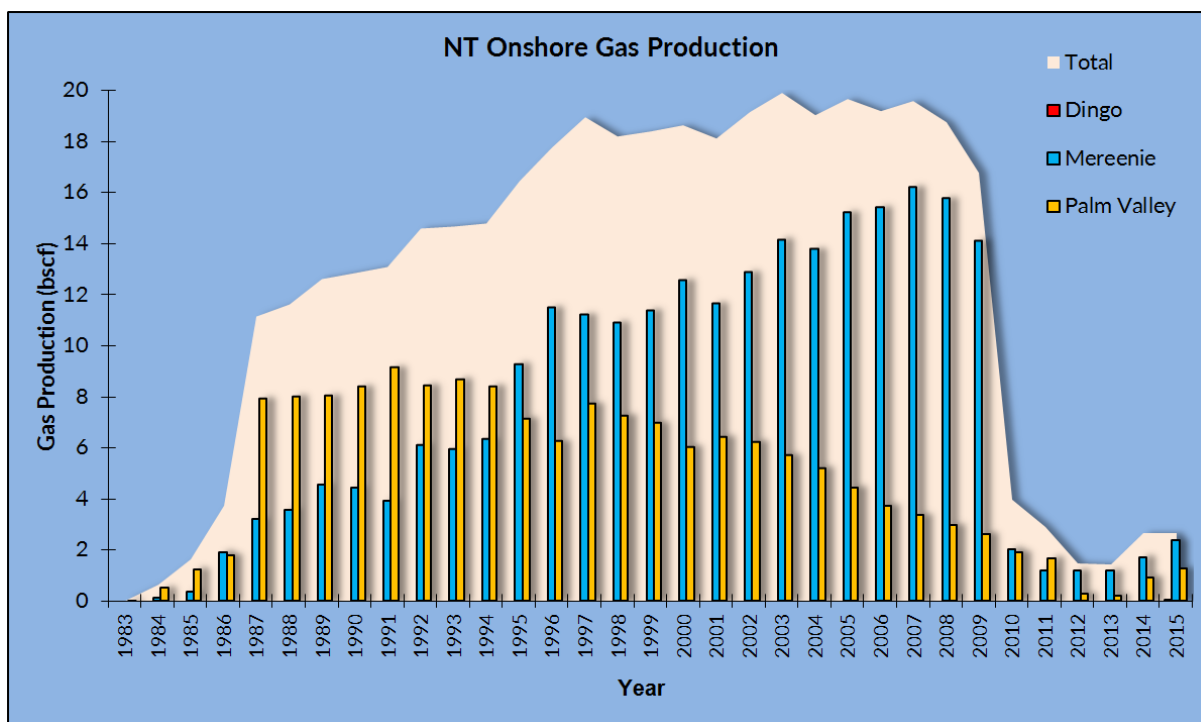


Figure 11. NT onshore gas production for period 1983-2015

Table 3. NT Oil and Gas Production Data (1983-2015)

Year	Oil Production (mmbbl)			Gas Production (bscf)			
	Mereenie Field	Surprise Field	Total	Mereenie Field	Palm Valley Field	Dingo Field	Total
1983					0.029		0.029
1984	0.187		0.187	0.125	0.519		0.644
1985	0.835		0.835	0.365	1.259		1.624
1986	1.246		1.246	1.919	1.804		3.723
1987	0.941		0.941	3.207	7.928		11.135
1988	0.765		0.765	3.587	8.023		11.610
1989	0.631		0.631	4.560	8.043		12.603
1990	0.547		0.547	4.453	8.391		12.844
1991	0.514		0.514	3.944	9.147		13.091
1992	0.676		0.676	6.121	8.450		14.571
1993	0.838		0.838	5.972	8.687		14.659
1994	0.956		0.956	6.339	8.424		14.763
1995	1.018		1.018	9.297	7.148		16.445
1996	1.073		1.073	11.491	6.263		17.754
1997	0.886		0.886	11.208	7.724		18.932
1998	0.766		0.766	10.911	7.267		18.178
1999	0.614		0.614	11.387	6.981		18.368
2000	0.530		0.530	12.558	6.053		18.611
2001	0.469		0.469	11.652	6.430		18.082
2002	0.431		0.431	12.867	6.248		19.115
2003	0.407		0.407	14.161	5.718		19.879
2004	0.366		0.366	13.771	5.220		18.991
2005	0.366		0.366	15.209	4.448		19.657
2006	0.324		0.324	15.413	3.754		19.167
2007	0.336		0.336	16.202	3.371		19.573
2008	0.301		0.301	15.759	2.973		18.732
2009	0.236		0.236	14.123	2.639		16.762
2010	0.173		0.173	2.051	1.922		3.973
2011	0.184		0.184	1.212	1.697		2.909
2012	0.228		0.228	1.205	0.294		1.499
2013	0.203		0.203	1.202	0.224		1.426
2014	0.266	0.056	0.322	1.733	0.934		2.667
2015	0.278	0.024	0.302	2.395	1.282	0.026	3.703

Producing Wells in the Northern Territory

As of 31 December 2015, there are 41 producing wells in the NT (**Table 4**). The wells are located in four producing fields, which are the Dingo Gas Field, Mereenie Oil/Gas Field, Palm Valley Gas Field and the Surprise Oil Field.

<i>Table 4. NT Oil and Gas Production Wells</i>				
Well Name	Status at 31 December 2015	Field	Production Licence	Operator
Dingo 2	Producing	Dingo Gas Field	L7	Central Petroleum Limited
Dingo 3	Producing	Dingo Gas Field	L7	Central Petroleum Limited
East Mereenie 1	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 2	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 12	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 14	Shut-in	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 17	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 19	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 20	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 21	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 28	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 29	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 32	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 33	Shut-in	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 35	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 36	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 38	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 39	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 40	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 41	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
East Mereenie 42	Producing	Mereenie Oil/Gas Field	OL5	Central Petroleum Limited
West Mereenie 1	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 3	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 5	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 6	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 9	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 12	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 15	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 16	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 17	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 18	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 20	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
West Mereenie 23	Producing	Mereenie Oil/Gas Field	OL4	Central Petroleum Limited
Palm Valley 1	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 2	Producing	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 3	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 5	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 6	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 7	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Palm Valley 9	Shut-in	Palm Valley Gas Field	OL3	Central Petroleum Limited
Surprise 1 REH ST1	Shut-in	Surprise Oil Field	L6	Central Petroleum Limited

RESERVES AND RESOURCES

The NT onshore oil and gas reserves and resources estimated at the end of 2015 are summarised in the *Table 5* below.

<i>Table 5. NT Onshore Oil and Gas Reserves and Resources 2015</i>			
Gas Resource ¹ (Tcf)	Oil/Condensate Resource ¹ (mmbbl)	Gas Reserves ² (Tcf)	Oil/Condensate Reserves ² (mmbbl)
243	58	1.0	0.01
¹ For Resources, Best Estimates of prospective resources are used; ² For Reserves, 2P estimates are used; * Reserve and Resource estimates are based on reports provided and published by E&P companies in NT; * The estimates are for both Unconventional and Conventional Resources and Reserves.			

UPCOMING AND PROPOSED EXPLORATION, APPRAISAL AND DEVELOPMENT OPERATIONS

Activities for 2016 are expected to include the following:

- Armour Energy Ltd and its partners are expected to drill further appraisal wells in McArthur Basin including a possibility to conduct a seismic survey
- Beach Energy Ltd to conduct further well testing and evaluation of Cullen-1 well in EP126 in the onshore Bonaparte Basin
- Central Petroleum Limited is planning to conduct development drilling in the Palm Valley Gas Field in OL3 in the Amadeus Basin
- Central Petroleum Limited to change mode of operations of the Palm Valley Gas Field to 24 hour stand-by to provide back-up when the Dingo Gas Field comes on full production and can meet the current gas sales demand
- Imperial Oil & Gas Pty Limited is expected to conduct a geological field mapping survey in EP187 in the McArthur Basin
- Origin Energy Resources Limited will continue well appraisal and evaluation activities within EP98 and commenced exploration drilling in EP117 both in the Beetaloo Sub-basin
- Paltar Petroleum Limited is expected to drill an exploration well each in EP136 and EP143 in the McArthur Basin
- Pangaea (NT) Pty Ltd is expected to drill four appraisal wells within EP167 and EP168 in the McArthur Basin
- Santos QNT Pty Ltd is expected to conduct a 2D seismic survey within EP105, EP82, EP112 and EP125 in the Southern Amadeus Basin
- Santos QNT Pty Ltd is expected to drill stratigraphic wells in EP162 and EP189 in the McArthur Basin
- Santos QNT Pty Ltd is expected to conduct a DFIT on Tanumbirini 1 well in EP161 in the McArthur Basin
- Tom Oates is planning to conduct a 2D seismic survey within EP301 in the Georgina Basin.

Other Operations

As per the current approved work commitments under granted exploration permits, the following operators are expected to conduct drilling operations in 2016. A total of 25 wells are expected if the following operators complete their 2016 work program as planned.

- Armour Energy Pty Ltd
- Central Petroleum Limited
- Hancock Prospecting Pty Ltd
- Origin Energy Resources Limited
- Pangaea (NT) Pty Ltd
- Paltar Petroleum Limited
- Santos QNT Pty Ltd
- Tamboran Resources Limited
- Tri-Star Energy Company

A total of approximately 1,666 line km of 2D seismic survey is expected to be acquired by the following operators in 2016.

- Blue Energy Limited
- Central Petroleum Limited
- Hancock Prospecting Pty Ltd
- Imperial Oil & Gas Pty Limited
- Pangaea (NT) Pty Ltd
- Wiso Oil Pty Ltd

PIPELINES

In 2015 there were 21 licences under the NT's *Energy Pipelines Act*. (**Table 6**):

- Fifteen operational pipelines (13 natural gas, 1 LPG and 1 condensate)
- Four pre-operational gas pipelines (PL26, PL27, PL31 and PL32)
- Two mothballed pipelines (1 oil (PL2) and 1 gas (PL19)).

There were also four pipeline licences under the NT's *Petroleum (Submerged Lands) Act*. (**Table 6**):

- Three operational pipelines (2 gas and 1 condensate)
- One pre-operational gas pipeline (NTCP-4).

Pipelines completed, or under construction, in 2015 included:

- The Wadeye Lateral to the Bonaparte Gas Pipeline for supplying the new Wadeye Power Station (PL21)
- The onshore and offshore portions of NT portion of the 890 km Ichthys Gas Export Pipeline from the Ichthys Gas Field in the Browse Basin to the Ichthys LNG Plant at Bladin Point in Darwin Harbour (PL26, PL27 and NTCP-4)
- The Dingo Gas Pipeline from the Dingo Gas Field south of Alice Springs to the Owen Springs Power Station at Brewer Estate (PL30)
- The Wickham Point Pipeline / INPEX Fuel Gas Pipeline Interconnect Pipeline at Bladin Point (PL31)
- The Ichthys Fuel Gas Pipeline within the Ichthys LNG Plant at Bladin Point (PL32)

Licence No.	Onshore/Offshore	Name	Product	Length (km)	Nominal Diameter (mm)	Year Constructed
PL1	Onshore	Palm Valley to Alice Springs (incl. laterals)	Gas	156	200/150/50	1983 - 2011
PL2	Onshore	Mereenie Field to Brewer Estate	Oil	269	200	1985
PL4	Onshore	Amadeus Basin Pipeline (incl. laterals)	Gas	1628	350/300/250/100	1986
PL7	Onshore	Central Energy Pipeline	Gas	10	100	1988
PL10	Onshore	Elliot Pipeline	Gas	4	60	1990
PL15	Onshore	Channel Island LPG Pipeline	LPG	<1	150	1992
PL18	Onshore	Berrimah Pipeline	Gas	19	150	1996
PL19	Onshore	Mt Todd Mine Pipeline	Gas	10	200	1996
PL20	Offshore	Bayu-Undan to Darwin Pipeline	Gas	92	660	2005
NTCP-1	Offshore	Bayu-Undan to Darwin Pipeline	Gas	7	661	2005
PL21	Onshore	Bonaparte Gas Pipeline	Gas	286	300	2008
PL22	Onshore	Weddell Pipeline	Gas	1	300	2007
PL23	Offshore	Blacktip Gas Export Pipeline	Gas	3	450	2008
NTCP-2	Offshore	Blacktip Gas Export Pipeline	Gas	5	451	2008
PL24	Offshore	Blacktip Condensate Pipeline	Condensate	3	300	2008
NTCP-3	Offshore	Blacktip Condensate Pipeline	Condensate	6	301	2008
PL25	Onshore	Wickham Point Pipeline	Gas	10	300	2008
PL26	Offshore	Ichthys Gas Export Pipeline	Gas	82.50	1050	Under construction
NTCP-4	Offshore	Ichthys Gas Export Pipeline	Gas	7.0	1050	Under construction
PL28	Onshore	Darwin Abattoir Pipeline	Gas	2	50	2014
PL27	Onshore	Ichthys Gas Export Pipeline	Gas	3.30	1050	Under construction
PL30	Onshore	Dingo Pipeline	Gas	46.8	100	2015
PL31	Onshore	Wickham Point Pipeline / INPEX Fuel Gas Pipeline Interconnect	Gas	<1	300	Under construction
PL32	Onshore	Ichthys Fuel Gas Pipeline	Gas	1.30	300	Under construction
PL33	Onshore	McArthur River Mine Pipeline	Gas	333	150	1995

REGULATORY APPROVALS AND COMPLIANCE MONITORING ACTIVITIES

The Petroleum Operations team within the Energy Directorate administers and regulates all petroleum tenure and operations in the NT. A summary of all the regulatory approvals and compliance monitoring activities conducted in 2015 is provided in *Table 7*.

<i>Table 7. NT Regulatory Approvals and Compliance Monitoring Activities 2015</i>													
Regulatory Approvals and Compliance Monitoring	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	YTD
Projects/Operations/Titles reports received and reviewed	142	112	98	82	125	177	309	268	174	251	226	175	2139
Projects/Operations/Titles Applications received	5	8	14	7	7	6	14	21	14	14	16	5	131
Projects/Operations/Titles Applications Assessment in progress	5	13	13	17	17	11	71	13	12	9	13	12	206
Projects/Operations/Titles Applications Assessment completed	19	4	6	7	8	10	21	17	14	19	13	5	143
Projects/Operational/Titles Applications assessed	24	17	19	24	25	21	92	30	26	28	26	17	349
Environmental Management Plans submitted	1	2	4	2	1	1	4	0	0	2	0	1	18
Environmental Management Plans approved	0	0	2	2	2	1	2	2	1	0	0	0	12
Wells approved	0	0	0	0	2	2	1	1	0	1	0	0	7
Geophysical and seismic surveys approved	0	0	2	3	0	2	1	2	0	0	0	0	10
Clients/Stakeholders Meetings and Presentations	17	13	9	5	8	18	11	12	15	16	16	8	148
Visits/Inspections/Audits	0	1	1	0	0	2	2	0	0	5	0	9	20

REGULATORY REFORM

The Energy Directorate expects exploration activity to increase into the future. Whilst the focus remains on striving for leading contemporary regulation of onshore upstream and midstream energy activities and a high level of responsiveness to explorers and developers, we are also focused on building our regulatory and compliance monitoring capacity for the future. This includes investing in and expanding our staff, reviewing and improving our business systems and processes, and updating legislation to reduce unnecessary red tape whilst at the same time ensuring that the oil and gas activities can occur in a safe and environmentally sustainable manner in the NT.

USEFUL NORTHERN TERRITORY GOVERNMENT CONTACTS

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Energy Resource Development

Industry Development, NT Department of Business

This group facilitates development of:

- NT's oil and gas resources
- Darwin as a production hub and offshore petroleum supply base
- NT supply and service industries to support the regions oil and gas industry.

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