



Northern
Territory
Government

energyNT|2011

Energy activities for the Northern Territory, Australia



AUSTRALIA'S
Northern Territory

May 2012

energyNT|2011

Department of Resources, Minerals and Energy group
Darwin, May 2011

© Northern Territory Government

ISSN 1838-3874 (print)

ISSN 1838-3882 (online)

ISSN 1838-4250 (CD-ROM)

Bibliographic reference: Department of Resources, Minerals and Energy Group, 2012. *EnergyNT 2011*. Northern Territory Government, Darwin.

Cover photo:

Falcon Oil & Gas Australia Pty Ltd's Shenandoah-1A Fracking, Stimulation and Testing set-up, EP98, Beetaloo sub-Basin. Panorama constructed from photos courtesy of Falcon Oil & Gas Australia Pty Ltd.

Disclaimer

While all care has been taken to ensure that information contained in *energyNT 2011* is true and correct at the time of publication, changes in circumstances after the time of publication may impact on the accuracy of its information. The Northern Territory of Australia gives no warranty or assurance, and makes no representation as to the accuracy of any information or advice contained in *energyNT 2011*, or that it is suitable for your intended use. You should not rely upon information in this publication for the purpose of making any serious business or investment decisions without obtaining independent and/or professional advice in relation to your particular situation. The Northern Territory of Australia disclaims any liability or responsibility or duty of care towards any person for loss or damage caused by any use of, or reliance on the information contained in this publication.

CONTENTS

| | |
|---|----|
| Executive Summary | v |
| Administration of Petroleum Activities in Commonwealth Offshore Areas | v |
| Activities in NT Onshore and Coastal Waters | v |
| Petroleum | v |
| Licensed pipelines | v |
| Geothermal..... | v |
| Activities in NT-Administered Commonwealth Offshore Areas | vi |
| Petroleum | vi |
| Licensed pipelines | vi |
| Future Format of energy NT..... | vi |
| | |
| 2011 Activities | 1 |
| | |
| NT Onshore and Coastal Waters | 1 |
| Petroleum | 1 |
| Permits/Titles/Work programs | 1 |
| Onshore..... | 1 |
| Coastal Waters | 2 |
| Exploration | 4 |
| Seismic surveys | 4 |
| Drilling operations..... | 6 |
| Production | 6 |
| Oil | 6 |
| Gas..... | 7 |
| Development..... | 7 |
| Central Petroleum Ltd | 7 |
| Falcon Oil and Gas Australia Pty Ltd..... | 7 |
| PetroFrontier (Australia) Pty Ltd..... | 7 |
| Licensed pipelines | 8 |
| Geothermal..... | 9 |
| Titles | 9 |
| Exploration | 9 |
| | |
| Commonwealth Offshore Areas | 10 |
| Petroleum | 10 |
| Petroleum permits/titles/work programs..... | 10 |
| Principal Northern Territory Offshore Area..... | 10 |
| The Territory of Ashmore and Cartier Islands Offshore Area..... | 10 |
| Eastern Greater Sunrise Offshore Area | 10 |
| Exploration | 10 |
| Seismic operations: | 10 |
| Drilling operations:..... | 11 |
| Production | 11 |
| Development..... | 11 |
| PTTEP Australia (Ashmore Cartier) Pty Ltd (PTTEPAA)..... | 11 |
| Licensed pipelines | 12 |
| | |
| Useful NT Government Contacts | 13 |
| Energy Resource Development..... | 13 |
| Major Projects, Asian Relations and Trade Division, NT Department of the Chief Minister:..... | 13 |
| Energy Titles and Operations Administration and Regulation | 13 |
| Energy Titles & Operations, Minerals & Energy Group, NT Department of Resources: | 13 |
| | |
| Acknowledgements | 13 |

| | |
|---|----|
| Appendix 1 | |
| NT Oil and Gas Production Data (1983–2011) | 14 |
| Appendix 2 | |
| NT Onshore Petroleum Titles..... | 15 |
| Appendix 3 | |
| Petroleum Titles in the Principal NT Offshore Area..... | 16 |
| Appendix 4 | |
| Petroleum Titles in the Ashmore/Cartier Offshore Area | 17 |

Figures

| | |
|---|---|
| 1. Areas administered by Northern Territory Department of Resources during 2011 | 1 |
| 2. Northern Territory Coastal Waters (includes the 3 nautical mile-wide release area) | 2 |
| 3. Petroleum operations and development in 2011 | 3 |
| 4. Hess Australia (Beetaloo) Pty Ltd seismic program 2011 | 4 |
| 5. PetroFrontier's Emma 2D seismic acquisition, 2011–2012 | 5 |
| 6. Northern Territory onshore oil production for period 1983–2011 | 6 |
| 7. Northern Territory onshore gas production for period 1983–2011 | 7 |
| 8. Geothermal exploration permit applications in 2011 | 9 |

Tables

| | |
|---|----|
| 1. Wells drilled in the Northern Territory onshore area in 2011..... | 6 |
| 2. Operating Licensed Pipelines in NT Onshore and Coastal Waters areas..... | 8 |
| 3. Wells drilled in the Territory of Ashmore and Cartier Islands and the Northern Territory Offshore areas in 2011 | 11 |
| 4. Northern Territory administered Commonwealth Waters oil production data | 11 |

Executive Summary

Administration of Petroleum Activities in Commonwealth Offshore Areas

Commencing 1 January 2012, responsibility for administering and regulating petroleum activities (including petroleum transmission pipeline operations) in Commonwealth offshore areas passed from the states and the Northern Territory to the National Offshore Titles Administrator (NOPTA) and the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

The change in responsibility was one of the main recommendations from the Australian Government's Productivity Commission's April 2009 research report, "Review of Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector".

Activities in NT Onshore and Coastal Waters

Darwin's growth as a gas hub received a major boost in January 2012 when Inpex Browse, Ltd (Inpex) and Total E&P Australia (Total) committed to the \$34 billion Ichthys LNG and condensates project and chose Darwin as the site for construction of the project's 8.5 Mtpa LNG facilities. Combined with ConocoPhillips existing 3.5 Mtpa Darwin LNG Plant, (which is fed by the Bayu Undan field in the Joint Petroleum Development Area northwest of Darwin), the Ichthys facility will raise Darwin LNG exports to 12 Mtpa. The Ichthys gas processing facility will include two LNG trains, with room to expand to 6 trains, a liquefied petroleum gas processing facility and a condensate separation plant. Gas from the Ichthys field in the Browse Basin west of Darwin will be supplied through an 890 km 42" gas pipeline. The plant is expected to be operational and shipping LNG by the end of 2016.

Petroleum

2011 saw a significant increase in onshore petroleum activities. Highlights for the year include:

- Hess Australia (Beetaloo) Pty Ltd acquired 470 line km of 2D seismic in the Beetaloo Sub-basin of the McArthur Basin.
- Falcon Oil and Gas Australia Pty Ltd completed drilling and flow testing of the Shenandoah-1 exploratory well in the Beetaloo Sub-basin.
- PetroFrontier (Australia) Pty Ltd drilled two exploration wells and acquired 230 line km of 2D seismic in the Georgina Basin.
- Central Petroleum Ltd drilled and flow tested the Surprise-1 exploratory well in the Amadeus Basin.
- Santos Ltd commenced a workover of several wells in its Mereenie field as part of an upgrade in oil production capacity.

Proposed onshore activities for 2012 include:

- Central Petroleum Ltd: extended production testing of Surprise-1 and further exploration in the Amadeus Basin, including acquisition of 3D seismic over Surprise discovery.
- Falcon Oil and Gas Australia Pty Ltd: further exploration drilling in the Beetaloo Sub-basin.
- Hess Australia (Beetaloo) Pty Ltd: acquisition of 3100 line km of 2D seismic in the Beetaloo Sub-basin.
- PetroFrontier (Australia) Pty Ltd: further exploration drilling and acquisition of 1600 line km of 2D seismic in the Georgina Basin
- Armour Energy Pty Ltd: exploration drilling and acquisition of 67 line km of 2D seismic in the McArthur Basin

Licensed pipelines

Inpex and Total were issued 3 pipeline licences to cover the NT waters and onshore portions of the 890 km Ichthys Gas Export Pipeline to be constructed between the Ichthys Gas Field in the Browse Basin and the Ichthys LNG plant in Darwin Harbour.

APA Group, on behalf of Envestra Ltd., constructed a 4 km 150 mm diameter lateral pipeline to deliver gas from the Palm Valley Pipeline to the Pine Gap Facility at Alice Springs. Work was completed in December and operations commenced in Q2 2012.

Eni Australia's Blacktip gas pipeline supplied 22.5 PJ of energy to power stations, mines, commercial enter-

prises and homes from Darwin to Alice Springs through the Blacktip, Bonaparte, McArthur River and Amadeus Basin pipelines.

Geothermal

Areas in the Northern Territory were made available for geothermal exploration in February 2011. Six Geothermal Exploration Permits (GEP) were granted in 2011 covering a total area of 16 390 km². Exploration is being undertaken in various parts of the Northern Territory, including the Georgina and Pedirka basins. Work commitment for 2011 was estimated at \$657 000.

Activities in NT-Administered Commonwealth Offshore Areas

Petroleum

Highlights of 2011 included:

- Exploration drilling by Woodside Energy Ltd in AC/RL8, Santos Ltd in NT/RL1 and PTTEP Australasia (Ashmore Cartier) Pty Ltd in AC/RL7, AC/P24 and AC/P40.
- 3D seismic acquisition by Woodside Energy Ltd in AC/P48 and Eni Australia Ltd in NT/P68.
- Abandonment by PTTEP Australasia (Ashmore Cartier) Pty Ltd of the Jabiru and Challis fields
- Construction and development of the Montara and Swift/Skua fields by PTTEP Australasia (Ashmore Cartier) Pty Ltd.

Licensed pipelines

In March, the Ichthys Project joint venture partners Inpex and Total were granted pipeline licences for the 890 km Ichthys Gas Export Pipeline between the Ichthys Gas Field in the Browse Basin and the 8.5 Mtpa Ichthys LNG plant at Blaydin Point in Darwin Harbour.

Two licences were issued under the Commonwealth Offshore Petroleum and Greenhouse Gas Storage Act to cover sections of the pipeline that will traverse the Northern Territory and Western Australian administered sections of Commonwealth waters.

The Northern Territory Department of Resources was the lead administering agency in the process and worked closely with the WA Department of Mines and Petroleum and the Commonwealth Department of Resources, Energy and Tourism.

Future Format of energy|NT

As a consequence of the transfer of responsibilities for administering and regulating petroleum activities in Commonwealth offshore areas to NOPTA and NOPSEMA, future issues of **energy|NT** will focus on onshore activities (including coastal waters to the 3 nautical mile limit) and will be in the form of a four or five page “brochure type” format; a digital version of which will be available on the Department of Resources’ website in early February each year.

Enquiries for information on petroleum activities in Commonwealth offshore areas previously administered by the Northern Territory should now be directed to NOPTA and NOPSEMA.

2011 Activities

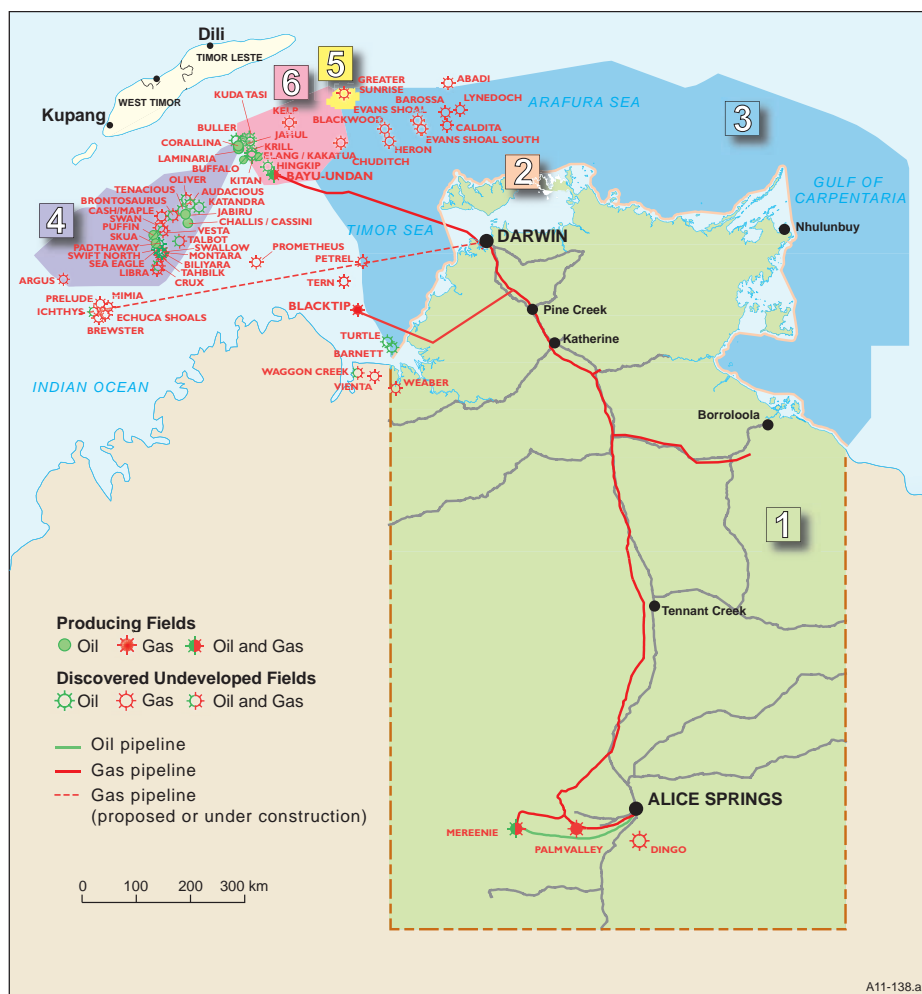
NT Onshore and Coastal Waters

PETROLEUM

Permits/Titles/Work programs

Onshore

The NT onshore area is over 1.35 million km² (**Figure 1**) and as of December 2011, there were 24 active exploration permits, 2 retention licenses and 3 production licences, where hydrocarbons have been produced since the early 1980s. **Appendix 2** contains a list of 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

3 Area 3: The Principal Northern Territory Offshore Area: 0.501 million km² between the Territorial Waters line and the international borders. This area is administered by DoR on behalf of the Commonwealth of Australia.

4 Area 4: The Territory of Ashmore and Cartier Islands Offshore Area, 77 187 km² within the Western Australian Offshore Area; this area is administered by DoR on behalf of the Commonwealth of Australia.

5 Area 5: Greater Sunrise is made up of two adjacent but separate gas-condensate fields – Sunrise and Troubadour. The field is jointly administered by the governments of Australia and Timor-Leste.

6 Area 6: A sixth Joint Petroleum Development Area (JPDA); is administered by a Joint Authority, independent from the Territory Government.

Figure 1. Areas administered by Northern Territory Department of Resources in 2011. (Administration of Areas 3, 4, 5, and 6 passed to NOPTA and NOPSEMA on 1 January 2012)

The minimum nominated exploration expenditure work program for onshore titles for the period 2012–2015 is estimated at A\$56.8M for petroleum exploration. The work commitment for the period includes the drilling of 16 wells and the acquisition of 3269 line km of 2D seismic data.

Four onshore titles were granted in 2011 and 90 applications were received, continuing a steady increase from only 10 in 2007.

- EP 126 was awarded to Territory Oil and Gas Pty Ltd. The proposed work program includes a helicopter-borne gravity survey, seismic processing and interpretation, and the drilling of a 1500 m well in year 4 .
- EP 156 was awarded to Oilco Pty Ltd, The proposed work program includes a geological and geophysical review, 225 line km of seismic acquisition, processing and interpretation, and the drilling of a well in year 4 of the program.
- EP 171 was awarded to Armour Energy Pty Ltd, The proposed work program includes geological mapping, geophysical interpretation, core drilling, appraisal and prefeasibility studies.
- EP 176 was awarded to Armour Energy Pty Ltd, The proposed work program includes; geological mapping, geophysical interpretation, and exploration drilling.

Expenditure for onshore petroleum exploration activities in the Northern Territory is expected to exceed \$33M, including \$19.2M in the above permits.

Coastal Waters

Coastal Waters includes all waters between the mean low water mark and a line 3 nautical miles seaward of the Australian Territorial Sea Baseline (**Figures 1, 2**). This area was first released for applications in 2009 and is approximately 15 000 km². Unlike Commonwealth Waters, acreage in Coastal Waters is not released for competitive tender, but is available for application at any time. Four applications for exploration permits were received in 2011.

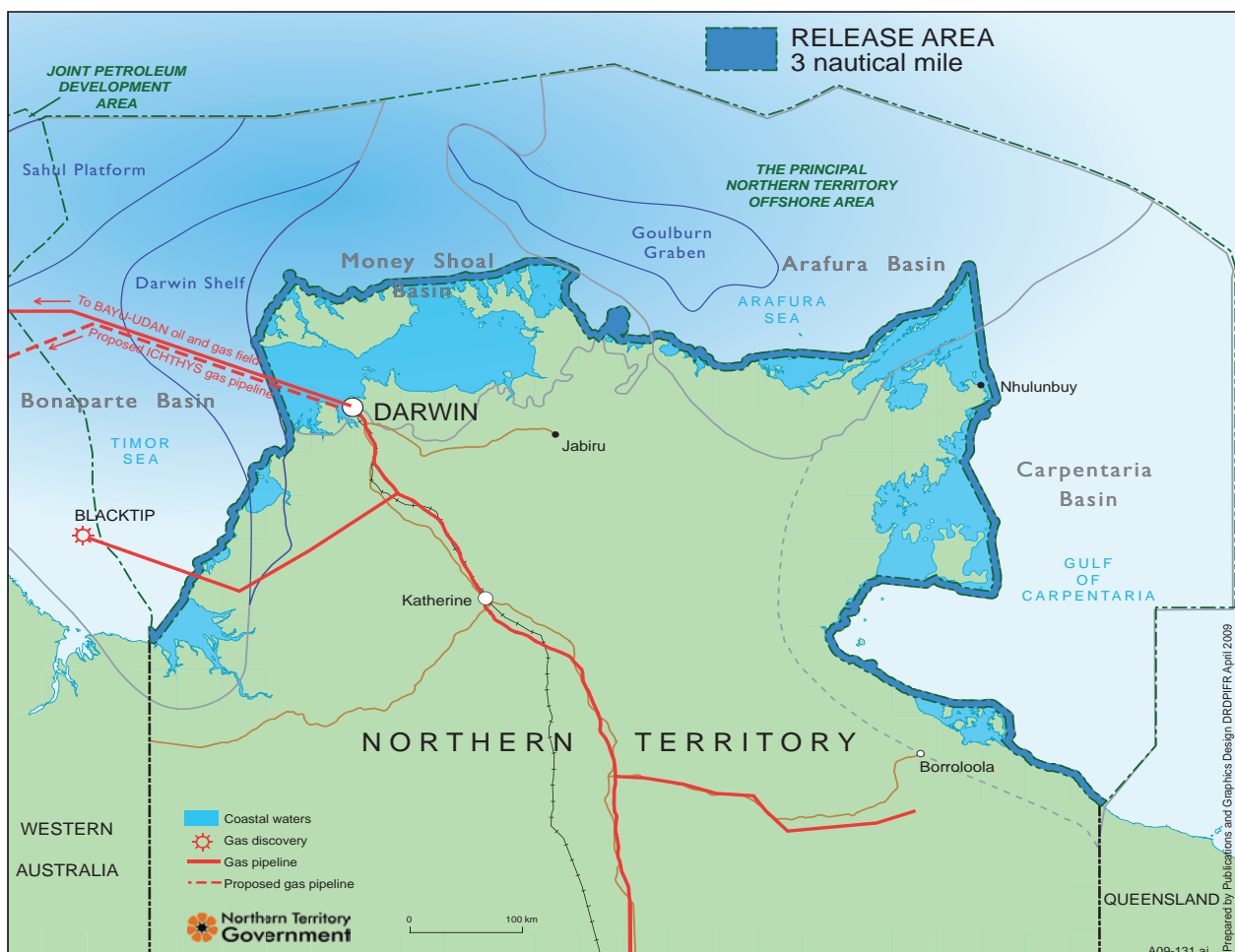
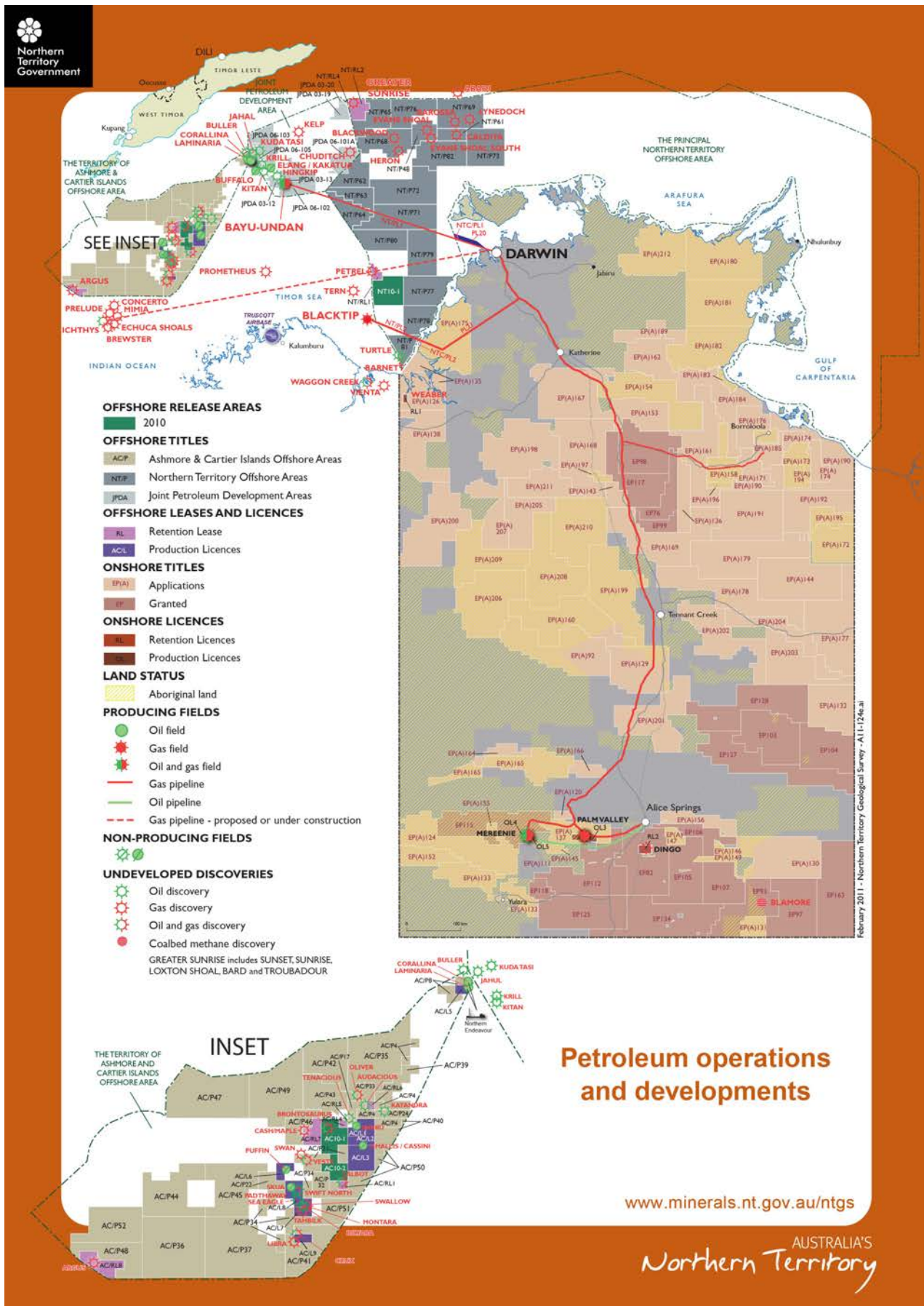


Figure 2. Northern Territory Coastal Waters – (includes the 3 nautical mile wide Release Area)



Petroleum operations and developments

www.minerals.nt.gov.au/ntgs

AUSTRALIA'S
Northern Territory

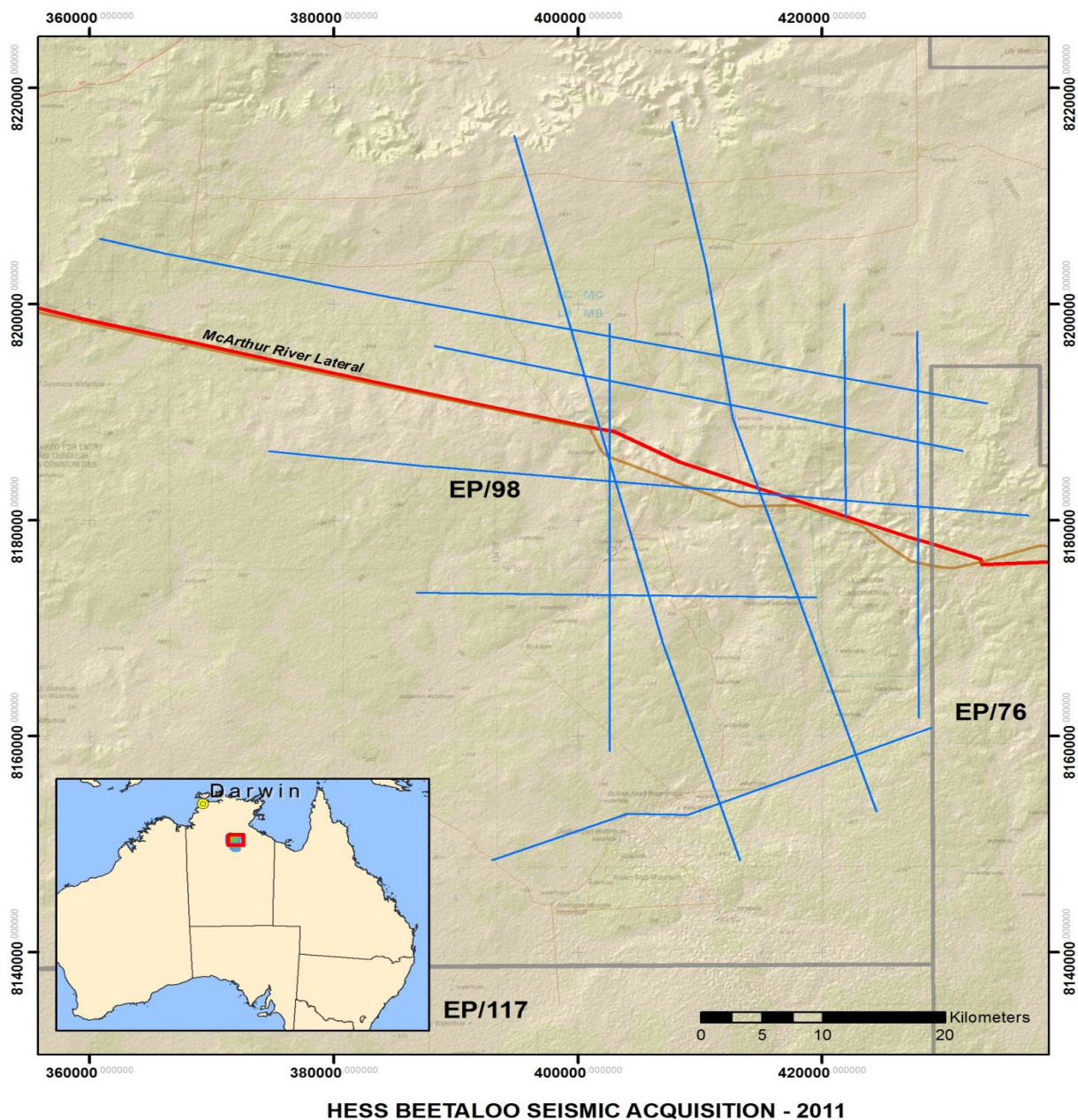
Figure 3. Petroleum operations and development 2011.

Exploration

Seismic surveys

There were three 2D seismic surveys undertaken in onshore areas of the Northern Territory in 2011:

- Hess Australia (Beetaloo) Pty Ltd: In July, Hess commenced a 3600 line km 2D seismic acquisition program over Falcon Oil and Gas Australia Ltd's exploration permits EP 76, 98 and 117 in the Beetaloo Sub-basin, principally south and east of Daly Waters (**Figure 4**). 470 line km of data were acquired prior to the wet season, mainly in EP 98. The survey will be completed in 2012.
- PetroFrontier (Australia) Pty Ltd: In September, PetroFrontier commenced the Emma 2D seismic survey (**Figure 5**) proposed to cover 1869 line km in exploration permits EP 103, 104, 127 and 128 in the



HESS Australia (Beetaloo) will bear no liability for reproductions, copies or derivations of this map.

Figure 4. Hess Australia (Beetaloo) Pty Ltd seismic program 2011.

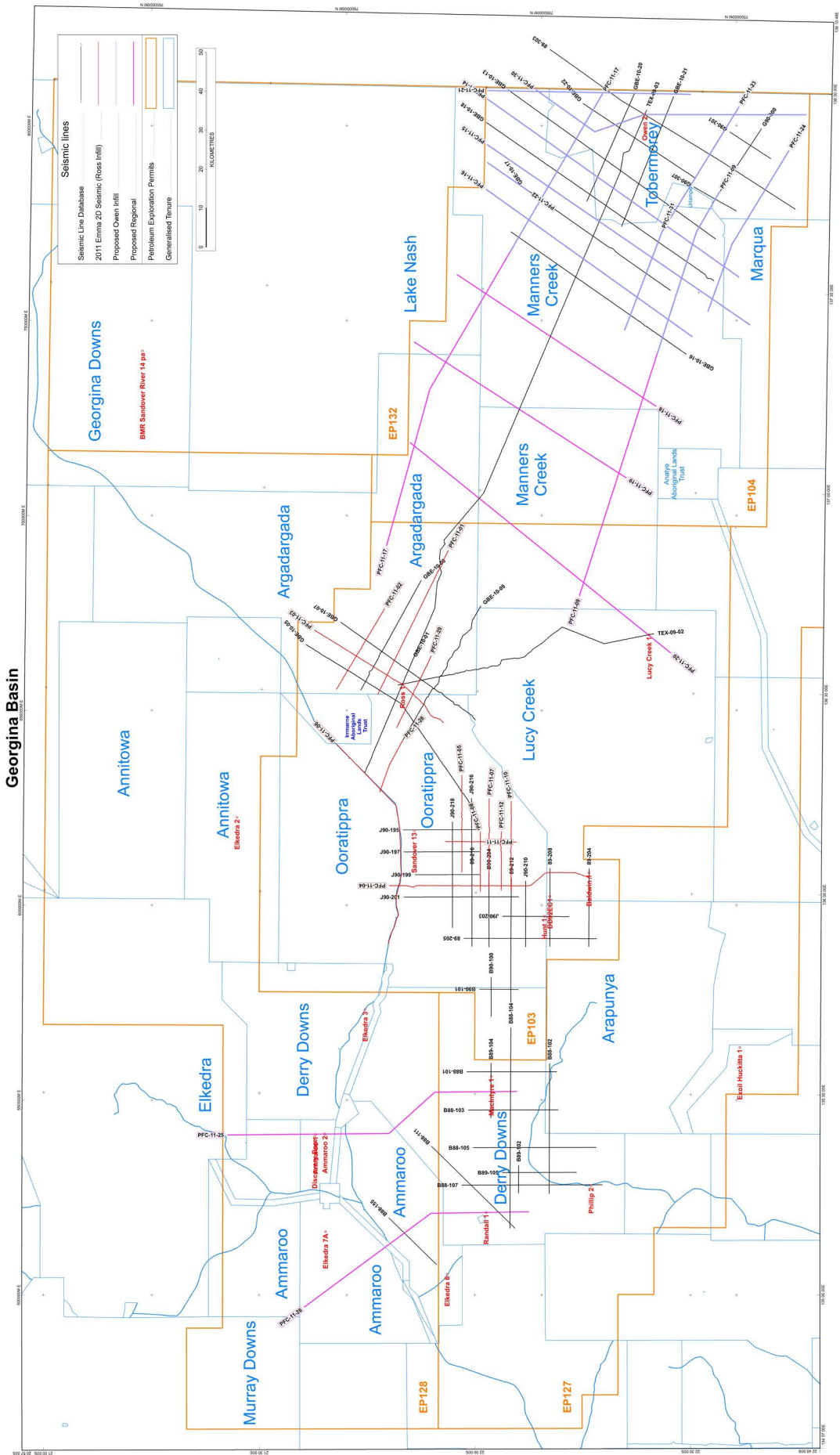


Figure 5. PetroFrontier's Emma 2D seismic acquisition, 2011–2012.

Georgina Basin northeast of Alice Springs. Acquisition of the first stage (Ross Infill), covering approximately 374 line km, was completed in November. The second and third stages will be completed in 2012.

- Santos Ltd: In May, Santos ran an 8.5 line km 2D seismic survey trial in OL 4 and EP 115 at the Mereenie Field in the Amadeus Basin west of Alice Springs.

Drilling operations

A total of four exploration drilling operations were conducted in NT onshore areas (see **Table 1**).

| Well Name | Classification | Operator | Permit | Drill Rig | Spud Date | Rig release date | Total Depth (m-MD) | Comments |
|---------------------------|----------------|-----------------------------------|--------|-----------------------|------------|--|--|--|
| Baldwin 2H ST1 | Exploration | PetroFrontier (Australia) Pty Ltd | EP103 | SS20108-Schramm TX200 | 03/08/2011 | 15/10/2011 | 1952.5 | Completed and suspended as a potential producer. |
| MacIntyre 2 | Exploration | PetroFrontier (Australia) Pty Ltd | EP127 | TXD-SS20108 | 28/10/2011 | Drilling Operations suspended due to wet season. | Drilling Operations suspended due to wet season. | Drilling Operations suspended due to wet season. |
| Shenandoah 1A Re-entry | Exploration | Falcon Oil and Gas Australia Ltd | EP98 | ADS Rig No.6 | 4/09/2011 | 22/09/2011 | 2714 | Re-entered to drill out cement plugs. Stimulated and tested prior to plugging and abandonment. |
| Surprise 1 Re-entry H ST1 | Exploration | Central Petroleum Ltd | EP115 | Hunt Rig No.3 | 19/11/2011 | 13/01/2012 | 2853 | Re-entered, deepened, sidetracked, completed and suspended awaiting Extended Production Test. |

Table 1. Wells drilled in the Northern Territory onshore area in 2011.

Production

Oil

The Northern Territory's total onshore oil production comes from the Santos-operated Mereenie field west of Alice Springs. In 2011, Mereenie produced 0.184 mmbbl of oil (**Figure 6**), a 6% increase over the 0.173 mmbbl produced in 2010. Production should continue to increase during 2012 as Santos refocuses on the oil side of its operations.

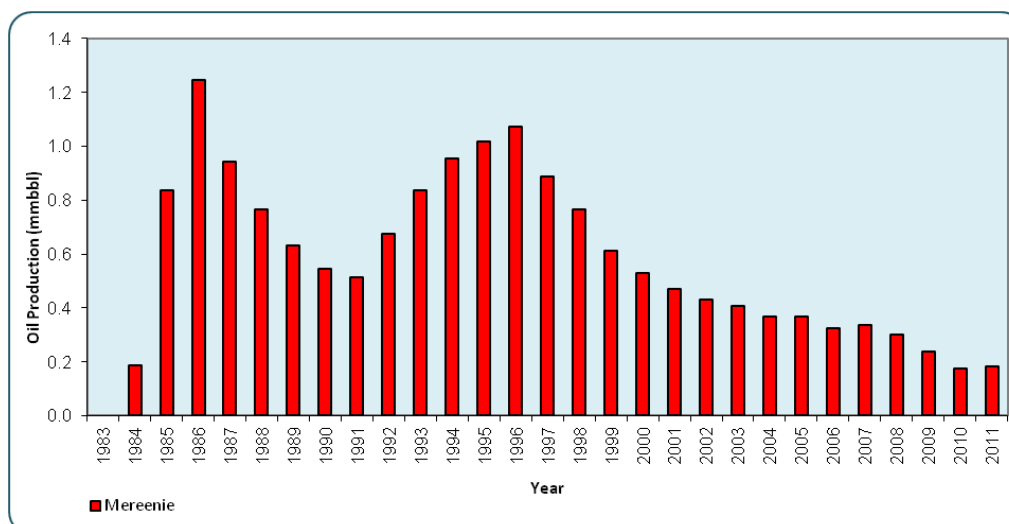


Figure 6. Northern Territory onshore oil production for period 1983–2011.

Shipment of oil from Mereenie to South Australia continues to be by truck, but the viability of refurbishing the pipeline is being reassessed in light of the impending increases in production.

Gas

All of the NT's onshore gas production comes from the Mereenie and Palm Valley fields in the Amadeus Basin, west of Alice Springs. In 2011, 2.909 bscf of gas was produced from the fields (**Figure 7**). Mereenie produced 1.212 bscf in 2011 compared to 2.051 bscf in 2010, while Palm Valley produced 1.697 bscf in 2011 compared to 1.922 bscf in 2010.

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 maintaining pressure.

Gas from Palm Valley, which is operated by Magellan Petroleum Australia Ltd, has been supplied to Power and Water Corporation in Alice Springs for power generation. This contract ended on 16 January 2012, but Magellan has been able to continue limited production through working arrangements with Santos Ltd.

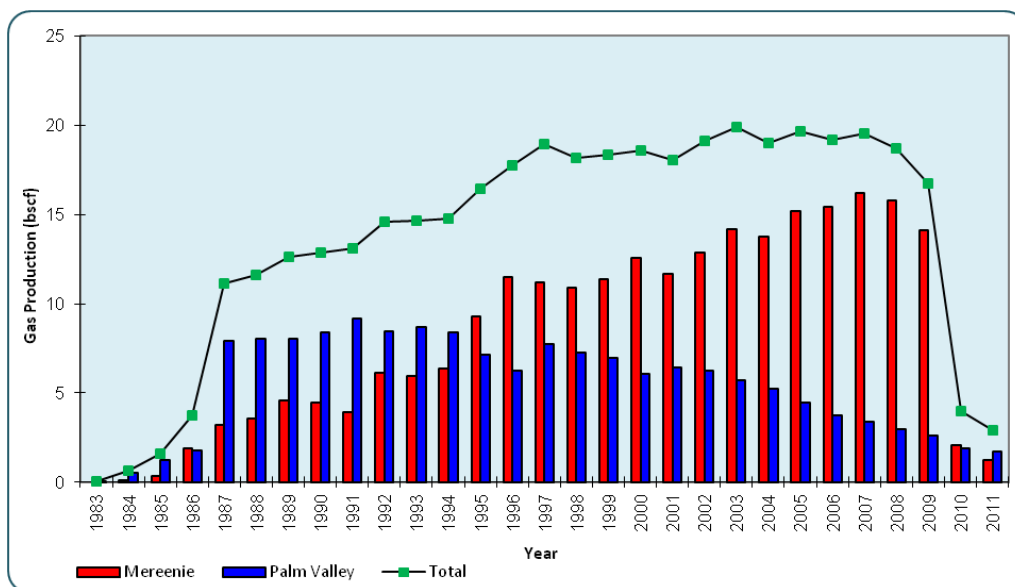


Figure 7. Northern Territory onshore gas production for period 1983–2011.

Development

Central Petroleum Ltd

Central Petroleum is proposing to conduct an Extended Production Test (EPT) on the currently suspended Surprise 1 Reentry H ST1 well in EP 115, which it hopes will prove to be a commercial producer, to verify the initial flow test results of 380 bopd. The company is also proposing further seismic surveys in the Surprise area to assist with operational planning.

Falcon Oil and Gas Australia Pty Ltd

Activities planned for 2012 in Falcon's exploration permits EP 76, 98, 99 and 117 include:

- proposed drilling of further wells
- acquisition of 3130 line km of 2D seismic in exploration permits EP 76, 98 and 117 by Hess Australia (Beetaloo) Pty Ltd to complete the survey commenced in 2011.

PetroFrontier (Australia) Pty Ltd

PetroFrontier's program for 2012 includes acquiring the final 1495 line km of the rain-delayed Emma 2D seismic survey and the completion of operations at the MacIntyre-2 well followed by the drilling of Owen-3/3H.

LICENSED PIPELINES

There are 19 current licences under the NT's *Energy Pipelines Act*. 13 operational pipelines (11 gas, one condensate and one LPG; **Table 2**), two mothballed pipelines (one oil and one gas), two decommissioned gas pipelines and two sections of the 890 km Ichthys Project gas export pipeline, construction of which is scheduled to commence in Q2 2014.

There are 4 current licences under the NT's *Petroleum (Submerged Lands) Act*. 3 operational pipelines (two gas and one condensate; **Table 2**), and a section of the yet-to-be-constructed Ichthys Project gas export pipeline.

Inpex and Total were issued 3 licences to cover the NT waters and onshore portions of the 890 km Ichthys Gas Export Pipeline to be constructed between the Ichthys Gas Field in the Browse Basin and the Ichthys LNG plant in Darwin Harbour.

APA Group, on behalf of Envestra Ltd, constructed a 4 km 150 mm diameter lateral pipeline from the Palm Valley Pipeline (Pipeline Licence 1) to deliver gas to the Pine Gap Facility at Alice Springs. Work was completed in December 2011, and operations commenced late in Q1 2012.

Eni Australia's Blacktip gas field in the Bonaparte Gulf and the associated onshore gas processing facility at Wadeye were fully operational and supplied 22.5 PJ of energy to power stations, mines, commercial enterprises and homes from Darwin to Alice Springs through the Blacktip, Bonaparte, McArthur River and Amadeus Basin pipelines.

| Licence Number | Name | Product | Length (km) | Nominal diameter (mm) | Year constructed |
|----------------|--|------------|-------------|------------------------|------------------|
| PL1 | Palm Valley to Alice springs (incl. laterals) | Gas | 156.00 | DN200 | 1983-2011 |
| PL4 | Amadeus Basin Pipeline (incl. laterals) | Gas | 1628.00 | DN2350/300/ 250/100 | 1986 |
| PL7 | Central Energy Pipeline | Gas | 10.20 | DN100 | 1988 |
| PL10 | Elliott Pipeline | Gas | 4.00 | DN60 | 1990 |
| PL15 | Channel Island Pipeline | LPG | 0.28 | DN150 | 1992 |
| PL17 | McArthur River Mine Pipeline | Gas | 333.00 | DN150 | 1995 |
| PL18 | Berrimah Pipeline | Gas | 19.00 | DN150 | 1996 |
| PL20 | Bayu Undan to Darwin Pipeline (Territorial Sea Baseline to Darwin LNG Plant) | Gas | 92.20 | DN660 | 2005 |
| NTCP-1 | Bayu Undan to Darwin Pipeline (3 Nautical Mile Limit to Territorial Sea Baseline) | Gas | ~ 6.00 | DN660 | 2005 |
| PL21 | Bonaparte Pipeline | Gas | 286.00 | DN300 | 2008 |
| PL22 | Weddell Interconnect Pipeline | Gas | 1.20 | DN300 | 2007 |
| PL23 | Blacktip Gas Pipeline (Territorial Sea Baseline to Wadeye Gas Processing Facility) | Gas | 110.00 | DN450 | 2008 |
| NTCP-2 | Blacktip Gas Pipeline (3 Nautical Mile Limit to Territorial Sea Baseline) | Gas | ~ 6.00 | DN450 | 2008 |
| PL24 | Blacktip Condensate Pipeline (Wadeye Gas Processing Facility to Territorial Sea Baseline) | Condensate | 9.00 | DN300 | 2008 |
| NTCP-3 | Blacktip Condensate Pipeline (Territorial Sea Baseline to 3 Nautical Mile Limit) | Condensate | ~ 6.00 | DN300 | 2008 |
| PL25 | Wickham Point Interconnect Pipeline | Gas | 12.00 | DN300 | 2008 |

Table 2. Operating Energy Pipelines in NT Onshore and Coastal Waters Areas (Licensed under the Northern Territory Energy Pipelines and Petroleum (Submerged Lands) Acts).

GEOTHERMAL

Titles

Six Geothermal Exploration Permits were awarded in February 2011 (**Figure 8**). Work commitments for the first year were essentially research and analysis. Most drilling activity is not planned until 2013.

Exploration

By February 2012, most of the permit holders are expected to have completed their first year of exploration work program. The exploration activities undertaken will be reported in energyNT|2013.

Close to \$60M has been committed for geothermal exploration over the next three years.

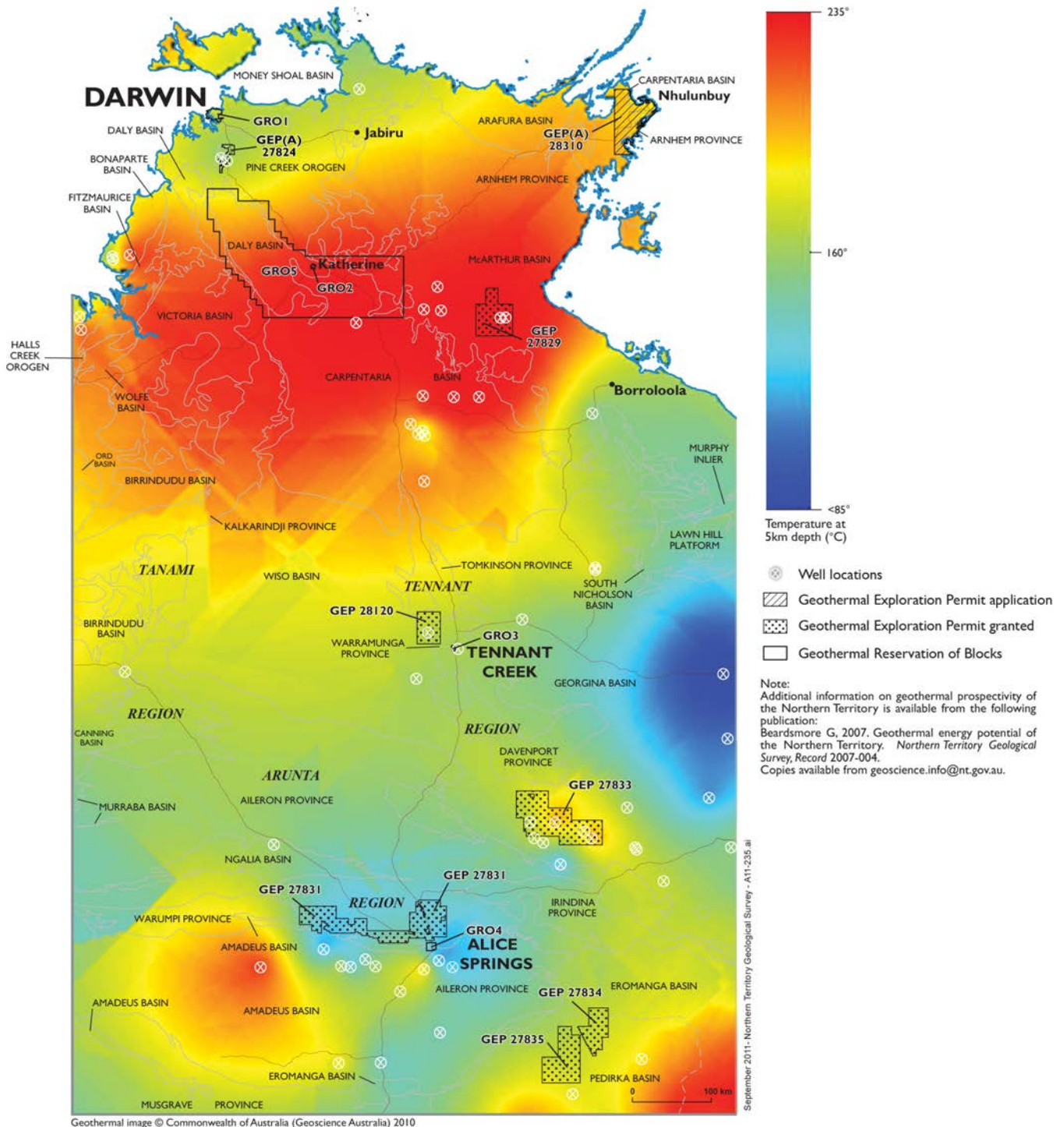


Figure 8. Geothermal exploration permit applications in 2011

Commonwealth Offshore Areas

During 2011, the Northern Territory administered two offshore areas on behalf of the Commonwealth, these being the Principal Northern Territory Offshore Area and the Territory of the Ashmore and Cartier Islands Offshore Area (Areas 3 and 4 in **Figure 1**). In addition, the NT provided support for Commonwealth in regard to the special Eastern Greater Sunrise Offshore Area (Area 5 in **Figure 1**). Responsibility for administration of these areas passed to NOPSEMA and NOPTA on 1 January 2012.

PETROLEUM

Petroleum permits/titles/work programs

Principal Northern Territory Offshore Area

The Principal Northern Territory Offshore Area includes over 0.5 million km² of sea between the three nautical miles line around the Territory coastline and the international borders of Australia (Area 3 of **Figure 1**). The area is currently subject to 10 exploration permits and 3 retention leases, which include highly productive gas discoveries (**Figure 3**).

A minimum nominated expenditure for the five-year period 2011–2015 of A\$450 million has been committed in the Principal Northern Territory Offshore Area. The work programs for the period include the drilling of 18 wells and acquisition of 1950 line km of 2D and 620 km² of 3D seismic data.

Appendix 3 contains a list of Principal Northern Territory Offshore Area titles and titleholders.

The Territory of Ashmore and Cartier Islands Offshore Area

The Territory of Ashmore and Cartier Islands Offshore Area covers 69 170 km² adjacent to the northwest corner of the Western Australian Offshore Area (Area 4 of **Figure 1**). In 2011, this area held 26 exploration permits (two of which were granted during the year), as well as 6 retention leases and 8 production licences (**Figure 3**).

A minimum nominated expenditure of A\$625 million has been committed for the period 2011–2015. This includes the drilling of 23 wells and the acquisition of 4650 line km of 2D and 5910 km² of 3D seismic data.

Appendix 4 contains a list of Ashmore and Cartier Islands Offshore Area Titles and Titleholders.

Eastern Greater Sunrise Offshore Area

The Eastern Greater Sunrise Offshore Area comprises the NT/RL2 and NT/RL4 retention leases, and was created in 2007 to reflect the introduction and ratification of a number of international treaties (Area 5 of **Figure 1**). In 2007, NT/RL2 was renewed and NT/RL4 was granted for a five-year term.

Appendix 3 contains a list of Greater Sunrise Area titles.

Exploration

Seismic operations:

Two 3D marine seismic surveys were conducted in 2011. One was undertaken in the Territory of Ashmore and Cartier Islands Offshore Area, the other in the Principal Northern Territory Offshore Area:

- Woodside Energy Ltd's Phrixus 3D marine seismic survey was acquired over exploration permit AC/P48. The survey was conducted over 509.79 km² in May 2011. PGS used the Ramform Sterling to acquire the survey.
- Eni Australia Ltd's Bathurst 3D marine seismic survey was acquired over 701.79 km² in exploration permit NT/P68. CGG Veritas used the seismic survey vessel Viking II to conduct the survey from December 2011 to January 2012.

Drilling operations:

Offshore operators drilled five exploration wells in 2011. Four of the wells were drilled in the Territory of Ashmore and Cartier Islands Offshore Area, whereas one well was drilled in the Northern Territory Offshore Area (**Table 3**).

| Well Name | Classification | Operator | Permit | Drill rig | Spud date | Rig release date | Total depth (m-MD) | Comments |
|-------------|----------------|---|--------|---------------|------------|------------------|--------------------|-----------|
| Argus 2 ST1 | Exploration | Woodside Energy Ltd | AC/RL8 | Ocean America | 02/06/2011 | 14/09/2011 | 4718 | Abandoned |
| Cash 2 | Exploration | PTTEP Australasia (Ashmore Cartier) Pty Ltd | AC/RL7 | Ocean Patriot | 02/07/2011 | 24/09/2011 | 4135 | Abandoned |
| Ironstone 1 | Exploration | PTTEP Australasia (Ashmore Cartier) Pty Ltd | AC/P40 | Ocean Patriot | 26/09/2011 | 12/10/2011 | 1492 | Abandoned |
| Kingtree 1 | Exploration | PTTEP Australasia (Ashmore Cartier) Pty Ltd | AC/P24 | Ocean Patriot | 14/10/2011 | 26/10/2011 | 1472 | Abandoned |
| Petrel 7 | Exploration | Santos Ltd | NT/RL1 | Stena Clyde | 02/08/2011 | 27/10/2011 | 3923 | Abandoned |

Table 3. Wells drilled in the Territory of Ashmore and Cartier and Northern Territory Offshore areas in 2011.

Production

Woodside Energy Ltd's Floating Production, Storage and Offtake Facility (FPSO), the *Northern Endeavour*, which receives oil from the Laminaria and Corallina fields in the northeastern corner of the Ashmore/Cartier Offshore Area currently produces all of the Territory's offshore oil. A total of 2.6 mmbbl of oil were produced in 2011 (**Table 4**), a 40% decrease from the 4.3 mmbbl of oil produced in 2010. The decline is attributable to a combination of natural depletion of resources and increasing water cuts.

The cessation of production from the Jabiru and Challis fields in 2010 also contributed significantly to 2011's decreased offshore oil production performance, though PTTEP Australasia (Ashmore Cartier) Pty Ltd's current development of the Montara and Skua/Swift fields and the Montara production platform and FPSO will help improve this situation in the near future.

| Oil Production (mmbbl) | | | | | | |
|------------------------|--------|---------|-----------|-----------|--------|--------|
| YEAR | Jabiru | Challis | Laminaria | Corallina | Puffin | TOTAL |
| 2007 | 0.897 | 0.578 | 2.034 | 3.066 | 0.838 | 7.413 |
| 2008 | 0.942 | 0.503 | 1.202 | 1.909 | 1.204 | 5.760 |
| 2009 | 0.603 | 0.485 | 1.009 | 4.314 | 0.205 | 6.616 |
| 2010 | 0.562 | 0.300 | 0.945 | 2.538 | 0 | 4.345 |
| 2011 | 0 | 0 | 1.016 | 1.615 | 0 | 2.631 |
| TOTAL | 3.004 | 1.866 | 6.206 | 13.442 | 2.247 | 26.765 |

Table 4. Oil production in Commonwealth Waters 2007-2011.

Development**PTTEP Australia (Ashmore Cartier) Pty Ltd (PTTEPAA)**

In 2011, PTTEPAA continued development of the Montara and Swift/Skua fields as part of the Southern Oil Project, covering permits AC/L7, AC/L8, AC/P32 and AC/P34, and expects to produce first oil in Q3 2012.

Future operations in the area will include new exploration and reappraisal of production license areas to determine whether they contain previously undiscovered resources that may be commercially viable.

LICENSED PIPELINES

Inpex Browse, Ltd and Total E&P Australia were issued pipelines licences CTP-PLA-0005 and NTPL4 for the Principal Western Australian Offshore Area and the Principal Northern Territory Offshore Area portions of the 890 km Ichthys Gas Export Pipeline to be constructed between the Ichthys Gas Field in the Browse Basin and the Ichthys LNG plant in Darwin Harbour.

Commencing 1 January 2012, NOPSEMA and NOPTA are responsible for all aspects of administration of these licences.

Useful NT Government Contacts

ENERGY RESOURCE DEVELOPMENT

Major Projects, Asian Relations and Trade Division, NT Department of the Chief Minister:

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.

Enquiries

Phone: +61 8 8946 9555

Fax: +61 8 8946 9556

Email: majorprojects.info@nt.gov.au

ENERGY TITLES AND OPERATIONS ADMINISTRATION AND REGULATION

Energy Titles & Operations, Minerals & Energy Group, NT Department of Resources:

Administers and regulates upstream petroleum activities, petroleum transmission pipelines and geothermal resource activities in Northern Territory onshore and coastal waters areas.

Director of Energy

Phone: +61 8 8999 5357

Fax: +61 8 8981 7106

Email: directorenergy@nt.gov.au

Energy Titles

Phone: +61 8 8999 7112

Fax: +61 8 8981 7106

Email: petroleum.operations@nt.gov.au

Energy Operations

Phone: +61 8 8999 5460

Fax: +61 8 8981 7106

Email: petroleum.operations@nt.gov.au

Acknowledgements

This annual report is a compilation of contributions made by several sections within the Northern Territory Government. The report was edited and formatted by the Publications and Graphic Design section of the Northern Territory Geological Survey.

Department of Resources

Richard Galton

Chief Executive

Alister Trier

Executive Director

Alan Holland

Director of Energy

Ian Scrimgeour

Director Northern Territory Geological Survey

Appendix 1

NT Oil and Gas Production Data (1983–2011)

| YEAR | OIL PRODUCTION (mmbbl) | | | | | | | | GAS PRODUCTION (bscf) | | | |
|-------|------------------------|----------|---------|--------|-----------|-----------|--------|----------------|-----------------------|----------|-------------|---------|
| | Onshore | Offshore | | | | | | | TOTAL | Mereenie | Palm Valley | TOTAL |
| | Mereenie | Jabiru | Challis | Skua | Laminaria | Corallina | Puffin | Offshore Total | | | | |
| 1983 | | | | | | | | 0.000 | 0.000 | 0.000 | 0.029 | 0.029 |
| 1984 | 0.187 | | | | | | | 0.000 | 0.187 | 0.125 | 0.519 | 0.644 |
| 1985 | 0.835 | | | | | | | 0.000 | 0.835 | 0.365 | 1.259 | 1.624 |
| 1986 | 1.246 | 2.005 | | | | | | 2.005 | 3.251 | 1.919 | 1.804 | 3.723 |
| 1987 | 0.941 | 7.620 | | | | | | 7.620 | 8.561 | 3.207 | 7.928 | 11.135 |
| 1988 | 0.765 | 11.391 | | | | | | 11.391 | 12.156 | 3.587 | 8.023 | 11.610 |
| 1989 | 0.631 | 15.126 | 0.535 | | | | | 15.661 | 16.292 | 4.560 | 8.043 | 12.603 |
| 1990 | 0.547 | 19.452 | 11.049 | | | | | 30.501 | 31.048 | 4.453 | 8.391 | 12.844 |
| 1991 | 0.514 | 9.977 | 12.109 | 0.288 | | | | 22.374 | 22.888 | 3.944 | 9.147 | 13.091 |
| 1992 | 0.676 | 9.343 | 7.562 | 8.045 | | | | 24.950 | 25.626 | 6.121 | 8.450 | 14.571 |
| 1993 | 0.838 | 4.169 | 5.066 | 5.522 | | | | 14.757 | 15.595 | 5.972 | 8.687 | 14.659 |
| 1994 | 0.956 | 5.289 | 3.008 | 3.249 | | | | 11.546 | 12.502 | 6.339 | 8.424 | 14.763 |
| 1995 | 1.018 | 2.777 | 4.596 | 1.962 | | | | 9.335 | 10.353 | 9.297 | 7.148 | 16.445 |
| 1996 | 1.073 | 2.982 | 2.977 | 1.351 | | | | 7.310 | 8.383 | 11.491 | 6.263 | 17.754 |
| 1997 | 0.886 | 3.719 | 2.291 | 0.075 | | | | 6.085 | 6.971 | 11.208 | 7.724 | 18.932 |
| 1998 | 0.766 | 2.593 | 1.652 | 0.000 | | | | 4.245 | 5.011 | 10.911 | 7.267 | 18.178 |
| 1999 | 0.614 | 2.568 | 1.312 | 0.000 | 4.403 | 0.910 | | 9.193 | 9.807 | 11.387 | 6.981 | 18.368 |
| 2000 | 0.530 | 2.034 | 1.259 | 0.000 | 29.886 | 20.954 | | 54.133 | 54.663 | 12.558 | 6.053 | 18.611 |
| 2001 | 0.469 | 1.705 | 1.164 | 0.000 | 20.653 | 19.872 | | 43.394 | 43.863 | 11.652 | 6.430 | 18.082 |
| 2002 | 0.431 | 1.742 | 0.944 | 0.000 | 16.278 | 13.534 | | 32.498 | 32.929 | 12.867 | 6.248 | 19.115 |
| 2003 | 0.407 | 1.652 | 0.921 | 0.000 | 7.063 | 9.527 | | 19.163 | 19.570 | 14.161 | 5.718 | 19.879 |
| 2004 | 0.366 | 1.148 | 0.612 | 0.000 | 3.072 | 7.070 | | 11.902 | 12.268 | 13.771 | 5.220 | 18.991 |
| 2005 | 0.366 | 1.049 | 0.625 | 0.000 | 1.685 | 5.735 | | 9.094 | 9.460 | 15.209 | 4.448 | 19.657 |
| 2006 | 0.324 | 1.110 | 0.493 | 0.000 | 2.320 | 5.167 | | 9.090 | 9.414 | 15.413 | 3.754 | 19.167 |
| 2007 | 0.336 | 0.897 | 0.578 | 0.000 | 2.034 | 3.066 | 0.838 | 7.413 | 7.749 | 16.202 | 3.371 | 19.573 |
| 2008 | 0.301 | 0.942 | 0.503 | 0.000 | 1.202 | 1.909 | 1.204 | 5.760 | 6.061 | 15.759 | 2.973 | 18.732 |
| 2009 | 0.236 | 0.603 | 0.485 | 0.000 | 1.009 | 4.314 | 0.205 | 6.616 | 6.852 | 14.123 | 2.639 | 16.762 |
| 2010 | 0.173 | 0.562 | 0.300 | 0.000 | 0.945 | 2.538 | 0.000 | 4.345 | 4.518 | 2.051 | 1.922 | 3.973 |
| 2011 | 0.184 | 0.000 | 0.000 | 0.000 | 1.016 | 1.615 | 0.000 | 2.631 | 2.815 | 1.212 | 1.697 | 2.909 |
| TOTAL | 16.616 | 112.455 | 60.041 | 20.492 | 91.566 | 96.211 | 2.247 | 383.012 | 399.628 | 239.864 | 156.560 | 396.424 |

Appendix 2

NT Onshore Petroleum Titles

| Title | Title holder | Date granted/renewed |
|-------|---|----------------------|
| EP76 | Falcon Oil and Gas Australia Pty Ltd | 08-Mar-01 |
| EP82 | Hellium Australia Pty Ltd and Gas Australia Pty Ltd and Oil and Gas Exploration Limited | 02-Sep-05 |
| EP93 | Merlin Energy Pty Ltd | 01-Nov-04 |
| EP97 | Rawson Resources Ltd | 23-May-11 |
| | Merlin Energy Pty Ltd | |
| EP98 | Falcon Oil and Gas Australia Pty Ltd | 04-Feb-04 |
| EP99 | Falcon Oil and Gas Australia Pty Ltd | 04-Feb-04 |
| EP103 | PetroFrontier (Australia) Pty Ltd | 21-Nov-06 |
| | Texalta Australia Pty Ltd | |
| EP104 | PetroFrontier (Australia) Pty Ltd | 21-Nov-06 |
| | Texalta Australia Pty Ltd | |
| EP105 | Merlin Energy Pty Ltd | 28-Sep-07 |
| EP106 | Merlin Energy Pty Ltd | 28-Sep-07 |
| EP107 | Merlin Energy Pty Ltd | 28-Sep-07 |
| EP112 | Frontier Oil & Gas Pty Ltd | 21-Jul-05 |
| EP115 | Frontier Oil & Gas Pty Ltd | 17-Aug-07 |
| EP117 | Falcon Oil and Gas Australia Pty Ltd | 14-Mar-06 |
| EP118 | Frontier Oil & Gas Pty Ltd | 21-Jul-05 |
| EP125 | Ordiv Petroleum Pty Ltd and Oil and Gas Exploration Limited | 07-Dec-05 |
| EP126 | Territory Oil and Gas Pty Limited | 15-Jun-11 |
| EP127 | PetroFrontier (Australia) Pty Ltd | 14-Dec-07 |
| | Northern Territory Oil Limited | |
| | Baraka Petroleum Limited | |
| EP128 | PetroFrontier (Australia) Pty Ltd | 14-Dec-07 |
| | Northern Territory Oil Limited | |
| | Baraka Petroleum Limited | |
| EP134 | Tri-star Energy Company | 26-Feb-06 |
| EP156 | Oilco Pty Ltd | 11-Nov-11 |
| EP163 | Tamboran Resources Pty Ltd | 14-May-10 |
| EP171 | Amour Energy Pty Ltd | 29-Jun-11 |
| EP176 | Amour Energy Pty Ltd | 20-Jun-11 |
| RL1 | Onshore Energy Pty Ltd | 05-Nov-07 |
| RL2 | Magellan Petroleum (NT) Pty Ltd, Santos AQNT Pty Ltd, Santos Limited | 04-Feb-09 |
| OL3 | Magellan Petroleum (NT) Pty Ltd, Santos AQNT Pty Ltd, Santos Limited | 06-Nov-03 |
| OL4 | Magellan Petroleum (NT) Pty Ltd, Santos AQNT Pty Ltd, Santos Limited | 06-Nov-02 |
| OL5 | Magellan Petroleum (NT) Pty Ltd, Santos AQNT Pty Ltd, Santos Limited | 06-Nov-02 |

Appendix 3

Petroleum Titles in the Principal NT Offshore Area

(Greater Sunrise Area titles highlighted in blue)

| Title | Title Holder | Date Awarded/Renewed |
|---------|---|----------------------|
| NT/P48 | Shell Development (Australia) Proprietary Pty Ltd | 23-Oct-07 |
| | Santos Offshore Pty Ltd | |
| | Osaka Gas Australia Pty Ltd | |
| | Petronas Carigali (Australia) Pty Ltd | |
| NT/P 61 | Santos Offshore Pty Ltd | 14-Oct-08 |
| | ConocoPhillips Australia Exploration Pty Ltd | |
| NT/P62 | National Oil & Gas Pty Ltd | 20-Sep-02 |
| | Nations Natural Gas Pty Ltd | |
| | Australian Natural Gas Pty Ltd | |
| NT/P68 | Tsp Arafura Petroleum Pty Ltd | 27-Apr-10 |
| | Oz Exoil Pty Ltd | |
| | Eni Australia Limited | |
| NT/P69 | Santos Offshore Pty Ltd | 10-Oct-05 |
| | ConocoPhillips Australia Exploration Pty Ltd | |
| NT/P73 | Alpha Oil & Natural Gas Pty Ltd and Gascorp Australia Pty Ltd | 27-Mar-07 |
| NT/P76 | OPIC Australia Pty Ltd | 10-Nov-08 |
| | SIPC Australia Pty Limited | |
| NT/P79 | Finder Exploration Pty Ltd | 24-Jun-09 |
| NT/P80 | Murphy Australia Oil Pty Ltd | 24-Jun-09 |
| | Diamond Resources Australia Pty Ltd | |
| NT/P81 | DVM International Limited | 13-May-10 |
| | Ansbachall Pty Ltd | |
| NT/P82 | Magellan Petroleum (Offshore) Pty Ltd | 13-May-10 |
| NT/RL1 | Origin Energy Bonaparte Pty Ltd | 10-Jul-06 |
| | Bonaparte Gas and Oil Pty Limited | |
| | Santos Offshore Pty Ltd | |
| | GDF Suez Bonaparte Pty Ltd | |
| NT/RL2 | Shell Development (Australia) Pty Ltd | 19-Nov-07 |
| | Woodside Energy Ltd | |
| | ConocoPhillips STL Pty Ltd | |
| | Osaka Gas Australia Pty Ltd | |
| NT/RL4 | Shell Development (Australia) Proprietary Pty Ltd | 19-Nov-07 |
| | Woodside Energy Ltd | |
| | ConocoPhillips STL Pty Ltd | |
| | Osaka Gas Australia Pty Ltd | |

Appendix 4

Petroleum Titles in the Ashmore/Cartier Offshore Area

| Title | Title Holder | Date Awarded/Renewed |
|--------|--|----------------------|
| AC/P4 | PTTEP Australia Timor Sea Pty Ltd | 24-Jun-09 |
| | Cosmo Energy Exploration & Development Ltd | |
| AC/P8 | Talisman Oil & Gas (Australia) Pty Ltd | 03-Oct-08 |
| | Karoo Energy International Ltd | |
| AC/P17 | PTTEP Australia Timor Sea Pty Ltd | 24-Jun-09 |
| | Cosmo Energy Exploration & Development Ltd | |
| AC/P21 | ENI Australia Limited | 13-Jan-10 |
| | SIPC Australia Pty Limited | |
| | OPIC Australia Pty Ltd | |
| AC/P22 | AED Oil Limited | 28-May-10 |
| | Sinopec Po; and Gas Australia (Puffin) Pty Limited | |
| AC/P24 | PTTEP Australia Timor Sea Pty Ltd | 08-Jun-05 |
| | Bengal Energy Ltd | |
| AC/P32 | PTTEP Australasia (Ashmore Cartier) Pty Ltd | 24-Jun-09 |
| | Bounty Oil & Gas NL | |
| | Cosmo Energy Exploration & Development Ltd | |
| | Bharat Petroleum Corporation Ltd | |
| AC/P33 | PTTEP Australasia (Ashmore Cartier) Pty Ltd | 25-Jun-04 |
| AC/P34 | PTTEP Australasia (Ashmore Cartier) Pty Ltd | 06-Jul-04 |
| AC/P36 | Finder Exploration Pty Ltd | 18-Oct-05 |
| | Murphy Australia Oil Pty Ltd | |
| AC/P37 | Apache Northwest Pty Ltd | 20-Jul-09 |
| | Total E&P Pty Ltd | |
| AC/P39 | Natural Gas Corporation Pty Ltd | 07-Apr-06 |
| | Auralandia NL | |
| | Vulcan Australia Pty Ltd | |
| | Petrocorp Australia Pty | |
| AC/P40 | PTTEP Australasia (Ashmore Cartier) Pty Ltd | 01-Mar-07 |
| AC/P41 | Shell Development (Australia) Pty Ltd | 01-Mar-07 |
| | Mitsui E&P Australia Pty Ltd | |
| AC/P42 | Apache Northwest Pty Ltd | 15-Apr-08 |
| | Total E&P Australia | |
| AC/P43 | Apache Northwest Pty Ltd | 15-Apr-08 |
| | Total E&P Australia | |
| AC/P44 | Finder Exploration Pty Ltd | 15-Apr-08 |
| | Perenco (SE) Australia Pty Ltd | |
| AC/P45 | Finder Exploration Pty Ltd | 15-Apr-08 |
| | Perenco (SE) Australia Pty Ltd | |
| AC/P46 | TATA Petrodyne Pty Ltd | 03-Mar-09 |