

THE DEVELOPMENT OF SHALE GAS AND COAL BED METHANE IN AUSTRALIA: BEST PRACTICE FOR INTERNATIONAL JURISDICTIONS?

*Dr. Tina Hunter**

I.	INTRODUCTION	368
II.	SCOPE AND METHODOLOGY	373
III.	UNCONVENTIONAL PETROLEUM RESOURCES IN AUSTRALIA.....	374
	A. <i>Shale Gas Resources</i>	375
	B. <i>Development of coal seam gas resources in Queensland</i>	381
IV.	REGULATION OF UNCONVENTIONAL GAS RESOURCES IN AUSTRALIA.....	385
	A. <i>Overview of Regulation – Jurisdiction and Competence</i>	385
	B. <i>Regulation of East Coast Coal Seam Gas</i>	393
	C. <i>Central and Western Australia Shale Gas Development</i>	408
	D. <i>Harmonisation of Unconventional Petroleum Regulation in Australia</i>	422
V.	CONCLUSION.....	423

* Dr Tina Hunter. Reader in Energy Law, and Director of the Centre for Energy Law at the University of Aberdeen. Email: thunter@abdn.ac.uk.

I. INTRODUCTION

Australia contains vast amounts of both conventional and unconventional petroleum resources.¹ Like the United States and the United Kingdom, Australia primarily focused on the development of conventional petroleum resources, with onshore gas production for commercial purposes occurring from conventional reservoirs for over fifty years.² The production of gas commenced with the exploitation of the giant Moomba field in the Cooper Basin, operated by Santos, which has been a constant and voluminous supplier of petroleum, especially gas, to the densely populated eastern states via a series of pipelines.³ The Moomba field exists in central Australia, in an area that is sparsely populated, and which most Australians do not even know exists.⁴ Other conventional gas extraction has occurred in the Cooper Basin in South Australia (SA), the Otway Basin in Victoria, and the Amadeus Basin in the Northern Territory (NT).⁵ Conversely, the production of conventional petroleum from Western Australia (WA) has been small to date.⁶ With the exception of the giant Moomba field in the Cooper Basin, onshore conventional petroleum resources have been relatively unspectacular, contributing little to Australia's energy supply.⁷

1. See LAINIE KELLY, JAPAN OIL, GAS AND METALS NAT'L CORP., THE INCREASING IMPORTANCE OF AUSTRALIA'S ONSHORE PETROLEUM RESOURCES 37 (2015) ("Australia's total identified conventional and unconventional gas resources are estimated at 392 trillion cubic feet (tcf), according to Geoscience Australia.").

2. See *id.* at 39 (describing the first commercial gas discovery in Australia in the 1960's).

3. *Id.* at 39, 41.

4. See PETER COOK ET AL., AUSTRALIAN COUNCIL OF LEARNED ACADEMIES, ENGINEERING ENERGY: UNCONVENTIONAL GAS PRODUCTION A STUDY OF SHALE GAS IN AUSTRALIA 162 (2013) (describing how major shale basins, like the Moomba location in the Cooper Basin, are in arid and sparsely populated areas of Australia); see also Ken White, *A Significant Milestone: Is an Australian Unconventional Gas Boom in the Cards?* GEO EXPRO, <http://www.geoexpro.com/articles/2013/03/a-significant-milestone> (last visited Feb. 9, 2016) (describing the central location and unpopulated nature of the Cooper Basin region).

5. KELLY, *supra* note 1, at 38 fig.1.

6. *Id.*

7. *Id.* at 41 tbl.3.

Unlike the United States, Australia and Australians have had little exposure to the development of unconventional petroleum resources (UPR) to date. This is primarily a function of the location of the largest source of onshore production, the Moomba gas fields in the Central Australian desert. To most Australians, gas magically appears at the end of a tap at home, with little thought to how the gas arrives there. This is especially the case in New South Wales (NSW) and Victoria, which are heavily reliant on gas for industry and domestic use.⁸ In the western areas of Australia there is a heavy reliance on gas for the generation of electricity, which is primarily attributable to the low coal resources that WA possesses.⁹ This gas has, until now, been provided largely from offshore gas fields, making WA vulnerable to interruptions to gas supply, illustrated by a 30% reduction in gas supply in 2008 as a result of the Varanus Island Gas pipeline explosion.¹⁰ In order to ensure the security of its supply, the western Australian government is committed to investigating and developing its unconventional gas resources as an additional source of gas for the WA domestic and industrial population.¹¹

At the beginning of the 2000s, there became an extraordinary interest in the small amounts of coal seam gas (CSG)¹² that had been produced from the coal reserves in the Surat Basin in

8. Paul Ashby, *The Looming N.S.W. Gas Crisis in Supply, Demand and Price*, AUSTL. INST. OF ENERGY NEWS, Mar. 2014, at 11; *Demand for Gas in Victoria*, VICT. STATE GOV'T, ONSHORE GAS CMTY. INFO., <http://onshoregas.vic.gov.au/victorias-energy-supply/gas-in-victoria/demand-for-gas-in-victoria> (last updated May 18, 2015).

9. ANDREW HAYLEN & DANIEL MONTOYA, N.S.W. PARLIAMENTARY RESEARCH SERV., GAS: RESOURCES, INDUSTRY STRUCTURE AND DOMESTIC RESERVATION POLICIES BRIEFING PAPER No. 12/2013 19 (2013).

10. KYM BILLS AND DAVID AGOSTINI, GOV'T OF W. AUSTL., OFFSHORE PETROLEUM SAFETY REGULATION: VARANUS ISLAND INCIDENT INVESTIGATION XV (2009); *see also* KELLY, *supra* note 1, at 38.

11. *See, e.g.*, N.S.W. PARLIAMENT LEGISLATIVE COUNCIL GEN. PURPOSE STANDING COMM. NO. 5, COAL SEAM GAS 191 (2012) (describing how the development of unconventional gas resources could provide much needed energy security to western Australia).

12. Coal seam gas is the Australian term for coal bed methane. The two terms are interchangeable.

Queensland (Qld),¹³ on the back of increased interest in shale gas in the United States.¹⁴ The development of CSG in Queensland has been undertaken by a large number of Australian and international petroleum companies, including British Gas, Arrow Energy, Shell, PetroChina, Santos, Queensland Gas Company, Conoco Phillips, Total, Petronas, Kogas, Origin and Sinopec.¹⁵ Extraordinarily, the Queensland Government has not coordinated the development of field infrastructure, transport and processing facilities. Rather, these facilities have been developed by the consortia of companies that have been established to exploit Queensland's CSG resources.¹⁶ This has resulted in the triplication of pipelines, storage, processing and shipping facilities, and facilitated the need to reclaim Curtis Island and undertake large scale dredging in an area within the Great Barrier Reef Marine Park off the coast of Gladstone.¹⁷ The rapid development of CSG resources in Queensland over the last 10 years has led to the Queensland government scrambling to effectively legislate the development of CSG in a manner that addresses the social issues arising from CSG development in a predominantly agricultural area.

13. See QUEENSLAND COMPETITION AUTHORITY, *COAL SEAM GAS REVIEW 14* (2014) (describing the increased interest in CSG after discovery in the Surat Basin in the early 2000's); see also *id.* at 15 fig.4 (showing the location of the Surat Basin).

14. See *id.* at 21 (describing how Australia's CSG market began in the wake of the United States CSG industry).

15. See AUSTL. GOV'T DEP'T OF INDUS., *EASTERN AUSTRALIAN DOMESTIC GAS MARKET STUDY 25* (2013) (describing the rapid increase in CSG production in Eastern Australia and Queensland in the mid-2000's with the entry of large international petroleum companies).

16. See KELLY, *supra* note 1, at 53 (describing the lack of consolidation or coordination between the companies in the development of CSG infrastructure).

17. See *id.* (describing how the lack of coordination between companies has led to inefficient and uneconomic development of CSG infrastructure near Curtis Island, creating an excessive web of pipelines); see also *Save the Reef*, GLADSTONE REV. SECRETARIAT, <https://www.environment.gov.au/system/files/pages/884f8778-caa4-4bd9-b370-318518827db6/files/15savethereef-doc1.pdf> (last visited Feb. 16, 2016) (describing how the construction on Curtis Island has led to the largest dredging operation even in the Great Barrier Reef World Heritage Area).

Conversely, industry has been slow to develop shale gas in the region, where Australia is predicted to have huge reserves.¹⁸ This is largely attributable to two realities. The first is the vast distribution of shale gas reserves in an area of Australia that is sparsely populated with little existing infrastructure.¹⁹ The other is community reservations and concerns regarding shale gas development, largely as a result of the movie *Gasland* in 2010.²⁰ *Gasland*, alongside community concerns relating to the development of CSG in Queensland, prompted community groups in WA to engage in community protest and question the government regarding the regulation of shale gas development.²¹ As a consequence, the WA government undertook a review of its shale gas regulatory framework to ensure it is fit for purpose.²² Similarly, there have been concerns regarding the development of shale gas resources in the Northern Territory, particularly from cattle farmers and indigenous groups.²³ As a result of these concerns, the NT government also undertook a study of its regulatory framework for unconventional gas resources, and, as a result, is reforming the onshore petroleum regulatory framework.²⁴

The concerns that have been raised by communities and farmers regarding the development of UPR generally fall into three categories. Firstly, and perhaps the greatest concern expressed by the community, is the effects of hydraulic fracturing

18. U.S. ENERGY INFO. ADMIN., TECHNICALY RECOVERABLE SHALE OIL AND SHALE GAS RESOURCES: AN ASSESSMENT OF 137 SHALE FORMATIONS IN 41 COUNTRIES OUTSIDE THE UNITED STATES III-2 (2013).

19. COOK, *supra* note 4, at 153-54.

20. GASLAND (Home Box Office Documentary Films 2010); MELANIE TAYLOR ET AL., BACKGROUND PAPER ON COMMUNITY CONCERNS IN RELATION TO COAL SEAM GAS 18-19 (2013).

21. TAYLOR ET AL., *supra* note 20; N.S.W. PARLIAMENT LEGISLATIVE COUNCIL GENERAL STANDING COMM. NO. 5, *supra* note 11, at 3.

22. N.S.W. PARLIAMENT LEGISLATIVE COUNCIL GEN. PURPOSE STANDING COMM. NO. 5, *supra* note 11, at 3.

23. See HYDRAULIC FRACTURING INQUIRY, REPORT ON THE INDEPENDENT INQUIRY INTO HYDRAULIC FRACTURING IN THE NORTHERN TERRITORY 20, 149, 151 (2014) (describing government concerns regarding the effects of potential fracking on indigenous groups and cattle farmers).

24. See *id.* at i-ii, xiii (describing the reasons for the report, including the various community concerns over the environmental impacts).

on the ground water and communities. An examination of social activism and protest relating to UPR development in Australia places this issue at the forefront ahead of other concerns.²⁵ The main concern with hydraulic fracturing that is voiced by such community groups is that it poses a risk to human health and the environment, largely due to the chemicals utilized down-hole.²⁶ As such, chemical use and disclosure is associated with these concerns. The second community concern related to the development of UPR is the use of valuable water resources, and the disposal of produced water after hydraulic fracturing.²⁷ This concern is largely attributable to the scarcity of water in Australia,²⁸ particularly in areas where shale gas development is likely to take place, and the importance of water resources on the east coast, where CSG development is occurring, for agricultural production and sustenance of life.²⁹ Thirdly, concerns about the

25. See *id.* at 31 (illustrating how water contamination is the greatest concern on the communities); TAYLOR, *supra* note 20, at 5,7. Protests calling for a ban on fracking have been active in Australia since late 2000's, and include organized groups such as *Lock the Gate Alliance*. TAYLOR, *supra* note 20, at 7.

26. See GOV'T OF W. AUSTL., DEP'T OF HEALTH, HYDRAULIC FRACTURING FOR SHALE AND TIGHT GAS IN WESTERN AUSTRALIAN DRINKING WATER SUPPLY AREAS HUMAN HEALTH ASSESSMENT 6-7, (2015) (describing the health-related fears that tend to be associate with fracking); HYDRAULIC FRACTURING INQUIRY, *supra* note 23, at 31, 111 (describing the community concern with health risks and chemical utilization as a result of hydraulic fracturing).

27. See GOV'T OF W. AUSTL., DEP'T OF HEALTH, *supra* note 26, at 20 (describing concerns over the waste caused by produced water); see also HYDRAULIC FRACTURING INQUIRY, *supra* note 23, at 31, 37-38 (describing concerns about water allocation in areas where water is scarce).

28. Australia is the world's driest inhabited continent, with an average annual rainfall of just over 600mm. The areas of Australia where shale gas resources are located are mainly where annual rainfall is 500mm or less on average. *Geography and Climate*, AUSTRAL. BUREAU OF STAT., <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/bySubject/1301.0~2012~Main Features~Australia's climate~143> (last visited Feb. 15, 2016); see also N.S.W. PARLIAMENT LEGISLATIVE COUNCIL GEN. PURPOSE STANDING COMM. NO. 5, *supra* note 11, at 17 (describing the risk to the water resources given its scarcity).

29. The vast majority of Australia's population is located on its east coast. Water security there is critical. There is a National Water Commission in Australia, established under the *National Water Commission Act 2004*. The NWC has developed a National Water Initiative, which provides special conditions relating to water allocation for mining and petroleum sectors. Mark Hamstead & Steve Fermino, *Integrating the Mining Sector into Water Planning Entitlements and Regimes*, WATERLINES REPORT SERIES NO 77 1, March 2012. Paragraph 34 of the *Intergovernmental Agreement on a National Water*

development of UPR in Australia broadly relate to land and incorporate damage to productive farming land, land access and compensation, and long-term indigenous land protection.³⁰ These concerns are not unique to Australia, and have been raised in other, emerging jurisdictions.³¹

Given the level of activity in Queensland, the community concerns that have been voiced over the last 5 years relating to UPR development and future development of UPR in central and western Australia, there has been a plethora of legal reform associated with UPR development. This article examines the legal reforms concerning UPR that have occurred in Australia in response to such community concern. In particular, this article will examine the legal framework relating to UPR in Australia, incorporating (but not confined to) an examination of legal reform associated with the areas of concern, namely hydraulic fracturing and chemical disclosure, water use and treatment, and land access and compensation.

II. SCOPE AND METHODOLOGY

This paper examines the legal systems that exist to regulate the development of unconventional gas resources (UGR) in Australia, and how the regulatory framework addresses community concerns in the development of unconventional gas. The contribution of this paper to the wider study of UPR regulation is that it considers how the law has developed and exists in Australian jurisdictions in response to socio-legal issues related to UPR development, namely the impact of hydraulic fracturing on communities, community concerns related to water

Initiative, agreed to by the Commonwealth and all Australian mainland states and territories, except Western Australia, provides a carve out for water allocation in mining and petroleum recovery activities. The paragraph recognises that “there may be special circumstances facing the mining and petroleum sectors that will need to be addressed by policies and measures beyond the scope of this Agreement. Specific proposals will be assessed according to environmental, economic and social considerations. . .”. *Intergovernmental Agreement on a National Water Initiative* (Austl.) para 34.

30. COOK, *supra* note 4, at 24, 107, 110.

31. For example, similar concerns have been raised in the United Kingdom and the United States. TASK FORCE ON SHALE GAS, FIRST INTERIM REPORT: PLANNING, REGULATION AND LOCAL ENGAGEMENT (Mar. 25, 2015), <https://www.taskforceonshalegas.uk/reports/first-report>; COOK, *supra* note 4, at 107.

use and treatment associated with UPR development, and land access and compensation arising from UPR development. The findings of this paper are applicable to other jurisdictions outside of the United States that are undertaking the development of UPR, as it provides a study of varying styles of regulation for these activities.

Given the socio-legal issues, this study utilises a socio-legal research methodology, analysing the law and its relationship with the wider society. As part of the socio-legal research methodology, it embraces doctrinal research as a tool to examine the legal doctrine within the broader society, and its implication and effect. Doctrine can be defined as ‘a synthesis of rules, principles, norms, interpretive guidelines and values. It explains, makes coherent or justifies a segment of the law as part of a larger system of law. Doctrines can be abstract, binding or non-binding’.³² In the instance of this study, doctrine is limited to the rules, principles, and norms related to UPR development in Australia. Utilising the doctrinal research approach, this paper provides a systematic exposition of the rules governing UPR development. It then places these laws within the social context within which the laws have developed.

III. UNCONVENTIONAL PETROLEUM RESOURCES IN AUSTRALIA

Australia is a geologically old and complex continent, spanning over 3.8 billion years of the earth’s geological history and containing almost all known rock types.³³ UPR in Australia are geographically separated, with CSG reserves dominating the east coast of Australia, and shale gas reserves dominating the central and western areas of Australia.³⁴ This physical division in the location of UPR broadly follows the geological division of Australia, with western and central Australia dominated by Precambrian geology, and the eastern third dominated by

32. *Doctrine*, AUSTRALIAN LAW DICTIONARY (Trischa Mann & Audrey Blunden eds, 2nd ed., 2010).

33. *See generally* DAVID JOHNSON, THE GEOLOGY OF AUSTRALIA (2nd ed. 2009).

34. Tina Hunter, *Australia’s Unconventional Gas Resources*, in AUSTRALIA’S UNCONVENTIONAL ENERGY OPTIONS 55, 58 (2012); HAYLEN & MONTROYA, *supra* note 9, at 6, 19.

Cambrian and Phanerozoic geology, with an abundance of tertiary geology.³⁵

Without exception, all unconventional gas resources in Australia occur on land.³⁶ The recovery of UGR is divided geographically, with Shale Gas Resources (SGR), primarily found in Central and Western Australia in Canning Basin (WA), Perth Basin (WA), Amadeus Basin (NT), Georgina Basin (NT), Beetaloo Sub-Basin (NT), and the Cooper-Eromanga Basin (SA, NT and Qld).³⁷ Conversely coal bed methane (CBM) is primarily found in Eastern Australia, with the primary concentrations of CBM found in the Bowen and Surat Basins (Qld), the Gunnedah Basin (NSW) and the Sydney Basin (NSW).³⁸

A. Shale Gas Resources

There are a number of prospective Australian shale basins, with major shale gas potential existing in four major geological basins in central and western regions of Australia.³⁹ With the exception of the small, scarcely explored Maryborough Basin in coastal Queensland, shale gas resources in Australia are located in Western Australia, the Northern Territory, and South Australia. A U.S. Energy Information Administration 2013 estimate of shale gas resources in Australia places the reserves at 437 Tcf, the seventh largest country in the world in terms of reserves.⁴⁰ Similarly, a 2013 estimate of shale oil resources in Australia places the reserves at 18 billion barrels of oil, ranking Australia's reserves as the sixth largest global reserves.⁴¹

1. Western Australia

Western Australia has demonstrably large SGR, with the U.S. Energy Information Administration estimating the presence of shale gas reserves of 268 Trillion cubic feet (Tcf), almost double

35. JOHNSON, *supra* note 33.

36. Hunter, *supra* note 34, at 58.

37. *Id.*

38. *Id.*

39. TINA HUNTER, REGULATION OF SHALE, COAL SEAM AND TIGHT GAS ACTIVITIES IN WESTERN AUSTRALIA FINAL 14 (2011).

40. *Id.*

41. U.S. ENERGY INFO. ADMIN., *supra* note 18, at 10 tbl.5.

that of offshore conventional gas reserves.⁴² The Perth Basin in the smallest of the WA shale gas bearing basins.⁴³ However, due to its proximity to Perth and favourable climatic conditions, it is perhaps the best explored to date. Initial shale gas exploration has been undertaken by AWE Limited and Norwest Energy, targeting the prospective marine shales of Triassic and Permian age.⁴⁴ To date little commercial shale gas has been identified, however exploration continues.

The large Canning Basin in Western Australia has deep, Ordovician-age marine shales that are roughly correlative with the Bakken shale in the Williston Basin.⁴⁵ Buru Energy, an Australian exploration and production company, holds significant exploration permits in the Canning Basin.⁴⁶ In 2010, Mitsubishi agreed to fund an A\$152.4 million exploration and development program to earn a fifty per cent interest in Buru's permits.⁴⁷ The two companies executed a State Agreement with the Western Australian Government in 2012,⁴⁸ enabling them to undertake extensive exploration of the Canning super basin. The State Agreement, which extends for 25 years and an option of a further 25 years, enables appraisal work undertaken to relieve the exploration permits from their existing relinquishment obligations, and to enable exploration work to be credited against adjacent exploration permits that are not covered under the State Agreement.⁴⁹ In addition, under the terms of the State Agreement

42. GOV'T OF W. AUSTL DEP'T OF MINES AND PETROLEUM, WESTERN AUSTRALIA'S PETROLEUM AND GEOTHERMAL EXPLORER'S GUIDE 13 (2014) (discussing the assessment of world shale gas resources by the United States Energy Information Agency which estimated that the Canning and Perth basins of Western Australia hold around 268 Tcf of technically recoverable resources; this is approximately twice the amount of gas held in Western Australia's offshore areas).

43. U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-1 fig.III-1.

44. *Id.* at III-2.

45. *Id.*

46. *Id.* at III-33.

47. *Id.*

48. *Natural Gas (Canning Basin Joint Venture) Agreement Act 2013* (WA) pmb1 (Austl.).

49. *See id.* at 1, 36, 38, 84. (prescribing that in determining the minimum work commitments for any renewed permit, the Petroleum Act Minister shall regard prior obligations and may credit appraisal work carried out on any gas discovery in an adjacent petroleum permit area in determining compliance).

the WA Department of State Development will take the lead agency role in the development of an liquid natural gas (LNG) facility in the Pilbara as well as a domestic gas pipeline from the Canning Basin in order to secure domestic energy supplies in the future.⁵⁰ The primary role of the State Agreement and the exploration for and development of shale gas is to secure long-term accessible domestic supplies of gas for WA.⁵¹

Buru has also undertaken exploration in the Yulleroo gas field, after reporting gas-mature and organic-rich shale from the Yulleroo-1 conventional exploration well drilled originally in 1967 on permit EP-391.⁵² Cores from Yulleroo-3 (2012) and Yulleroo-4 (2013) wells demonstrate strong gas shows at depth.⁵³ In addition, reservoir stimulation of Yulleroo-2 in 2010 demonstrated that the Yulleroo reservoir is capable of flowing gas of good quality with significant hydrocarbon liquid content.⁵⁴ Buru Energy has approval to undertake hydraulic fracturing of Yulleroo-3 and Yulleroo-4 during the dry season of 2016 (May-October) to determine the commercial nature of shale gas in the Yulleroo field.⁵⁵ New Standard Energy also holds substantial exploration licenses in the Canning Basin.⁵⁶ In September 2011, it formed a joint venture with ConocoPhillips to accelerate exploration of the Golwyer Shale and has announced that it will fund an exploration program over four years for up to \$US119 million.⁵⁷

50. See *Buru Executes State Agreement Provides Long Term Tenure and Facilitates Domestic Gas Development*, BURU ENERGY (Nov. 7, 2012), www.buruenergy.com/wp-content/sharelink/20121107-buru-executes-state-agreement-88753664796695122.pdf.

51. See *Natural Gas (Canning Basin Joint Venture) Agreement Act 2013* (WA) 5-7, 23 (Austl.).

52. U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-33.

53. *Yulleroo 4 Appraisal Well Spuds*, BURU ENERGY (Jan. 21, 2013) <http://www.buruenergy.com/wp-content/sharelink/20130121-yulleroo-4-appraisal-well-spuds-86756853334798552.pdf>.

54. *Id.*

55. See Buru Energy, *Buru Energy Operations Update*, ASX RELEASE, April 2015, at 4 (discussing 2016 exploration plans).

56. See U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-33 (detailing that New Standard Energy is a principal operator in the Canning Basin holding exploration licenses covering 17,300 square miles in the northern edge of the Kidson sub-basin).

57. *Id.*

2. Northern Territory

In the Northern Territory, the Pre-Cambrian shales in the Beetaloo Basin and the Middle Cambrian shale in the Georgina Basin have reported oil and gas shows in shale exploration wells.⁵⁸ If proved commercial, these two shale petroleum basins would become some of the oldest producing hydrocarbon source rocks in the world.⁵⁹ Aside from the now depleted Mereenie and Palm Valley conventional petroleum fields, the NT utilised gas from the Blacktip gas field for domestic energy supplies.⁶⁰ As such, the development of shale gas resources in the NT will be for export purposes.

The Amadeus Basin, located in central-southern NT, contains producing conventional oil and gas fields (Mereenie and Palm Valley), is one of the most prospective onshore areas in the NT for unconventional petroleum.⁶¹ The Georgina Basin, covering an area of 330,000km², is located in central-eastern NT and extends into western Queensland.⁶² The Basin is also one of the most prospective for UPR, with organically rich shale rocks demonstrated.⁶³ Exploration is still in a frontier stage, and given the limited amount of seismic and geological data available,⁶⁴ no estimate is available for potential shale gas resources in the NT section of the Georgina Basin.⁶⁵ The Beetaloo Sub-Basin has attracted a considerable amount of exploration activity, probably since it is a significant subsurface depositional centre within the McArthur Basin.⁶⁶ To date, the Sub-Basin has been delineated as a result of the collection and interpretation of seismic, drilling,

58. *Id.* at III-2.

59. *Id.*

60. T.J. MUNSON, NORTHERN TERRITORY GEOLOGICAL SURVEY, PETROLEUM GEOLOGY AND POTENTIAL OF THE ONSHORE NORTHERN TERRITORY 92-93 (2014); N. Terr. Gov't, *Oil and Gas in Australia's Northern Territory*, TERRITORY Q., 2012, at 2,4, <http://www.australiasouthernterritory.com.au/publications/documents/tq-intl-english.docx>.

61. MUNSON, *supra* note 60, at 62.

62. *Id.* at 111.

63. *Id.*

64. *Id.*

65. *Id.* at 138.

66. MUNSON, *supra* note 60, at 21.

and magnetotelluric data.⁶⁷ Like the two other NT Basins, it is a target for UPR exploration.⁶⁸

Whilst there has been little shale gas exploration activity in the NT to date, interest in UPR in the NT has rapidly increased. In 2001, approximately 10% of the NT was under exploration permit applications. At present approximately 90% of the Territory is under them. Furthermore, the area under exploration permits has risen from less than 2% to over 10% in 2012.⁶⁹

3. South Australia

Not only has South Australia been Australia's leading onshore gas producer, it has also been a pioneer in the exploration for and development of shale gas.⁷⁰ The shale gas formations in SA are confined to the Cooper Basin, which partly extends into southern NT and western Queensland (although the majority of the field lies within SA).⁷¹ To date several exploratory shale gas wells have been drilled with Beach Energy's Encounter 1 well, the first shale gas exploration well drilled in the Cooper Basin in

67. *Id.*

68. *See id.* at 47.

69. *See* DEP'T OF MINES AND ENERGY, ENERGY NT 2012: ENERGY ACTIVITIES FOR THE NORTHERN TERRITORY AUSTRALIA 1, 4 fig.6 (2012), http://www.nt.gov.au/d/Minerals_Energy/Content/File/pdf/PetroleumSummaries/2012_EnergyNT.pdf (illustrating the area under granted onshore petroleum exploration permits in the Northern Territory in 2012 which covers over 10% of the total NT area).

70. *See* U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-8 (noting that the Cooper Basin in South Australia has been Australia's main onshore oil and gas supply region for the past several decades); UCL INT'L ENERGY POLICY INSTITUTE, SHALE GAS IN AUSTRALIA: THE POLICY OPTIONS 13 (2013), <https://www.ucl.ac.uk/australia/files/shale-gas-in-australia-green-paper-final> (discussing Australia's first exploratory vertical and horizontal wells aimed at shale gas which were drilled in the Cooper Basin in Southern Australia and describing the Cooper Basin as the most productive area to conduct shale gas development); *see also* Elinor Alexander, *South Australia's Unconventional Resource*, 10 GEO EXPRO, April 2013, at 6, 6, http://assets.geoexpro.com/uploads/c0bb0c43-5962-47e3-a4b6-ac09ee9cab50/GEO_ExPro_v10i2_Full.pdf (observing that Australia's first unconventional gas production was achieved in Southern Australia's Cooper Basin when commercial natural gas production commenced from Moomba 191 shale gas well and noting that South Australia became the first Australian state to finalize a comprehensive approach to developing its vast unconventional gas resources on December 12, 2012).

71. U.S. ENERGY INFO. ADMIN., TECHNICALLY RECOVERABLE SHALE OIL AND GAS RESOURCES: AUSTRALIA III-2 (2015), https://www.eia.gov/analysis/studies/worldshalegas/pdf/Australia_2013.pdf.

2010.⁷² Unlike other basins in Australia, much of the shale gas in the Cooper Basin is located below operational conventional gas fields.⁷³ Santos, a major operator in the Cooper Basin, estimates the potential range of net recoverable gas from under existing conventional petroleum licences to be 15-125 Tcf.⁷⁴ Of the six shale basins assessed, the Cooper Basin, with its existing gas processing and transportation infrastructure, has provided the first commercial source of shale hydrocarbons (comprising a small amount of shale gas).⁷⁵ Santos, Beach Energy, and Senex Energy continue to explore the Cooper Basin shale reservoirs, expecting to find huge commercial reserves of gas that will be utilised via existing infrastructure⁷⁶

Given the existing conventional petroleum activities and the extent of associated infrastructure for delivery of gas to east coast markets, it is highly likely that shale gas from the Cooper Basin will be the first shale gas to market in Australia.

72. See U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-15 (2013) (stating that Beach Energy, Senex, DrillSearch Energy, and Santos all have shale gas exploration programs underway in the Cooper Basin and reporting that Beach and Senex have drilled several test wells throughout the Cooper Basin); see also *Shale Gas*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV., http://petroleum.statedevelopment.sa.gov.au/old-site/prospectivity/basin_and_province_information/unconventional_gas/shale_gas (last modified July 14, 2014) (stating that Beach Energy's Encounter 1, drilled in late 2010, is the first dedicated shale gas exploration well drilled in the SA Cooper Basin).

73. See COOK ET AL., *supra* note 4, at 1, 15, 16, 85 (2013), <http://www.shale-gas.com.au/wp-content/uploads/2014/05/ACOLA-Final-Report-Engineering-Energy-June-2013.pdf> (noting that unlike other regions which lack infrastructure, the Cooper Basin has existing infrastructure which includes pipelines for gas, ethane, and oil as well as a large gas processing plant, meaning that any development of shale gas is likely to occur in the Cooper Basin first).

74. *Cooper Basin Unconventional Gas Opportunities & Commercialisation*, SANTOS (Nov. 2012), https://www.santos.com/media/2134/121112_eabu_cooper_basin_unconventional_gas_opportunities_and_commercialisation.pdf.

75. U.S. ENERGY INFO. ADMIN., *supra* note 18, at III-2.

76. See Scott Weeden, *Australian Unconventional Plays Remain in Proof-of-Concept Stage*, E&P (Apr. 1, 2013, 12:00 AM), <http://www.epmag.com/australian-unconventional-plays-remain-proof-concept-stage-692011#p=full> (discussing shale exploration in the Cooper Basin pursued by Santos, Beach Energy, and Senex Energy, all taking advantage of the Cooper Basin's infrastructure and detailing Santos' effort to unlock the vast unconventional potential of the Cooper Basin, Senex Energy's belief of "big opportunity" in the Cooper Basin, and Beach Energy's anticipation of further gas discoveries under Beach's exploration permits).

B. Development of coal seam gas resources in Queensland

Australia is endowed with massive coal resources, possessing 6% of the world's black coal and 25% of recoverable brown coal.⁷⁷ CBM reserves in Australia are largely confined to the east coast of Australia, with a small amount in Western Australia's Perth Basin.⁷⁸ The primary CBM activity has been confined to Queensland as a result of the quality and type of coal, where gas production has occurred since the late 1990s, beginning with small-scale commercial exploitation of the methane gas from coal seams in 1996.⁷⁹ Since the mid-1990s commercial production of CSG has increased, initially providing gas for Queensland electricity generation.⁸⁰ Today the large-scale development is also targeted at the export of LNG to Asian energy markets on long-term forward contracts.⁸¹

The pioneering development of CSG occurred in the Surat and Bowen Basins over an area of around 270,000km², with additional area for pipeline corridors and LNG processing and transport

77. *Coal Resources*, AUSTL. GOV'T, GEOSCIENCE AUSTL., <http://www.ga.gov.au/scientific-topics/energy/resources/coal-resources> (last visited Aug. 1, 2015).

78. See U.S. ENVTL. PROT. AGENCY, COALBED METHANE OUTREACH PROGRAM, COAL MINE METHANE COUNTRY PROFILES 1, 12, 18 (2015), http://www3.epa.gov/cmop/docs/cmm_country_profiles/Toolsres_coal_overview_fullreport.pdf [hereinafter U.S. EPA] (reporting that Australia has large deposits of both brown and black coals which are located in the east coast states of Queensland and NSW and finding that CBM recovery activity in Australia has been focused predominantly in NSW and Queensland). As at June 2013, a moratorium has been placed on the extraction of CSG from the Perth Basin. It is expected that this moratorium will not be lifted in the near future. As such, the discussion relating to CSG in Australia is confined to eastern Australia, especially NSW and Queensland.

79. See U.S. EPA, *supra* note 78, at 1, 18 (finding that CBM recovery activity in Australia has been focused predominantly in NSW and Queensland with 97 percent of CBM production occurring in Queensland where commercial CBM production began in 1996); *About Coal Seam Gas*, QUEENSL. GOV'T, DEPT OF ENV'T AND HERITAGE PROT., <http://www.ehp.qld.gov.au/management/coal-seam-gas/> (last updated April 1, 2013).

80. Production has increased rapidly due to a 2000 decision by the Queensland Government to require that 13% of all power on the State's electricity grid be generated by gas by 2005. See *Coal Resources*, *supra* note 77.

81. See Dr. Tina Hunter, *Rising Demands for Australian Gas Exports in the Asian Century: Implications for Japan's Energy Security*, in GRIFFITH ASIA INSTITUTE, THE AUSTRALIA JAPAN DIALOGUE: ENERGY SECURITY: CHALLENGES AND OPPORTUNITIES 83, 83-84 (2013) (describing the ability for the expansion of LNG exports to other Asian markets, three of which are currently major importers).

facilities on Curtis Island.⁸² This development has occurred since the mid-2000s, and has involved four individual consortia, with a capital investment exceeding US\$60 billion.⁸³ To date, Australia's annual CSG production has increased from 1 petajoule in 1996 to 285 petajoules in 2013-14,⁸⁴ around 10 per cent of Australia's total gas production.⁸⁵ Of the 2013-14 production of 285 petajoules of CSG, 119 petajoules were produced from the Bowen Basin, and 166 petajoules from the Surat Basin.⁸⁶

At present there is a major development of infrastructure for CSG resources is taking place in Queensland, with at least three large consortia developing fields and infrastructure for the export CSG as LNG since 2015.⁸⁷ The gas is to be transported by pipeline from the CSG fields to Gladstone Harbour/Curtis Island for LNG processing prior to shipment to Asian markets.⁸⁸

The first consortium is the Queensland Curtis LNG (QCLNG) consortium, formed by the partnership of Queensland Gas Company and British Gas.⁸⁹ It is the world's first project to turn gas from coal seams into LNG.⁹⁰ The project acquired licences in

82. See N.S.W. CHIEF SCIENTIST & ENGINEER, INITIAL REPORT ON THE INDEPENDENT REVIEW OF COAL SEAM GAS ACTIVITIES 45 (2013).

83. QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, CSG TO LNG: OPPORTUNITIES IN QUEENSLAND 1, 6 (2013), [http://www.jie.or.jp/2013/events/130612sankou4\(english\).pdf](http://www.jie.or.jp/2013/events/130612sankou4(english).pdf).

84. QUEENSL. GOV'T, DEP'T OF NAT. RES. AND MINES, QUEENSLAND'S PETROLEUM AND COAL SEAM GAS 5 (2016).

85. See QUEENSL. GOV'T, DEP'T OF INDUS. AND SCIENCE, AUSTRALIAN ENERGY UPDATE 2015 1, 19 (2015) (stating the total amount of gas production as 2479.2 PJ, which means the percent CSG production is about 10% of the total gas production in Australia).

86. QUEENSL. GOV'T, DEP'T OF NAT. RES. AND MINES, *supra* note 84, at 7.

87. Project proponents include 1) Queensland Curtis LNG — owned by the Queensland Gas Company (a British Gas group company); 2) Gladstone LNG — a joint venture between Santos, Petronas, Kogas and Total; 3) Australia Pacific LNG — a joint venture project between Origin, ConocoPhillips and Sinopec; and 4) Arrow LNG — a joint venture between Shell and PetroChina. See QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, *supra* note 83, at 7.

88. *Id.*; Jessica van Vonderen, *First Shipment of LNG to Leave Gladstone in Central Queensland Bound for Asia*, AUSTRAL. BROADCASTING CORP. NEWS (Jan. 2, 2015, 8:17 PM).

89. QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, *supra* note 83, at 6.

90. *QCLNG Project*, QGC, <http://www.qgc.com.au/qclng-project.aspx> (last visited Jan. 28, 2016) ("Queensland Curtis LNG (QCLNG) will be the world's first project to turn gas from coal seams into liquefied natural gas, or LNG.").

the Surat Basin during the mid-2000s and began seeking approvals for development at that time.⁹¹ With approvals in place, construction of the necessary infrastructure, alongside the development of wells for production has occurred since 2010.⁹² The project involves the development of CSG field in the Surat Basin, further exploration in the Bowen Basin, and the construction of a 540km pipelines linking the fields to Gladstone, where QCLNG has also built a two train LNG processing facility, two LNG storage tanks and LNG loading facilities on Curtis Island near.⁹³ The capital investment has been enormous, with over US\$20 billion of investment from 2010-14.⁹⁴ The project culminated in the first shipment of gas in January 2015, which was also the first export of gas from Australia's east coast.⁹⁵

The Gladstone LNG (GLNG) consortium comprises Santos, Petronas, Total and Kogas, with fields in the Bowen and Surat basins.⁹⁶ The consortium is also developing, independently of other LNG consortia, a 420km pipeline to its two LNG processing trains and associated LNG storage and loading infrastructure on Curtis Island.⁹⁷ First gas from this consortium was delivered to

91. See QUEENSL. GAS CO., LTD., TRANSFORMATION ANNUAL REPORT 2008 2, 12 (2008) (referring to the company's attempt to acquire permission to develop LNG in the Surat Basin); see also QUEENSL. GAS CO, LTD., QUEENSLAND CURTIS LNG EXECUTIVE SUMMARY 1, 7 (2010), <http://www.statedevelopment.qld.gov.au/resources/project/queensland-curtis-liquefied-natural-gas-project/executive-summary-eis.pdf> (noting that the QCLNG project was declared a "significant project" in 2008, a designation for which project managers would have sought approval).

92. See *QCLNG Project*, *supra* note 90.

93. See *On Curtis Island*, QGC, <http://www.qgc.com.au/qclng-project.aspx> (last visited Jan. 28, 2016) (discussing the plans for the QCLNG project); see also N.S.W. CHIEF SCIENTIST & ENGINEER, INITIAL REPORT ON THE INDEPENDENT REVIEW OF COAL SEAM GAS ACTIVITIES IN NSW, 1, 45 (2013).

94. *QCLNG Project*, *supra* note 90.

95. See *First Shipment of Natural Gas Leaves Gladstone Bound for Asia*, AUSTRAL. BROADCASTING CO. (Jan. 5, 2015), <http://www.abc.net.au/news/2015-01-06/first-lng-from-csg-ship-leaves-queensland/6002446>; see also *First shipment of coalseam gas-based LNG leaves Australia's east coast*, PLATTS (Jan 6, 2015), <http://www.platts.com/latest-news/natural-gas/sydney/first-shipment-of-coalseam-gas-based-lng-leaves-26974672>.

96. QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, *supra* note 83, at 6.

97. *Id.*

the processing facility on Curtis Island in March 2015,⁹⁸ and the delivery of first gas to customers is expected in the second half of 2015.⁹⁹

Australia Pacific LNG (APLNG) is the third CSG consortium developing CSG production, transport and processing/LNG loading facilities.¹⁰⁰ It is a partnership between Origin, ConocoPhillips and Sinopec.¹⁰¹ Similar to the GLNG consortium, APLNG has gas fields in the Surat and Bowen basins and is constructing a 530km transmission pipeline from the gas fields to the LNG processing and loading facility on Curtis Island,¹⁰² as well as supplying domestic gas.¹⁰³

A fourth consortium, Arrow LNG, comprised of Arrow Energy and PetroChina, (as well as Shell prior to January 2015), planned to construct similar production, transport and processing facilities for the export of CSG produced from its tenements in the Bowen and Surat Basins.¹⁰⁴ However, a change in Commonwealth law relating to requirements under the principal environmental act¹⁰⁵ meant that approval for the construction of such facilities by the Arrow Consortium were delayed significantly. As a consequence of the delayed approval for the necessary infrastructure, the Arrow Consortium has instead decided to secure higher marginal sales for its gas by selling downstream.¹⁰⁶ To that end, Arrow is building pipelines from the

98. *Santos GLNG Brings First Gas into LNG Plant*, SANTOS (Mar. 9, 2015), <http://www.santoslng.com/media-centre/media-releases/santos-glng-brings-first-gas-into-lng-plant.aspx>.

99. *Id.*

100. QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, *supra* note 83, at 6.

101. *Id.*

102. *About the Project*, AUSTL. PAC. LNG, <http://www.aplng.com.au/about-project/about-project> (last visited Jan. 28, 2016).

103. *Id.*

104. QUEENSL. GOV'T, DEP'T OF STATE DEV., INFRASTRUCTURE & PLANNING, *supra* note 83, at 6.

105. See discussion *infra* Section 4 for a discussion of the changes in the law. See also Environment Protection and Biodiversity Conservation Act 1999 s 24D (Austl.).

106. See *Projects*, ARROW ENERGY (Dec. 14, 2015), <https://www.arrowenergy.com.au/projects>.

Surat and Bowen Basins to Gladstone, in order to connect its gas with high value overseas markets.¹⁰⁷

IV. REGULATION OF UNCONVENTIONAL GAS RESOURCES IN AUSTRALIA

A. Overview of Regulation – Jurisdiction and Competence

The regulation of UGR in Australia is complex, primarily as a result of the preexisting Australian colonies at the time of the formation of the federation and the promulgation of the Australian Constitution, which entered into force on 1 January 1901.¹⁰⁸ Australia is comprised of six states,¹⁰⁹ each with their own political and legal system, as well as two self-governing territories: Northern Territory and the Australian Capital Territory.¹¹⁰ Given that Tasmania and the Australian Capital Territory do not have shale gas reserves, they will not be considered in this analysis. All onshore petroleum activities are regulated by the states/Northern Territory, as there is no enumerated power for the Commonwealth to regulate petroleum and mineral activities under the Australian constitution.¹¹¹ In contrast, each Australian state has the capacity to regulate all other activities not enumerated in the Australian Constitution for the “peace, welfare and good government” of that state.¹¹² All

107. *Arrow Pushes On With Plan to Build Gas Pipeline*, OBSERVER (Aug. 6, 2014, 9:32 AM), <http://www.gladstoneobserver.com.au/news/arrow-pushes-plan-build-gas-pipeline/2342349/>; ARROW ENERGY, ARROW ENERGY SUSTAINABILITY REPORT 2013 1, 5 (2013).

108. Commonwealth of Australia Act, 1900 (Imp), 63 & 64 Victoria, c. 12, § 9 (U.K.).

109. These states are New South Wales, Queensland, Western Australia, South Australia, Victoria, and Tasmania. *State and Territory Governments*, AUSTRALIAN GOVERNMENT, <http://www.australia.gov.au/about-government/how-government-works/state-and-territory-government> (last visited Feb. 3, 2016).

110. *See id.* (describing the North Territory and Australian Capital Territory as having a “limited right of self government” and “range of governmental matters [handled] by a locally-elected parliament”).

111. The only authority under which the Commonwealth could regulate the extraction of UGR is s 51(i) of the Constitution (Interstate and overseas trade and commerce), or s 51(XX) of the Constitution (Corporations power). *Australian Constitution* s. 51.

112. *Constitution of Queensland 2001* (Qld) pmb. (Austl.); *Constitution Act 1902 No 32* (N.S.W.) s 5 (Austl.); *Constitution Act 1899* (WA) s 2 (Austl.).

onshore petroleum activities, be they conventional or unconventional, are regulated under the relevant petroleum legislation in each state/Northern Territory, with the exception of Victoria, where CSG activities are regulated under the Mineral Resources (Sustainable Development) Act 1990 (MRA).¹¹³ The reason for this difference relates to the regulation of coal mining activities under the MRA in Victoria, with CSG viewed as an extension of coal mining activities and therefore to be regulated under the MRA.¹¹⁴

The exploration for and extraction of shale gas in Australia is generally governed by the main petroleum act in each jurisdiction, with petroleum¹¹⁵ defined in the sections following:

- Petroleum (Onshore) Act 1991 (N.S.W.) s 3;
- Petroleum Act (N. Terr.) s 5;
- Petroleum Act 1923 (Queensl.) s 2 and Petroleum and Gas (Production and Safety) Act 2004 (Queensl.) s 10(1);
- Petroleum and Geothermal Energy Act 2000 (S. Austl.) s 4;
- Petroleum Act 1998 (Vict.) s 6 (defined under conventional petroleum) and Mineral Resources (Sustainable Development) Act 1990 (Vict.) s 5 (defined under unconventional petroleum); and
- Petroleum and Geothermal Energy Resources Act 1967 (W. Austl.) s 5.

113. See David Maloney, *Unconventional Oil and Gas in Australia: a Case of Regulatory Lag*, 33 J. Energy & Nat. Res. L. 349, 356-58, 360 (2015) (naming the applicable onshore petroleum laws for each Australian state and listing Victoria as being regulated under the Mineral Resources 'Sustainable Development' Act 1990); see also *Mineral Resources (Sustainable Development) Act 1990* (Austl.).

114. See *Unconventional Gas: Coal Seam Gas, Shale Gas and Tight Gas*, PARLIAMENT OF VICT., <http://www.parliament.vic.gov.au/publications/research-papers/8927-unconventional-gas-coal-seam-gas-shale-gas-and-tight-gas> (last visited Feb. 4, 2016).

115. Shale gas is a gaseous form of hydrocarbons, and therefore falls under the definition of petroleum in the various acts. See ASHURST, *PETROLEUM IN AUSTRALIA* 1, 12 (2013), https://www.ashurst.com/doc.aspx?id_Content=8805 ("[CSG] is licensed as a form of petroleum under Australian legislation . . . [and] is reserved to and owned by the relevant State or Territory and is subject to licensing and leasing regimes under the relevant jurisdiction.").

Although each of the state/territory Onshore Petroleum Acts defines petroleum in a slightly different manner, each definition has a common thread. Generally, each of the Acts (with the exception of Tasmania) defines petroleum as any naturally occurring hydrocarbon (whether in a gaseous, liquid or solid state), or any naturally occurring mixture of hydrocarbons.¹¹⁶

Similarly, the regulation of environmental issues relating to shale gas (and CSG) in Australia is a matter for individual states under the ambit of the states' constitutional plenary power to make laws for the "peace, welfare and good government" of the state. The Commonwealth does not have an enumerated power to make laws with respect to environmental matters. However, there are sections of the Australian Constitution where the Commonwealth has the capacity to regulate environmental management of petroleum activities. In particular, the Commonwealth can regulate under the trade and commerce power (s 51(i) of the Constitution) as interpreted by the High Court in *Murphyores*.¹¹⁷ In this unanimous decision, the court held that given that the trade and commerce power was a purposive power, legislation allowing the Minister to prohibit the activities of a company that exports mineral sands pending the outcomes of an environmental inquiry was a valid exercise of the trade and commerce power.¹¹⁸ Similarly, the Commonwealth has the capacity to regulate the activities of companies under the Corporations power (s 51(xx) of the Constitution), especially given the outcome of the *Workchoices* case.¹¹⁹ However it is under the

116. Such as the definition in s 5(1) of the *Petroleum and Geothermal Petroleum Resources Act 1967* (WA). Other state Acts define petroleum in similar terms. See e.g. *Petroleum (Onshore) Act of 1991 No 84* (N.S.W.) s 3(1) (Austl.); see e.g. *Mineral Resources (Sustainable Development) Act 1990* (Vict.) s 5 (Austl.).

117. *Murphyores Inc. Pty. Ltd. v. Commonwealth* (1976) 136 CLR 3 (Austl.); *Australian constitution* s 51(i).

118. See *Murphyores Inc. Pty Ltd. v. Commonwealth* (1976) 136 CLR 1 (Austl.) (displaying various opinions by the justices, concluding that the Minister is within his power to prohibit activities of a company exporting certain items due to the commerce and trade powers in the Constitution).

119. See *New South Wales v. Commonwealth* [2006] HCA 52. (This case is referred to as the "WorkChoices" case after the Act that was in controversy. In this case the High Court held by a majority of 5:2 that changes to the Workplace Relations Act were valid, thus enabling the Commonwealth to enact a comprehensive regime of industrial relations law, and substantially widening the scope of the corporations power. More importantly,

External Affairs power (s 51 (xxix) of the Constitution) that the Commonwealth Government is able to regulate environmental matters.¹²⁰

The primary legislative tool for environmental regulation at Commonwealth level is the Environmental Protection and Biodiversity Conservation Act 1999 (EPBCA), which gives effect to the numerous environmental treaties and conventions to which Australia is a signatory.¹²¹

This Act provides for protection of the environment in a number of circumstances, as well as protection of biodiversity, including some habitats. While the EPBCA is Commonwealth legislation and has as its ambit environmental protection, it does not apply to all petroleum activities. Rather it only applies where the activity falls into an area where referral for assessment is required under the EPBCA.¹²² Day-to-day environmental management falls under the ambit of state/Northern Territory law. Therefore, while the EPBCA is not core environmental legislation, it is nonetheless important and needs to be considered when examining environmental regulation of petroleum activities.

Under the EPBCA an action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance (MNES).¹²³ Under s 523 of the EPBCA, an action is

the landmark decision signified a shift in the distribution of power from the states to the federal parliament.); *Australian Constitution* s 51(xx).

120. See *Australian Constitution* s 51(xxix) (declaring the Australian government to “have power to make laws for the peace, order, and good government of the Commonwealth with respect to . . . external affairs”).

121. *Environment Protection and Conservation Act 1999* (Cth) (Austl.); See *Local Government and Australian Environmental Law*, AUSTRALIAN GOVERNMENT, DEPARTMENT OF THE ENVIRONMENT, <https://www.environment.gov.au/resource/local-government-and-australian-environment-law> (last visited Feb. 4, 2016) (discussing the scope of the applicability of the EPBCA).

122. *Environment Protection and Conservation Act 1999* (Cth) ch 2 (Austl.). For a discussion of the applicability of the Act and the definition of “significant impact” see PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA, HOUSE OF REPRESENTATIVES, STANDING COMMITTEE ON INDUSTRY AND RESOURCES, *EXPLORING AUSTRALIA’S FUTURE — IMPEDIMENTS TO INCREASING INVESTMENT IN MINERALS AND PETROLEUM EXPLORATION IN AUSTRALIA* 106-10 (2003).

123. *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) ss 11, 130 (Austl.).

2016] *DEVELOPMENT OF SHALE GAS AND COAL BED METHANE* 389

defined broadly to include a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things.¹²⁴ A significant impact is defined as:

[A]n impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have significant impact depends on the sensitivity, value and quality of the environment which is impacted, and on the intensity, duration, magnitude and geographic extent of the impacts.¹²⁵

The MNES comprises:

1. listed threatened species and ecological communities;
2. migratory species protected under international agreements;
3. Ramsar wetlands¹²⁶ of international importance;
4. the Commonwealth Marine Environment;
5. world heritage properties;
6. the Great Barrier Reef Marine Park;
7. nuclear actions; and
8. a water resource in relation to coal seam gas development and large coal mining development (Water Trigger).¹²⁷

To determine whether an action requires approval by the Minister, the project is referred to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) if the project includes one of the MNES.¹²⁸ The project can be referred by either the project proponent themselves, or a third party such as a Minister, or a government agency. Generally, the project proponent will refer

124. *Id.* s 523.

125. *Significant impact*, GLOSSARY, AUSTRALIAN GOVERNMENT, DEPARTMENT OF THE ENVIRONMENT, <http://www.environment.gov.au/epbc/about/glossary.html#significant> (last visited on January 28, 2016).

126. These are wetlands designated under Art 2 of the Convention of Wetlands of International Importance especially as waterfowl habitat, done at Ramsar, Iran in 1971.

127. *Environment Protection and Conservation Act 1999* (Cth) ch 2 (Austl.).

128. Craig Donovan, *EPBCA and Translocating the Devil "Down Under"*, 27 NAT. RES. & ENV'T, Fall, 2012, at 49, 49.

the project to SEWPaC to determine whether the referral requires assessment under the EPBCA. An application for referral is then assessed to determine whether it requires assessment by the Minister (a controlled action), on the grounds of posing a significant risk to a MNES.¹²⁹ If it does not pose a significant risk (an uncontrolled action), the project may not be referred to the Minister for assessment. Where an action is deemed to be a controlled action, it is referred to the Minister.. The action is assessed under the EPBCA, and will either be approved or not. If approved, the action will also be assessed under the normal exploration permit assessment and approval process under the Offshore Petroleum and Greenhouse Gas Storage Act 2006.¹³⁰

Prior to 2013, the MNES only comprised the first seven criteria listed above. The “Water Trigger” was implemented by reforms to the EPBCA, implemented by the Environmental Protection and Biodiversity Conservation Amendment Act 2013.¹³¹ The water trigger deemed that water resources are a matter of national environmental significance, and coal mining and coal seam gas production activities need approval from the Commonwealth due to the likely impact of the project on water resources.¹³² This amendment to the EPBCA has had a significant impact on the development of CSG in Australia. Unlike the QCLNP, GLNG, and APLNG consortia, the Arrow LNG CSG project required additional Commonwealth EPBCA approval under the water trigger. The other consortia projects had already been approved at the time of the commencement of the water trigger, which did not have retroactive effect, meaning that the each of the consortia’s projects did not have to resubmit

129. *Id.* at 50.

130. See AUSTL. GOV’T, DEP’T OF INDUSTRY, OFFSHORE GREENHOUSE GAS STORAGE ACREAGE RELEASE 4-5 (2014) (describing the distinction between the OPGGSA permitting process and the EPBCA permitting process).

131. *Environment Protection and Biodiversity Conservation Amendment Act 2013* (Cth) s 24D (Austl.); see also AUSTL. GOV’T, DEP’T OF THE ENV’T, SIGNIFICANT IMPACT GUIDELINES 1.3: COAL SEAM GAS AND LARGE COAL MINING DEVELOPMENTS – IMPACTS ON WATER SOURCES 4-5 (2013) (discussing the water trigger).

132. *Environment Protection and Biodiversity Conservation Amendment Act 2013* (Cth) s 24D (Austl.); see also AUSTL. GOV’T, DEP’T OF THE ENV’T, *supra* note 131, at 4-5 (2013).

their already approved projects. However, EPBCA approval for the Arrow LNG project was pending at the time of the amendment.¹³³ Since approval had not been granted, the project was now subject to the Water Trigger, requiring additional studies and assessment. The additional approval delayed the project by at least one year, and altered the project scope significantly.¹³⁴

One of the limitations of the EPBCA Water Trigger is its scope of application. In its current form, the Water Trigger only applies to water resources in relation to coal seam gas and coal mining projects.¹³⁵ It does not apply to water resources in relation to shale gas projects. This is a significant weakness of the Water Trigger, given the vast shale gas resources in Australia, the location of most of those resources in areas of low rainfall, and the amount of water required to hydraulically fracture shale gas resources to enable the production.. With the production of CSG, wells are generally dewatered, with only around 8% requiring hydraulic fracturing.¹³⁶ Conversely, 100% of shale gas wells require hydraulic fracturing, with each well often requiring multiple fractures.¹³⁷ Data from the United States demonstrates that each fracture treatment often requires between 1.8 and 5.7 million gallons of water, depending on the geology being

133. Arrow LNG's approval was pending from May of 2009 until December of 2013, and the amendment was passed in June of 2013. *Assessments and Approvals, Arrow LNG Plant*, QUEENSL. GOV'T, DEP'T OF STATE DEV., <http://www.statedevelopment.qld.gov.au/assessments-and-approvals/arrow-lng-plant.html> (last visited Apr. 1, 2016); *Water Resources – 2013 EPBC Act Amendment – Water Trigger*, AUSTR. GOV'T, DEP'T OF THE ENV'T, <https://www.environment.gov.au/epbc/what-is-protected/water-resources> (last visited Apr. 1, 2016).

134. *Labor's Water Trigger Law Applies to 47 Mines and LNG*, THE OBSERVER (Sept. 27, 2013 12:00 P.M.), <http://www.gladstoneobserver.com.au/news/water-trigger-laws-former-labor-government/2033672/>; Matt Chambers, *Shell, PetroChina Mull Arrow LNG Options*, THE AUSTR. BUS. REV. (Jan. 22, 2014), <http://www.theaustralian.com.au/business/mining-energy/shell-petrochina-mull-arrow-lng-options/story-e6frg9df-1226807138530>; *Hot Debate on Arrow*, QUEENSL. IND. ADVOC. (Jan. 21, 2014), <http://industryadvocate.com.au/hot-debate-on-arrows-lng-future/>.

135. *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) s 24D (Austl.).

136. *Frequently Asked Questions on Coal Seam Gas Extraction and Fracing*, GAS INDUS. SOC. AND ENVTL. RES. ALLIANCE (GISERA) (Dec. 2011), <http://www.gisera.org.au/publications/faq/faq-csg-extraction-fracing.pdf>.

137. *Id.*

fractured.¹³⁸ Given the volume of water required to fracture a well and the low rainfall in many areas where shale gas occurs, it is logical that the ‘water trigger’ as a MNES should also apply to shale gas projects. As shale gas projects are developed in the future, the MNES should be.

Although the Commonwealth does not have constitutional capacity to regulate shale gas and CSG activities, Commonwealth Energy and Resources Ministers have nonetheless utilised the Standing Council of Energy and Resources (SCER), a subcommittee of the Council of Australian Governments, to address the issue of UPR development.¹³⁹ Responding to concerns raised by the community regarding the development of natural gas from coal seams, the SCER has developed a framework to address these concerns. This framework is known as the Harmonised Regulatory Framework for Natural Gas From Coal Seams (the “Framework”) and addresses the following areas of community concerns:

- Well integrity
- Water management and monitoring
- Hydraulic fracturing; and
- The use and disclosure of chemicals in operations.¹⁴⁰

Whilst the Framework is called a regulatory framework, it is not, given that the commonwealth has no power to regulate in this area. Rather, it is an overview of issues that all state and territory governments should consider when developing coal seam gas resources and guidance on developing the regulatory tools required to sustainably manage the development of CSG.¹⁴¹ Whilst the Framework focuses on a harmonised regulatory approach to coal seam gas, SCER recognises that the Framework

138. See *FAQs: Hydraulic Fracturing*, U.S. GEOLOGICAL SURV. (USGS), <http://www.usgs.gov/faq/categories/10132/3824> (last visited Feb. 7, 2016).

139. Allan Ingelson & Tina Hunter, *A Regulatory Comparison of Hydraulic Fracturing Fluid Disclosure Regimes in the United States, Canada, and Australia*, 54 NAT. RESOURCES J. 242 (2014).

140. STANDING COUNCIL ON ENERGY AND RES., THE NATIONAL HARMONISED REGULATORY FRAMEWORK FOR NATURAL GAS FROM COAL SEAMS 3 (2014).

141. *Id.*

may have some applicability to shale gas development.¹⁴² Many of the principles that are outlined in the Framework are relevant, and, as such, they should be expanded to incorporate shale gas activities. However, many of the principles relating to water use and disposal are not applicable. This is because CSG requires the dewatering of the coal seams, producing large quantities of briny water, which requires large amounts of treatment and disposal.

B. Regulation of East Coast Coal Seam Gas

1. Queensland

Traditionally a mining state rather than a petroleum producing state, the escalating development of CSG in Queensland in the early 2000s strained existing petroleum legislation. From the commencement of the rapid development of CSG activities in Queensland, the regulatory approach has been that of “adaptive management”. This method of “learning by doing” is implemented through the imposition of layered duties for the operator (reporting and monitoring), alongside obligations to compensate landholders, and “make good” any harm caused.¹⁴³ The reasoning for adopting this form of environmental regulation was premised on the uncertainty surrounding the impacts of CSG activities. The government sought to plan for that uncertainty by implementing a “learning by doing” approach to regulation, instigating changes where necessary.¹⁴⁴ Such an approach is very much reactive; it responds to regulatory issues as they occur, rather than trying to anticipate and legislate for problems prior to the activity taking place. Given the limitations of the existing Petroleum Act 1923,¹⁴⁵ the Queensland government undertook reform of the existing act through the implementation of the Petroleum and Gas (Production and Safety) Act 2004 (PGPSA).¹⁴⁶ However, as a result of existing native title regulation under the

142. *Id.* at 9.

143. Nicola Swayne, *Regulating Coal Seam Gas in Queensland: Lessons in an Adaptive Environmental Management Approach?*, 29 ENVTL. L. & PLANNING J. 163 (2012).

144. *See id.* (describing the development of the “learning by doing” regulatory approach as a response to inherent uncertainty surrounding CSG activities).

145. *Petroleum Act 1923* (Qld) (Austl.).

146. *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (Austl.).

Petroleum Act that were not incorporated into the PGPSA, the earlier act is still in force in some native title areas.¹⁴⁷ One of the greatest limitations of the PGPSA, aside from not incorporating the native title elements, is its prescriptive nature. Although there are two acts that apply to the regulation of the extraction of CSG in Queensland, all regulation primarily occurs under the PGPSA.

At over 1400 pages, the PGPSA outlines, in minutiae, the “rules” for the extraction of CSG. Such rule-based regulation relies on legislatively entrenched rules to regulate petroleum activities. These systems tend to require new rules every time a new regulatory situation arises.¹⁴⁸ This type of regulation is also known as prescriptive regulation, because the rule specifies in relatively precise terms what is required to be done.¹⁴⁹ Regulators, particularly in the petroleum industry, have traditionally relied on prescriptive regulation. This reliance was borne out of a need to ensure regulatory enforceability. As noted by Freiberg, the use of such a prescriptive regime may be appropriate where there is a single, commonly agreed means of controlling a hazard or risk.¹⁵⁰ However, rule-based regulation can lead to regulatory inconsistencies and rigidity, requiring constant updating.¹⁵¹ The use of such prescriptive legislation has become outdated, because rigid rules discourage innovation, and force companies to carry high administrative and compliance costs.¹⁵²

147. See QUEENSL. GOV'T, REGULATORY IMPACT STATEMENT FOR SL 2004 No. 309, 2-3 (2004) (explaining that to avoid a major disruption in the supply of petroleum which would occur in settling the native title issues, the government decided to retain the Petroleum Act).

148. AUSTRAL. GOV'T, DEP'T OF CLIMATE CHANGE AND ENERGY EFFICIENCY, THE ROLE OF REGULATION IN FACILITATING OR CONSTRAINING ADAPTATION TO CLIMATE CHANGE FOR AUSTRALIAN INFRASTRUCTURE: REPORT FOR THE DEPARTMENT OF CLIMATE CHANGE AND ENERGY EFFICIENCY 22 (2011), <http://www.environment.gov.au/system/files/resources/7ea13787-628d-477a-8230-66dc96296dfd/files/maddocks-report.pdf>.

149. ARIE FREIBERG, THE TOOLS OF REGULATION 89 (2010).

150. *Id.*

151. *Id.*

152. STATE GOV'T OF VICT., VICTORIAN GUIDE TO REGULATION, TOOLKIT 1: PURPOSES AND TYPES OF REGULATION 9, tbl. 2 (2014), <http://www.dtf.vic.gov.au/publications/victoria-economy-publications/victorian-guide-to-regulation>.

These pitfalls of rule-based regulation, outlined by legal scholars and the government alike,¹⁵³ have been demonstrated in the PGPSA. Since 2004, the PGPSA has been subject to multiple and major amendments. An examination of the endnotes of the PGPSA identifies over 1000 amendments to the PGPSA, with more than 40 consolidated versions of the Act released.¹⁵⁴ The PGPSA will be further altered under the Modernising Queensland Resources Acts Program, which is integrating five separate acts related to natural resources into a single act.¹⁵⁵ Added to this is a change of government in 2015,¹⁵⁶ whose vision for regulatory reform is unclear at the time of writing. Together, these impending and possible changes have created a legal framework that is ever-changing, thereby affecting both investment and stakeholders.

As of August 2015, the regulatory approach to CSG extraction and regulation of the impact of CSG activities in Queensland is still rule-based, centered around the philosophy of adaptive environmental management.¹⁵⁷ Queensland has implemented this method of “learning by doing” primarily by imposing on CSG operators layered duties to monitor and report alongside obligations to compensate and “make good” harm caused.¹⁵⁸ This regulatory approach clearly demonstrates that Queensland

153. See *supra* notes 151-55 and accompanying text.

154. *Petroleum Gas and Safety Act of 2004* (Cth) (Austl.).

155. The MQRA is an ambitious legislative reform program which commenced in 2013 and is expected to be finalised in 2017, and integrates the *Mineral Resources Act 1989* (Qld) (Austl.), the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (Austl.), the *Petroleum Act 1923* (Qld) (Austl.), the *Greenhouse Gas Storage Act 2009* (Qld) (Austl.), and the *Geothermal Energy Act 2010* (Qld) (Austl.). *Why a New Resources Act?*, QUEENSL. DEP'T OF NAT. RES. AND MINES, <https://www.dnrm.qld.gov.au/our-department/policies-initiatives/mining-resources/legislative-reforms/mqra/why-new-resources-act> (last visited July 15, 2015).

156. Australia elected a new Prime Minister in 2015. Michelle Innis, *Malcolm Turnbull Defeats Tony Abbott to Become Prime Minister of Australia*, N.Y. TIMES (Sept. 14, 2015), <http://www.nytimes.com/2015/09/15/world/asia/tony-abbott-liberal-party-australia.html>.

157. See *Adaptive Management*, QUEENSL GOV'T, DEP'T OF ENV'T AND HERITAGE PROT. (Apr. 1, 2013), <https://www.ehp.qld.gov.au/management/non-mining/adaptive-management.html> (describing adaptive management as the guiding principle of Australian environmental regulation).

158. Swayne, *supra* note 143, at 163.

continues in a “learning phase” of regulation, and the approach recognises the uncertainty surrounding the impacts of these activities.¹⁵⁹ Through these regulations, Queensland also seeks to put in place a system “to monitor and instigate change where necessary”,¹⁶⁰ to meet the expectations of the community. Such adaptive management frameworks are “widely used to address unknown and unintended impacts when making important management decisions” regarding environmental impacts of CSG extraction activities.¹⁶¹ These adaptive management techniques are regulated under a plethora of legislation, especially the Environmental Protection Act 1994 (Qld) (EPA),¹⁶² where numerous legislative changes have been made to accommodate this approach.¹⁶³

The current Queensland CSG framework under the Petroleum Act 1923 and the PGSPA is supported by other legislation, including:

- Environmental Protection Act 1994 — the EPA has the extremely broad objective of achieving “ecologically sustainable development” in Queensland by setting out a program for the identification and protection of important elements of the environment and by creating a range of regulatory tools for controlling the activities of individuals and companies,¹⁶⁴ and
- Regional Planning Interests Act 2014 — a legislative and planning framework designed identify and protect areas of regional interest

159. *See id.* at 33-34.

160. *Id.* at 170.

161. Tina Hunter, *supra* note 34, at 55, 60 (citing QUEENSL GOV'T, DEP'T OF ENV'T AND NAT. RES., ADAPTIVE ENVIRONMENTAL MANAGEMENT REGIME FOR THE COAL SEAM GAS INDUSTRY 1 (2011), <http://www.ehp.qld.gov.au/factsheets/pdf/environment/en7.pdf>).

162. *See* Swayne, *supra* note 143. (discussing the role that the Environmental Protection Act 1994 and Petroleum and Gas (Petroleum Safety) Act 2004 play in CSG regulation).

163. *See id.* at 23, 30 (describing some of the legislative changes enacted by the Environmental Protection Act).

164. *See Environmental Protection Act 1994* (Qld) ch1 pt2 (Austl.) (describing how the EPA's objective will be met in four stages of regulatory activities).

including regional communities, high quality agricultural areas, and strategic cropping land;¹⁶⁵

One of the greatest community issues in Queensland regarding the extraction of CSG is that of land access and compensation, which has had a significant impact on landholders whose land is affected by CSG production. In the report *Management of the Murray Darling Basin Interim Report: The Impact of Mining Coal Seam Gas on the Management of the Murray Darling Basin* (Murray-Darling Report)¹⁶⁶ a number of landholder issues were identified. In particular, the Murray-Darling Report identified concerns relating to the insufficient compensation paid to landholders for the impact of CSG extraction and the inability of landholders to control access to their land for CSG extraction activities.¹⁶⁷ Under Queensland law, like all other Australian states and territories, the Crown reserves rights to petroleum.¹⁶⁸ This reservation enables the Crown to grant petroleum titles (for exploration or production) over land that is owned in fee simple or held as a leasehold estate. This means that mining titles can be granted over privately held freehold land, Crown leases, and land over which native title is held.¹⁶⁹ As a result of Crown reservation of petroleum, under s 108 of the PGPSA, the titleholder is entitled to carry out activities associated with the extraction of CSG despite the rights of the landholder over the land.¹⁷⁰ The legal right of the titleholder creates conflict between landholders and titleholders, which are potentiated due to the long-term impact of the extraction of CSG on land (generally over 20 years). Given the level of community consternation regarding land access and use by titleholders, the Queensland government realized the need to amend the law to

165. *Regional Planning Interests Act 2014* (Qld) pt1 div2 (Austl.).

166. PARLIAMENT OF AUSTRALIA. RURAL AFFAIRS AND TRANSPORT REFERENCES COMM., *MANAGEMENT OF THE MURRAY DARLING BASIN INTERIM REPORT: THE IMPACT MINING COAL SEAM GAS ON THE MANAGEMENT OF THE MURRAY DARLING BASIN* (2011).

167. *See id.* at 4-14 (describing landowner concerns about allowing access to their property that stem from the realities of the exploration process, like the construction of roads, drilling sites, worker camps, and gas facilities).

168. *Petroleum and Gas (Production and Safety) Act 2004* (Qld), ss 26, 27 (Austl.).

169. Michael Weir & Tina Hunter, *Property Rights and Coal Seam Gas Extraction: The Modern Property Law Conundrum* 2 PROP. L. REV. 71, 74 (2012).

170. *Petroleum and Gas (Production and Safety) Act 2004* (Qld) s 108 (Austl.).

address issues related to land access. In November of 2010, the Queensland government developed the Land Access Code (Code).¹⁷¹ It aims to balance the interests of the agriculture and resource sectors in order to address issues related to land access for resource exploration and development.¹⁷² Integral to this balancing act is the establishment and maintenance of good relationships between these groups, assisted by adequate consultation and negotiation,¹⁷³ in order to improve transparency, equity, and cooperation between the stakeholders to create a more level playing field for all.¹⁷⁴ The Code attempts to regulate land access and provide a framework for the negotiation of compensation for access to land, without addressing the legal basis for the access given to the titleholder and the limits of that right and the legal rights of the landholder.¹⁷⁵ The obligations under the Land Access Code derive from s 153 of the PGPSA.¹⁷⁶ The Code regulates communication between titleholders and landholders, the negotiation of agreements landholders and titleholders, and stipulates the compulsory requirements regarding access as defined in Schedule 1A of the PGPSA.¹⁷⁷ Although the Code has experienced teething issues, it appears to be a satisfactory attempt to balance the concerns of landholders with the need for access by the titleholders once access to land is granted.

A critical issue impacting landholders in Queensland is the impact of CSG extraction on water resources. The issues identified by the affected landholders and dealt with in the Murray-Darling Report include the acknowledged impact of CSG extraction on groundwater supply, especially local aquifers and the Great Artesian basin, and the potential for aquifer pollution

171. QUEENSL. GOV'T, DEP'T OF EMP'T, ECON. DEV. AND INNOVATION, LAND ACCESS CODE (2010).

172. QUEENSL. GOV'T, DEP'T OF EMP'T, ECON. DEV. AND INNOVATION, GUIDE TO QUEENSLAND'S NEW LAND ACCESS LAWS: NOVEMBER 2010 1-2 (2010).

173. *See id.* at 4 (describing the stages for negotiation and dispute resolution).

174. Michael Weir & Tina Hunter, *supra* note 169, at 79.

175. *See* QUEENSL. GOV'T, DEP'T OF EMP'T, ECON. DEV. AND INNOVATION, *supra* note 172, at 2-4 (describing the three stages of the negotiating process).

176. *Petroleum and Gas (Production and Safety) Act 2004* (Qld) s 153 (Austl.).

177. *See id.* ss 502-503.

from CSG extraction.¹⁷⁸ Furthermore, the National Water Commission has noted that while there are benefits of CSG to Australia, there are other risks that, if not adequately managed and regulated, may have “significant, long-term and adverse impacts on adjacent surface and groundwater systems.”¹⁷⁹ Of critical concern to farmers has been the impact of CSG on agricultural water resources (both the use and contamination of water resources), given that much of the land where CSG extraction occurs in agricultural land used for cropping and grazing. Recognizing the critical importance of water resource management, the Queensland government established the Office of Groundwater Impact Assessment (OGIA) under the Water Act 2000, which regulates the use of water in Queensland, including use for CSG activities.¹⁸⁰ The role of the OGIA is to assess the impact of CSG activities on water, including cumulative impacts, and to map predicted water level impacts of CSG operations.¹⁸¹ Additionally, Queensland has also needed to address concerns relating to water produced from CSG activities. The processing of produced water (often called associated water or CSG water) is regulated under s 111A of the PGPSA, which was inserted in amendments in 2012 in response to farmer concerns.¹⁸² The produced water is treated to remove salts and other chemicals and then disposed of. Such disposal relies on the beneficial use of the water extracted, since it cannot be reinjected into the producing formation.¹⁸³ Traditional options for disposal include surface discharge, underground injection into aquifers, and surface

178. PARLIAMENT OF AUSTRALIA, RURAL AFFAIRS AND TRANSPORT REFERENCES COMM., *supra* note 169, at 17-32.

179. *Coal Seam Gas*, AUSTRALIAN GOVERNMENT, NAT'L WATER COMM'N (June 2012), <http://www.nwc.gov.au/nwi/position-statements/coal-seam-gas>.

180. *Water Act 2000* (Qld) ss 455-459 (Austl.).

181. *Id.*

182. *Petroleum and Gas (Production and Safety) Act 2004* (Qld) s 111A (Austl.); see also Sue Neales, *Farmers Fear Effects of CSG on Their Water*, THE AUSTRALIAN (Aug. 27, 2013), <http://www.theaustralian.com.au/news/nation/farmers-fear-effects-of-csg-on-their-water/story-e6frg6nf-1226704608230> (describing some of these concerns such as the excess water extracted from coal-gas seams).

183. Long D. Ngheim et al., *Treatment of Coal Seam Gas Produced Water for Beneficial Use in Australia: a Review of Best Practices*, 32 DESALINATION AND WATER TREATMENT 316, 319 (2011).

impoundment.¹⁸⁴ Given that CSG production in Queensland occurs in an area of water stress, innovative disposal options after appropriate treatment have been developed, as required under the PGPSA. Such innovative treatments include aquaculture, coal washing at existing coal facilities, irrigation, feedlot watering, and washdown water.¹⁸⁵

2. New South Wales

NSW has few shale gas resources, but, like Queensland, it has vast CSG resources and, as such, has set about to develop a regulatory regime for CSG development. To date there has been much interest in exploring for and producing CSG, but community concern and activism have, with the exception of a small production facility south of Sydney, restricted the development of CSG to date.¹⁸⁶ Vast CSG resources are found on the coal measures of the Gunnedah Basin in northern NSW and the coal deposits in the Sydney Basin.¹⁸⁷ It is the CSG in the Gunnedah Basin that is of particular interest to CSG companies, with the gas targeted primarily for the domestic market. If the gas is to be realised for the export market, it is likely that the gas will be transported to existing east coast export facilities rather than additional facilities being built on the NSW coast.

The extraction of CSG in NSW is regulated under the objective-based Petroleum (Onshore) Act 1991¹⁸⁸ (POA), and associated regulations, as well as the Environmental and Planning Assessment Act 1979.¹⁸⁹ While the POA is designed to regulate conventional petroleum activities, it has struggled (along

184. *Id.*

185. *Id.*

186. The CSG production facility is located at Camden, south west of Sydney, and operated by AGL. It supplies around 5% of NSW's gas needs, and comprises 144 gas wells, low-pressure gas gathering lines and a gas processing plant. *Camden Gas Project*, AGL, <http://www.agl.com.au/about-agl/how-we-source-energy/natural-gas/natural-gas-projects/camden-gas-project> (last visited Feb. 17, 2016); *see also* N.S.W. GOV'T, N.S.W. GOV'T CHIEF SCIENTIST AND ENG'R, *supra* note 93, at 2 (2013) (providing a list of community concerns regarding CSG).

187. *See* SANTOS, GUNNEDAH BASIN GAS COAL SEAM GAS OVERVIEW (2009) (describing how these deposits' potential has yet to be fully realized).

188. *Petroleum (Onshore) Act 1991* (N.S.W.) pt 3 (Austl.).

189. *Environmental Planning and Assessment Act 1979* (N.S.W.) s 5 (Austl.).

with environmental protection legislation) to regulate existing CSG petroleum exploration. Consequently, in December 2010 the NSW Government introduced a moratorium on the use of hydraulic fracturing in the development of CSG that was extended until 2012.¹⁹⁰ This moratorium remained in place while the New South Wales Legislative Council undertook a review of the impacts of CSG activities, reporting the findings in May 2012.¹⁹¹ In 2013, the NSW Chief Scientist was directed by the NSW government to conduct a comprehensive review of the environmental and human health related impacts of CSG.¹⁹² Her report, published in 2014, made a number of recommendations.¹⁹³ Heading these was that the government establish a world class regime for the extraction of CSG.¹⁹⁴ Such a regime is, at the time this article went to print, being developed.

In response to the findings of the report, the New South Wales Government has implemented a comprehensive suite of regulatory reforms across the spectrum of CSG activities prior to the resumption of new CSG exploration and production, including land access and community engagement, environment, water and well activities.¹⁹⁵ Under the POA, the legal framework regulating CSG activities comprises:

1. The Office of Coal Seam Gas (OCSG) within the New South Wales Department of Trade and Investment, Resources and Energy. The OCSG regulates the development of CSG through development

190. Media Release, N.S.W. Minister of Res. and Energy, NSW Government Extends Fracking Moratorium (Dec. 2, 2011), http://www.resourcesandenergy.nsw.gov.au/_data/assets/pdf_file/0010/531829/111202-Minister-Hartcher-Fracking-moratorium-extended.pdf

191. N.S.W. PARLIAMENT LEGISLATIVE COUNCIL GEN. PURPOSE STANDING COMM. NO. 5, *supra* note 11. The moratorium was lifted in 2013.

192. *Coal Seam Gas Review*, N.S.W. GOV'T, CHIEF SCIENTIST & ENG'R, www.chiefscientist.nsw.gov.au/reports/coal-seam-gas-review (last visited Feb. 5, 2016).

193. N.S.W GOV'T, CHIEF SCIENTIST & ENG'R, *supra* note 93, at 12-15 (2014).

194. *Id.* at 12.

195. For a description of the Government's response to the report, see N.S.W. GOV'T, IMPLEMENTING THE FINAL REPORT OF THE CHIEF SCIENTIST AND ENGINEER'S INDEPENDENT REVIEW OF COAL SEAM GAS ACTIVITIES IN NSW 1-4, 6, 11,15 (2015).

consents.¹⁹⁶ For development to occur, a licence is required, including exploration and production licences, issued under the POA;¹⁹⁷

2. The independent Environment Protection Authority provides a lead regulatory agency for the environmental and health impacts of CSG activities in NSW, under the Environmental and Planning Assessment Act 1979 and subordinate legislation.¹⁹⁸ It is the Environment Protection Authority that has responsibility for compliance and enforcement for CSG.¹⁹⁹ As part of the reform after the Chief Scientist report, a Land and Water Commissioner was created, to provide guidance to landholders regarding land access arrangements and to provide basin-wide oversight of the exploration licence process.²⁰⁰
3. The establishment of a statewide Aquifer Interference Policy, designed to protect the underground water resources of NSW, licence water use, and balance the water use requirements of the multiple land users, including towns, farmers, horse breeders and the CSG industry.²⁰¹

Under this tripartite regulatory regime all CSG activities in the upstream petroleum chain, including exploration

196. Clinton Douglas Marble, *An Analysis of Environmental Regulatory Compliance* (Aug. 2014) (M.A. thesis, Royal Roads University) (on file with Royal Roads University).

197. *Petroleum (Onshore) Act 1991* (Qld) ss 29, 41 (Austl.).

198. *Environmental Planning and Assessment Act 1979* (N.S.W.) (Austl.). The Authority was formed pursuant to the *Protection of the Environment Administration Act 1991* to guide compliance with environment protection legislation in N.S.W. *Protection of the Environment Administration Act 1991* (N.S.W.) ss 7, 8, 15 (Austl.); see also *About the N.S.W. EPA*, N.S.W. EPA (April 20, 2015), <http://www.epa.nsw.gov.au/whoweare/index.htm> (describing the Authority generally).

199. The Authority took on the role of lead regulator pursuant to the N.S.W. Gas Plan, which was published in response to the Chief Scientist and Engineer's report. N.S.W. GOV'T, N.S.W. GAS PLAN 1, Action 7 (2014).

200. N.S.W. GOV'T, STRATEGIC REGIONAL LAND USE POLICY (2012); see also *Land and Water Commissioner*, N.S.W. GOVERNMENT DEP'T OF INDUSTRY, <http://www.industry.nsw.gov.au/contact-us/commissioners/land-and-water-commissioner> (last visited Feb. 6, 2016).

201. *N.S.W. Aquifer Interference Policy* (N.S.W.) (Austl.). Policies are drafted and made under Chapter 2 of the *Protection of the Environment Operations Act 1997* (N.S.W.).

development and production, require an environmental protection licence in addition to approval under the POA development consent process.²⁰² The licence contains legally enforceable conditions that the licence holder must comply with in order to protect the environment.²⁰³ The licence incorporates water, air, waste, and noise requirements, as well as a “community right to know” provision.²⁰⁴ The Environment Protection Authority undertakes inspection of CSG activity sites to ensure compliance with the licence and also has the capacity to audit licence holders.²⁰⁵ The information contained within the licence is available as public information through the Environment Protection Authority Public Register, in order to address the concerns of the public.²⁰⁶

To protect groundwater, two codes of practice were implemented in September 2012. First is the NSW Code of Practice for Coal Seam Gas Well Integrity (Well Code).²⁰⁷ The Well Code has been developed as a practical guide for CSG titleholders to assist them in complying with a condition of title for CSG imposed under s 23 of the POA.²⁰⁸ The Well Code applies to the design, construction, production, maintenance, and

202. *Protection of the Environment Operations Act 1997* (N.S.W.) ch 3 (Austl.); see also *Petroleum Production*, DEPT OF INDUS. RES. & ENERGY, <http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/applications-and-approvals/environmental-assessment/petroleum-exploration-and-production/petroleum-production-including-csg> (last visited Feb. 17, 2016) (describing the requirements in order to produce petroleum).

203. *Id.*

204. *Protection of the Environment Operations Act 1997* (N.S.W.) ch 3 (Austl.); see also *Coal Seam Gas Regulation*, N.S.W. EPA (June 2, 2015), <https://www.epa.nsw.gov.au/licensing/coalseamgas.htm> (providing detail on what the “community right to know” entails such as notifying the EPA if there is an environmental incident).

205. *Protection of the Environment Operations Act 1997* (N.S.W.) ch 3 (Austl.); see also *Frequently asked questions*, N.S.W. ENVTL. PROT. AGENCY, <http://www.epa.nsw.gov.au/licensing/csgfaqs.htm> (last visited Feb. 17, 2016) (outlining the EPA responsibility to include inspecting and auditing).

206. See *id.* (Note also that all CSG activities need licencing under Chapter 3 of the *Protection of the Environment Operations Act 1997* (N.S.W.), and all licencing information can be found through EPA public registrar).

207. N.S.W. GOV'T, N.S.W. TRADE & INV., CODE OF PRACTICE FOR COAL SEAM GAS: WELL INTEGRITY (2012).

208. *Id.*

abandonment of CSG wells in NSW.²⁰⁹ In addition, the NSW Code of Practice for CSG Fracture Stimulation Activities was also implemented and sets out the principles, values, standards, and rules of behaviour that govern the decisions, procedures, and systems related to well stimulation.²¹⁰ Further, reform measures to address community concerns include a two kilometer exclusion zone for new CSG activities around residential areas, including areas identified as areas of future residential growth, and exclusion zones for “critical industry clusters” where businesses such as Viticulture and Equine Industries are located.²¹¹ However, one concern regarding the use of codes is the possibility that they could rapidly become out of date. Already, since the development of the Well Code in 2012, there have been a number of technological and regulatory advances in shale gas well design and extraction, rendering some the Code obsolete.²¹² This is only likely to continue in the future. Without continuous review of Codes, they can become out of touch with developments. Failure to promote best practice is certainly not “world class.”²¹³

3. Victoria

Victoria is dominated by conventional petroleum production and the transport of gas from the well-established fields in the Otway and Gippsland Basins (both onshore and offshore).²¹⁴ As such there is a well-established petroleum regulation framework for conventional petroleum which can be equally applied to shale gas. Under the existing onshore petroleum framework, petroleum approvals are granted by the Department of Primary Industries under the Petroleum Act 1998,²¹⁵ the Petroleum Regulations

209. *Id.*

210. N.S.W. GOV'T, N.S.W. TRADE & INV., CODE OF PRACTICE FOR COAL SEAM GAS: FRACTURE STIMULATION ACTIVITIES (2012).

211. N.S.W. GOV'T, *supra* note 202, at 4.

212. *See* EDO NSW, A REVIEW OF NSW COAL SEAM GAS REGULATION AND INTERNATIONAL BEST PRACTICE (2014), especially sections 3-6.

213. The N.S.W. government promised a “world class” CSG regime in promulgating the N.S.W. Gas Plan. N.S.W. GOV'T, *supra* note 199, at 6.

214. *Petroleum*, VICT. STATE GOV'T, DEP'T OF ENERGY AND EARTH RES. <http://www.energyandresources.vic.gov.au/earth-resources/victorias-earth-resources/petroleum> (last visited Feb. 17, 2016).

215. *Petroleum Act 1998* (Vict.) pts 1-2 (Austl.).

2000,²¹⁶ and the Pipelines Act 2005.²¹⁷ This legal regime is complemented by several guidelines, including guidelines for permit conditions and administration and guidelines for the preparation of pipeline consultation plans under the Pipelines Act 2005.²¹⁸

Whilst there are no known shale gas resources in Victoria, there is some CSG, which is presently regulated under the Mineral Resources (Sustainable Development) Act 1990.²¹⁹ An indefinite moratorium has been placed on the development of CSG in Victoria, along with a community call for an overhaul to the legislative framework for unconventional petroleum.²²⁰

UPR regulation in Petroleum in Victoria comprises shale gas petroleum activities, regulated under the Petroleum Act 1998,²²¹ the Petroleum Regulations 2000²²² and the Petroleum Regulations 2011,²²³ as well as CSG regulated under the Mineral Resources (Sustainable Development) Act 1990. The environmental requirements for each activity will be considered separately. In addition, petroleum activities take place within the

216. *Petroleum Regulations 2000* (Vict.) r 5 (Austl.).

217. *Pipelines Act 2005* (Vict.) pt 3 (Austl.).

218. AUSTL. GOV'T, COMMONWEALTH DEP'T OF RES., ENERGY AND TOURISM, EXPLORATION PERMIT GUIDELINE: PERMIT CONDITIONS AND ADMINISTRATION (2012); Vict. State Gov't, Dep't of Energy & Res, *Guideline for the Preparation of Pipeline Consultation Plan* (Feb. 24, 2014), <http://www.energyandresources.vic.gov.au/earth-resources-regulation/information-for-community-and-landholders/pipelines>.

219. CSG is regulated under the *Mineral Resources (Sustainable Development) Act 1990* (Vict.) because coal seam gas is deemed a product of coal, and coal is defined as a mineral under the Act.

220. See Chapters 4 and 5 of Dr. Catriona Ross & Paige Darby, *Unconventional Gas: Coal Seam Gas, Shale Gas and Tight Gas Introduction*, PARLIAMENT OF VICT., RESEARCH PAPERS (2013) <http://www.parliament.vic.gov.au/publications/research-papers/8927-unconventional-gas-coal-seam-gas-shale-gas-and-tight-gas> for a history of the development of unconventional gas regulation in Victoria, including the moratorium on new coal seam gas licenses, accompanied by a look at some of the community stakeholders who are calling for reforms in mining and gas extraction legislation.

221. *Petroleum Act 1998* (Vict.) s1 (Austl.).

222. *Petroleum Regulations 2000* (Vict.) r 5 (Austl.).

223. *Petroleum Regulations 2011* (Vict.) reg 1 (Austl.).

confines of the Environmental Protection Act 1970²²⁴ and the Environmental Effects Act 1978²²⁵ for major projects.

In order for any shale gas petroleum activity to occur onshore (including surveys, drilling, production, and decommissioning), an Environment Plan is required under the environmental legislation.²²⁶ The preparation and submission of an exploration permit for a petroleum activity includes geotechnical information. The requirements for the Plan are outlined in Pt 2 (rr 8-12) of the Petroleum Regulations 2011:

- The Plan must describe the environment, including any relevant values and sensitivities, and also describe any relevant cultural, historical, aesthetic, social, recreational, ecological, biological, landscape and economic aspects of the environment that may be affected by the petroleum operations;
- a description of the environmental risks;
- define the environmental performance objectives and standards against which the titleholder's performance in protecting the environment will be measured;
- contain an implementation strategy that includes measures, systems and standards, as well as outlining adverse effects;
- contain a statement of corporate environmental policy of the titleholder, details of consultations between the titleholder and relevant agencies, and all environmental legislation that applies to the petroleum operations.²²⁷

While the regulations do not specify the format of the Environment Plan, project proponents are referred to the Commonwealth Guidelines for the Preparation and Submission of an Environment Plan²²⁸ for guidance.

224. *Environmental Protection Act 1970* (Vict.) s 2(1) (Austl.).

225. *Environmental Effects Act 1978* (Vict.) s 3(1) (Austl.).

226. *Petroleum Regulations 2000* (Vict.) r 5 (Austl.).

227. *Petroleum Regulations 2011* (Vict.) Pt 2, rr 8-12 (Austl.).

228. DEP'T OF MINES AND PETROLEUM, GUIDELINES FOR PREPARATION AND SUBMISSION OF AN ENVIRONMENT PLAN 22 (2012).

The potential environmental effects of a proposed development may also have to be assessed under the Environmental Effects Act 1978.²²⁹ Unlike the Environmental Protection Act 1970, the process under the 1978 Act is not an approvals process, but rather an assessment process (through the environmental effects statement), enabling statutory decision-makers (including Ministers, local government authorities, and other statutory authorities) to make decisions regarding whether a project with potentially significant impacts will proceed.²³⁰ Where required by the Minister for Planning, a project proponent is required to prepare an environmental effects statement and undertake necessary investigations.²³¹ The statement is then released for public comment and consultation, and the Minister provides an assessment to the relevant decision makers.²³² The Department of Planning and Community Development coordinates the process.²³³

The future development of both shale gas and CSG in Victoria is to be postponed until at least 2017, given the public concerns over hydraulic fracturing,²³⁴ with the development of CSG dependent upon the outcome of a parliamentary inquiry, which is due to be released on December 1, 2015.²³⁵ Once the report is released, it is likely that there will be reform on the legislative framework currently applicable to UPR exploration and production.

229. *Environmental Effects Act 1978* (Vict.) ss 4, 8C (Austl.).

230. ENV'T AND NAT. RES. COMM., PARLAMENT OF VICT., INQUIRY INTO THE ENVIRONMENTAL EFFECTS STATEMENT PROCESS IN VICTORIA 171 (2011).

231. *Environmental Effects Act 1978* (Vict.) s 4 (Austl.).

232. *Environmental Effects Act 1978* (Vict.) s 9 (Austl.).

233. ENV'T AND NAT. RES. COMM., *supra* note 230, at 31.

234. See *Ban Fracking Until 2020: Vic Coalition*, WEEKLY TIMES (SEPT. 28, 2015, 5:15 AM), <http://www.weeklytimesnow.com.au/news/national/ban-fracking-until-2020-vic-opposition/news-story/f076b4f1aba1cc4b522549135a663712?> (indicating a fracking resolution will not be considered until the 2018 election while inquiries into the coal seam gas regulatory framework will continue).

235. Media Release, Inquiry to give regional communities a voice on coal seam gas (May 27, 2015), <http://www.premier.vic.gov.au/inquiry-to-give-regional-communities-a-voice-on-coal-seam-gas/>.

C. Central and Western Australia Shale Gas Development

The development of shale gas resources in this region is largely characterised by the use of principle or objective-based regulation, particularly by WA and SA. Principle-based regulation is outcome oriented,²³⁶ unlike the rule-oriented prescriptive regulation that characterises the development of CSG in Queensland.²³⁷ It moves away from detailed, prescriptive rules, instead relying on broadly stated principles or objectives, to set the standards by which companies conduct their operations and the basis for decision making by public authorities.²³⁸ Under this type of legislation, there is a reference to general rules that express fundamental obligations that the participants should observe.²³⁹ It is often known as objective-based regulation since it seeks to implement the policy objectives using broad principles rather than specific rules. Principle-based regulatory systems tend to provide flexibility and are more likely to allow a petroleum regulatory regime to respond to new issues as they arise, since they contain an element of discretion in the implementation of the relevant law. Generally, principle-based regulation is drafted at a high level of generality, with the intention to provide overarching requirements rather than rigid rules.²⁴⁰ This ensures that the legislation has a broad application to a wide range of circumstances and an outcome that is consistent with the general principles imbued in the regulatory framework.²⁴¹ Thus, principle-based regulations are flexible, allowing the regime to respond to changes in technology and markets during the development of SGR.

1. Western Australia

WA is currently undergoing something of a “shale gas revolution,” in the Canning Basin in Central Eastern WA, an attractive province for shale gas exploration. Although there has

236. FREIBERG, *supra* note 149, at 92.

237. *Id.*

238. *Id.*

239. *Id.* at 92-3.

240. STATE GOV'T OF VICT., *supra* note 152, at 7; *Id.*

241. FREIBERG, *supra* note 149, at 93-4.

been no production of shale gas for commercial use, interest from petroleum exploration companies and concerns from community groups remain. As such, the Western Australian Department of Mines and Petroleum, as an experienced regulator, has developed comprehensive environmental regulations for the upcoming increased interest in the region's onshore petroleum resources. Gas accounts for almost 70 per cent of the energy source in WA and, therefore, is a vital component of the state's energy mix.²⁴² This reliance on gas means that there is a recognised need to diversify the sources of gas, with onshore, unconventional shale gas resources being targeted by the WA government.²⁴³ To support this need, WA has a domestic gas reservation policy.²⁴⁴ Fortunately, WA is a petroleum resource-rich state, with vast amounts of onshore gas (mainly unconventional) as well as some oil.²⁴⁵ Given the prospectivity of the Canning Basin, the WA Department of Mines and Petroleum realised in 2010 that a robust and comprehensive objective-based regulatory framework was required to effectively regulate future unconventional gas activities.²⁴⁶ At the same time, increased activism relating to CSG activities in eastern Australia, social media, and films such as

242. ENGINEERS AUSTRALIA, WA ENERGY 2030 STRATEGY: COMMENTS ON THE STRATEGIC ENERGY INITIATIVE DISCUSSION PAPER 7 (2010).

243. PARLIAMENT OF AUSTL., THE SENATE, STANDING COMM. ON ECON., MATTERS RELATING TO THE GAS EXPLORATION AT VARANUS ISLAND, WESTERN AUSTRALIA 46 (2008) ("in order to improve energy security western Australia should have more diversified sources of gas and energy").

244. "The policy seeks commitments for the equivalent of 15 per cent of gas from new offshore developments to be available for domestic use." *Domestic Gas Policy*, GOV'T OF W. AUSTL. DEPT OF STATE DEVELOPMENT, <http://www.dsd.wa.gov.au/what-we-do/advice-on-economic-policy/domestic-gas-policy> (last visited Feb. 17, 2016); see also Department of Finance, *Strategic Energy Initiative Energy 2020: Building the Pathways for Western Australia's Energy Future* (August 2012) [http://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3814884cb40c9855a62ad8d948257a770006602d/\\$file/4884.pdf](http://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3814884cb40c9855a62ad8d948257a770006602d/$file/4884.pdf), p. 14.

245. WA has 72% of Australia's proven crude reserves, 92% of its condensate, and 79% of its LPG reserves. *Australia*, US ENERGY INFO. ADMIN., <https://www.eia.gov/beta/international/analysis.cfm?iso=AUS> (last updated Aug. 28, 2014).

246. See GOV'T OF W. AUSTL., DEPT OF MINES AND PETROLEUM, WESTERN AUSTRALIA'S PETROLEUM AND GEOTHERMAL EXPLORER'S GUIDE 9, 35 (2014) (detailing Buru Energy's 2010 discovery of oil in the Canning Basin, the biggest find in that region since the 1980's, as well as discussing the 2012 regulatory framework that came after that discovery).

Gasland influenced community attitudes regarding the development of shale gas in WA.²⁴⁷ In response to these community concerns and impending future unconventional gas activities, the WA government commissioned an independent assessment of the capacity of the existing regulatory framework to effectively regulate shale gas activities in 2011.²⁴⁸ The resulting report (Hunter Report)²⁴⁹ made a number of important findings. While recognising the strength of the internal processes presently applied to petroleum activities, the Hunter Report noted that the regulatory framework underpinning these processes was underdeveloped, lacking enforceability in many aspects.²⁵⁰ In particular, the Hunter Report noted that the use of guidelines rather than regulations for the effective regulation of environmental and well activities was required to establish a legally enforceable framework that would also provide community assurance.²⁵¹ The regulatory reform recommended by the Hunter Report included the drafting of environment regulations and resource regulations that included field development and well management.²⁵² The WA Department of Mines and Petroleum concurred with the recommendations, undertaking to write both regulations. Although contemplation of

247. See, e.g., Amanda Hooten, *Frack Off: Dwayne Pratsky's Fight Against Coal Seam Gas*, THE SYDNEY MORNING HERALD (Mar. 21, 2015), <http://www.smh.com.au/good-weekend/frack-off-dayne-pratzkys-fight-against-coal-seam-gas-20150309-13z1q8.html> (describing one activist's production of an anti-Coal Seam Documentary); see also MELANIE TAYLOR ET AL., *supra* note 20, at 18-19 (2013) (analyzing the role of media in the coal seam gas debate and discussing the community reaction to the release of the movie *Gasland*.); see also Alex Heber, *Coal Seam Gas: the Explosive Debate*, AUSTL. MINING (Aug. 19, 2013), <http://www.australianmining.com.au/features/coal-seam-gas-the-explosive-debate>, (discussing the failure of coal seam gas producers to accurately predict the scale of community uproar and activism).

248. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, DEPARTMENT OF MINES AND PETROLEUM RESPONSE TO REPORT: REGULATION OF SHALE, COAL SEAM AND TIGHT GAS ACTIVITIES IN WESTERN AUSTRALIA 2 (2011) (discussing community interest in unconventional gas development in Western Australia and the commission of the Hunter Report).

249. HUNTER, *supra* note 39.

250. *Id.* at 20-22.

251. *Id.*

252. *Id.* at 20, 23.

the two had occurred as early as 2003,²⁵³ they had to await passage and commencement of amendments in the Petroleum and Energy Legislation Amendment Act 2011, which provided the authority to promulgate regulations.²⁵⁴

The existing petroleum regulatory regime at the time was already well developed, with regulation of petroleum activities (both onshore and offshore) undertaken by the WA Department of Mines and Petroleum for petroleum activities for over 50 years.²⁵⁵ Onshore conventional petroleum activities are regulated under the Petroleum and Geothermal Energy Resources Act 1967,²⁵⁶ the Petroleum and Geothermal Energy Resources Regulations 2000,²⁵⁷ the Petroleum Pipelines Act 1969,²⁵⁸ and environment, resource management and safety regulations.²⁵⁹ Given the reforms introduced from 2013 as a result of the Hunter Report, the regulatory framework for shale gas in WA comprises thus:

253. GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, DEPARTMENT OF MINES AND PETROLEUM RESPONSE TO REPORT: REGULATION OF SHALE, COAL SEAM AND TIGHT GAS ACTIVITIES IN WESTERN AUSTRALIA (2011) <http://www.dmp.wa.gov.au/Documents/Petroleum/PD-SBD-NST-117D.pdf>, pages 4-8.

254. *Petroleum and Energy Legislation Amendment Act 2011* (W. Austl.) s 142.

255. The Department of Mines and Petroleum was formed in 2009 from a restructure of the former Department of Industry and Resources and the Department of Consumer and Employment Protection. GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, REVIEW OF REGULATORY BURDEN ON THE UPSTREAM PETROLEUM (OIL AND GAS) SECTOR 1 (2009).

256. *Petroleum and Geothermal Energy Resources Act 1967* (W. Austl.).

257. *Petroleum and Geothermal Energy Resources Regulations 2000* (W. Austl.).

258. *Petroleum Pipelines Act 1969* (W. Austl.).

259. *Petroleum And Geothermal Energy Resources (Management Of Safety) Regulations 2010* (W. Austl.); *Petroleum And Geothermal Energy Resources (Environment) Regulations 2012* (W. Austl.); *Petroleum And Geothermal Energy Resources (Resource Management and Administration) Regulations 2015* (W. Austl.); See also GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, NEW SOURCE MANAGEMENT REGULATIONS (2015) (describing the multi-agency regulation framework, including a risk-based management scheme for exploration and production of petroleum and geothermal energy, onshore resource and management regulations, as well as onshore environment regulations).

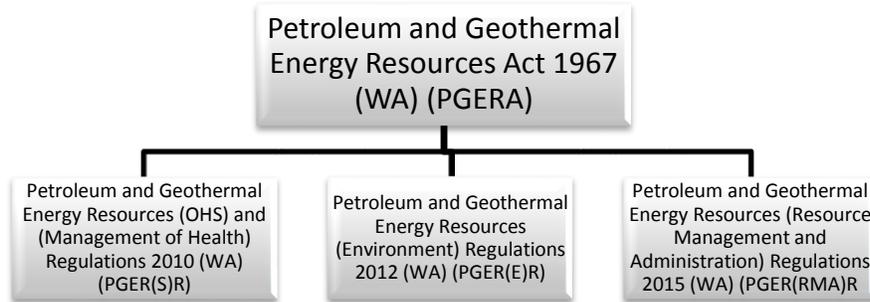


Figure 1 - Shale gas regulatory framework in Western Australia (Compiled by Author).

The WA regulatory framework is an integrated system, designed to provide operators with certainty and predictability, and assurance to the community. Aside from the legally enforceable acts and regulations, the WA regulatory framework is accompanied by a number of guidelines, including:

- criteria for the assessment of applications for the award of petroleum exploration permits and petroleum drilling operations;²⁶⁰
- permit conditions and permit administration guidelines;²⁶¹
- petroleum acreage bid assessment process state waters and onshore;²⁶² and
- petroleum acreage release approval process.²⁶³

The environmental impact of onshore petroleum activities in WA is regulated by the WA Department of Mines and Petroleum

260. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, WA PETROLEUM GUIDELINES FOR ACREAGE RELEASE: CRITERIA FOR ASSESSMENT 2 (stating criteria for assessment under the relevant regulations).

261. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, ADMINISTRATION OF PETROLEUM TITLES WESTERN AUSTRALIA 6 (discussing permits for petroleum operations).

262. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, PETROLEUM INFORMATION SHEET PETROLEUM ACREAGE (outlining bid assessment system in a flow chart).

263. See *id.* (outlining the acreage release process, in which Western Australia releases vacant petroleum exploration areas for the grant of Petroleum Exploration Permits).

(WADMP). The regulatory framework developed by the WADMP for the regulation of petroleum activities is well established, it having regulated onshore petroleum activities since the establishment of the PGERA. The framework is premised on the Petroleum and Geothermal Energy Resources Act 1967²⁶⁴ and subordinate environmental regulation Petroleum and Geothermal Energy Resources (Environment) Regulations 2012.²⁶⁵ The regulation of the impact of onshore petroleum activities on the environment in WA is premised on two primary objectives:

1. minimising harm to the environment from petroleum activities by identifying and reducing the risks; and
2. managing the environmental effects of the petroleum activity.²⁶⁶

In order to achieve these two primary objectives, the WADMP produces to types of regulations governing petroleum activities: regulations requiring risks to be identified and reduced; and regulations concerning the environmental impact of petroleum activities.. These two objectives are obtained through Petroleum and Geothermal Energy Resources (Environment) Regulations 2012, which requires the operator of a petroleum activity to have an approved environmental plan in place prior to a petroleum activity being undertaken.²⁶⁷ The object of the 2012 Regulations is to ensure that any petroleum activity carried out in WA occurs in a manner consistent with the principles of ecologically sustainable development and in accordance with an environmental plan that demonstrates that environmental impacts and risks associated with the activity will be reduced to

264. *Petroleum and Geothermal Energy Sources Regulations 1987* (WA) (Austl.).

265. *Petroleum and Geothermal Energy Sources (Environment) Regulations 2012* (WA) (Austl.).

266. See *Release of New State Petroleum Environment Regulations and Guidelines*, GOV'T OF W. AUSTRALIA, DEPT OF MINES AND PETROLEUM, <http://www.dmp.wa.gov.au/Documents/Petroleum/ENV-PEB-179.pdf> (last visited Feb. 17, 2016) (describing the purpose of the Petroleum Environment Regulations and Guidelines as ensuring that any petroleum activity is carried out in a manner consistent with ecological sustainability and in accordance with an environmental plan that ensures environmental risks are as low as possible).

267. *Petroleum and Geothermal energy Resources (Environment) Regulations 2012* (W. Austl.) r 7.

“as low as reasonably practicable.”²⁶⁸ In order to achieve this risk reduction, the plan is required to have appropriate environmental performance objectives and standards, and appropriate measurement criteria to determine whether the objectives and standards have been met.²⁶⁹

Similar to the Safety Case Regime and associated framework²⁷⁰ that was implemented for the regulation of safety after the Piper Alpha disaster,²⁷¹ the 2012 Regulations are based on the concept of reducing the risk as low as reasonably practicable.²⁷² This framework requires the operator to develop a plan that meets the key objectives of the PGER(E)R (as required under r 3). It shifts responsibility for environmental management, rightly so, from the regulator to the operator.²⁷³ The operator is required to:

- identify the risks in the specific environment in which they are undertaking the activity;
- identify the impact of those activities;
- assess the identified risks and impacts; and
- then formulate a plan to reduce those risks as low as reasonably possible.²⁷⁴

The content of environmental plans are set out in Pt 2 of the 2012 Regulations — Environment Plans²⁷⁵ — and specific requirements for a plan are outlined in rr 13-17²⁷⁶ and further clarified in the Guidelines for the Preparation and Submission of an Environment Plan²⁷⁷ (Guidelines). Given the principle-based nature of the 2012 Regulations, operators have flexibility in

268. *Id.* at r 3.

269. *Id.* at r 11.

270. Kevin G. Brown, *Oil and Gas Safety Laws in Western Australia*, 8 *Oil and Gas Indus.* 1, 4-5 (2006).

271. *Id.*

272. *Petroleum and Geothermal energy Resources (Environment) Regulations 2012* (W. Austl.) r 3.

273. *Id.* at r 7.

274. *Id.* at rr 3, 11.

275. *Id.* at pt 2.

276. *Id.* at div 3.

277. GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, GUIDELINES FOR THE PREPARATION AND SUBMISSION OF AN ENVIRONMENT PLAN 7 (2015).

preparing a plan. The document must comply with provisions of the 2012 Regulations²⁷⁸ that stipulate the requirements for the plan, but the method in which they comply is entirely up to the operator. The Guidelines are a comprehensive document that provides guidance to operators as to what “petroleum activity” includes and what needs to be contained in an environmental plan.²⁷⁹

Complementing the requirements for an environmental plan under Part 2 of the 2012 Regulations, Part 4 outlines the environmental requirements relating to emissions and discharges, including the monitoring and reporting requirements for such emissions and discharges.²⁸⁰ Part 3 outlines the reporting requirements in the event of an incident, stipulating what are reportable incidents and how and when operators are required to report such incidents.²⁸¹ This part of the 2012 Regulations also stipulates how and when records should be kept, and the conditions on which records are to be made available.²⁸²

While the environmental effects of onshore petroleum activities are primarily regulated by the Petroleum Environment Branch of the WA Department of Mines and Petroleum,²⁸³ it is important to note that other departments within the WA government play an important role in assessing the environmental impact of the development of onshore petroleum. As outlined in figure 2 below, the Petroleum Environment Branch plays a lead agency role in the regulation of environmental impact of shale gas activities, with other agencies also part of the environmental assessment process.

278. *Petroleum and Geothermal Energy Resources (Environment) Regulations 2012* (W. Austl.) div 3.

279. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, *supra* note 281, at 7 (describing the minimum requirements for an environmental plan).

280. *Petroleum and Geothermal energy Resources (Environment) Regulations 2012* (W. Austl.) pt 3.

281. *Id.* at pt 3.

282. *Id.*

283. See GOV'T OF W. AUSTL., DEP'T OF MINES AND PETROLEUM, *supra* note 281 (describing the expectations for the regulatory management of petroleum activities in western Australia).

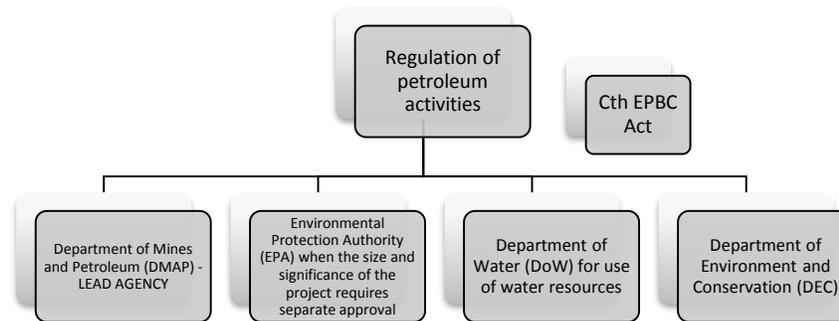


Figure 2 – Government agencies responsible for the regulation of the environmental impact of onshore petroleum activities in Western Australia (Source: Hunter and Chandler, p 238)

2. South Australia

As of the time of printing, the South Australia Department of State Development regulates petroleum activities in SA under a clear and unambiguous framework.²⁸⁴ Petroleum activities are regulated under the Petroleum and Geothermal Energy Act 2000 (formerly the Petroleum Act 2000²⁸⁵) and the associated Petroleum and Geothermal Energy Regulations 2000.²⁸⁶ This Act arose as a result of a major review of onshore petroleum legislation in SA in 1996, which recognised that significant benefits lay in adopting objective-based regulation.²⁸⁷ The review required an extensive process of industry and public stakeholder consultation, and took four years to complete.²⁸⁸ It was intended that the new legislation would be aligned to the SA government objective for the management of their petroleum resources, which is to maximise the public benefit derived from Australia's discovered and undiscovered petroleum resources.²⁸⁹ The

284. *Petroleum and Geothermal Energy Act 2000* (S. Austl.).

285. *Id.*

286. *Petroleum and Geothermal Energy Regulations 2000* (S. Austl.).

287. E. Alexander & J. Morton, *Selecting the Winning Bid* 2002 APPEA J. 523, 523.

288. See *Geothermal Energy, Legislation and Compliance*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV., http://www.geothermal.statedevelopment.sa.gov.au/legislation_and_compliance (last updated Aug. 5, 2015).

289. Alexander & Morton, *supra* note 287.

resultant Act represents a significant departure from the Australian legislative tradition of prescriptive, rule-based legislation. The new Act seeks to provide certainty, openness, transparency, flexibility, practicality and efficiency.

Petroleum activities in SA are advanced, with conventional oil and gas extraction (particularly gas) occurring for over 40 years, as well as the first commercial unconventional gas flowing from the Cooper Basin.²⁹⁰ Given the advanced level of knowledge and activity, the SA government has developed a comprehensive environmental regulatory framework that applies to all onshore petroleum activities, including shale gas activities. Given the location of these petroleum activities and the location of shale gas, both in remote SA, there has been little community consternation regarding shale gas activities to date.

The principal act regulating environmental management of onshore petroleum activities in SA is the Petroleum and Geothermal Energy Act 2000.²⁹¹ Unlike other onshore jurisdictions, the principles of environmental management are embedded in the Act and no petroleum activity under petroleum licences can be undertaken unless there is an approved statement of environmental objectives.²⁹² An environment impact report is required for low impact or medium impact activities,²⁹³ while a separate report is required for high impact activities.²⁹⁴

The statement of environmental objectives must be prepared in accordance with 2013 Regulations that address the natural, cultural, social and economic aspects of the area, locality or region where the petroleum activity occurs.²⁹⁵ A statement for a petroleum activity is required to outline the environmental objectives to be achieved in carrying out the activity and the measurement criteria used to assess whether the licensee has

290. Santos Announces start of Australia's first commercial shale gas production, SANTOS (Oct. 19, 2012), <https://www.santos.com/media-centre/announcements/santos-announces-start-of-australias-first-commercial-shale-gas-production/>.

291. *Petroleum and Geothermal Energy Act 2000* (S. Austl.) s 3.

292. *Id.* at s 96.

293. *Id.* at s 98-99.

294. *Id.* at s 100.

295. *Id.*; *Petroleum and Geothermal Energy Regulations 2013* (S. Austl.) r 10.

achieved the objectives.²⁹⁶ Therefore, the statement must also include conditions and requirements for achieving the stated objectives, such as incident reporting requirements.²⁹⁷ In accordance with the regulatory principles of certainty, openness, and transparency, the performance of the titleholder contrary to the statement is publically disclosed annually on an environmental register, as are the contents of the environmental impact reports, the statement, and the Minister's determination of the level of impact of all proposals.²⁹⁸ A statement may relate to either a specific activity carried out at a specific location or a particular activity type (e.g., drilling, seismic activities, the construction and operations of facilities and pipelines) carried out within a specific region or land system.²⁹⁹

Given its experience in the development of onshore petroleum resources, SA is leading the development of best practice regulation of unconventional petroleum activities. This has been accomplished to date through the implementation of lead agencies (one-stop shops, similar to the WA Department of Mines and Petroleum) with a single approval process through the lead agency rather than a separate agency for environment assessment. The Petroleum and Geothermal Energy Act 2000 facilitates such an approach, enabling integration with the requirements of the Environment Protection Act 1993.³⁰⁰

To further capture and address possible community concerns regarding shale gas development, in 2010 the SA government set up the Roundtable for Unconventional Gas Projects in South Australia.³⁰¹ This was established to assist in developing the

296. *Petroleum and Geothermal Energy Regulations 2013* (S. Austl.) r 12.

297. *Id.*

298. *Petroleum and Geothermal Energy Act 2000* (S. Austl.) s 3; *Petroleum and Geothermal Energy Regulations 2000* (S. Austl.); *Environmental Register*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV., http://www.petroleum.statedevelopment.sa.gov.au/legislation_and_compliance/environmental_register (last visited Jan. 28, 2016).

299. See *Environmental Register*, *supra* note 298 (the register divides information into four areas of petroleum industry activity).

300. TINA HUNTER & MADELINE TAYLOR, REGULATORY BEST PRACTICE FOR COAL SEAM GAS IN QUEENSLAND A BRIEFING PAPER 16 (2013).

301. *Roundtable for Oil and Gas*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV., www.petroleum.statedevelopment.sa.gov.au/roundtable_for_oil_and_gas (last visited Apr. 3, 2016).

burgeoning unconventional gas industry.³⁰² The roundtable comprises industry, government, universities, academics, media, and key individuals and takes a holistic approach to the regulation of unconventional petroleum activities.³⁰³ The group was responsible for the Roadmap for Unconventional Gas Projects in South Australia with further work to be completed by the end of 2015.³⁰⁴

3. Northern Territory

Although sources of energy are secure for the NT, there is much interest in developing the unconventional petroleum in the region. However, many groups in the community, including indigenous groups, cattle farmers (the peak body being the NT Cattlemen's Association), local government agencies, and residents, have expressed consternation regarding the impending development of shale gas resources in the NT.³⁰⁵ The three most pressing concerns for the community are land access (currently there is no mandatory land access code, only a requirement for private negotiations), water use, and contamination of surface and subsurface water resources from shale gas extraction.³⁰⁶

302. See *Oil and Gas Roundtable Drives Opportunity for Growth*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV. (Oct. 22, 2014), <http://www.statedevelopment.sa.gov.au/news-releases/all-news-updates/oil-and-gas-roundtable-drives-opportunities-for-growth> (the Roundtable's recommendations aid suppliers hoping to enter the growing oil and gas industry how to do business in the industry).

303. For a description of member organizations and a complete list of members, see *Membership of the Roundtable for Oil and Gas Projects in SA*, GOV'T OF S. AUSTL., DEP'T OF STATE DEV, http://www.petroleum.statedevelopment.sa.gov.au/roundtable_for_oil_and_gas#MembershipoftheRoundtableforOilandGasProjectsinSA (last visited April 5, 2016).

304. Roundtable for Oil and Gas, Roadmap for Unconventional Gas Projects in South Australia (http://www.petroleum.statedevelopment.sa.gov.au/__data/assets/pdf_file/0019/238033/Roadmap_Unconventional_Gas_Projects_SA_12-12-12_web.pdf).

305. See HYDRAULIC FRACTURING INQUIRY, *supra* note 23, at 144 (2014) (stating NT Cattlemen's Association, Environment Centre NT, Environmental Defenders Office NT, Northern Land Council and Central Land Council, and concerned residents have all expressed concern regarding use of land for shale).

306. *Id.* at I; See *Fact Sheet 3 Exploration and Production*, N. TERR. GOV't., https://onshoregas.nt.gov.au/__data/assets/pdf_file/0009/189216/Oil-and-Gas-fact-sheet-Factsheet3.pdf (last visited February 27, 2016) (stating that applicants must negotiate land access agreements prior to the Department of Mines and Energy granting a license).

Petroleum activities are regulated under the Petroleum Act 1984³⁰⁷ and the Schedule of Onshore Petroleum Exploration and Production Requirements 1993 (Schedule).³⁰⁸ An assessment of the NT regulatory framework in 2012 by the Author³⁰⁹ concluded that there was a need for extensive legislative reform in order for the regulatory framework of the NT to be able to sufficiently regulate shale gas activities there. This assessment has been followed by several other reports, including an inquiry into hydraulic fracturing in 2014, headed by Dr Allan Hawke (Hawke Report)³¹⁰ and the Environmental Defenders Office report (EDO Report) regarding hydraulic fracturing operations.³¹¹ There is universal agreement among all of the reports that the current legal framework is lacking and that legislation regulating well integrity and the environment requires implementation in the NT.³¹² Consequently, new Resource Management Administration and environment regulations, similar to those in WA, are to be drafted and implemented, replacing the existing Schedule.³¹³ It is likely that these Regulations will come into force in 2016 or 2017.

4. Environmental Regulation

The regulation of environmental processes and management and the protection of the environment are unique in the NT. Rather than uniform environmental protection legislation (such

307. *Petroleum Act 1984* (N. Terr.) (Austl.).

308. See *Schedule of Onshore Petroleum Exploration and Production Requirements 1993* (NT) s 101 (Austl.) (regulating the exploration and exploitation of soil for petroleum).

309. It is important to note that the NT government never made the contents of the report public, although there was some consultation with affected community groups. However, the NT government has responded to the recommendations made in the report. *Legislative Review – Petroleum*, GOV'T OF N. TERR., DEP'T OF MINES AND ENERGY, http://www.nt.gov.au/d/Minerals_Energy/?header=Legislation%20Review%20-%20Petroleum (last visited Feb 8, 2016).

310. See HYDRAULIC FRACTURING INQUIRY, *supra* note 23, at 144 (recommending that environmental risks associated with hydraulic fracturing can be managed subject to the creation of a regulatory regime).

311. See ENVTL. DEF. OFFICE N. TERR., BEST PRACTICE REGULATORY FRAMEWORKS FOR HYDRAULIC FRACTURING OPERATIONS 3 (2014) (analysing the Australian regulatory regime for fracking and recommending legislation reform before allowing the continuation of petroleum operations).

312. *Id.* at 3; *Legislative Review – Petroleum*, *supra* note 309.

313. ENVTL. DEF. OFFICE N. TERR., *supra* note 311, at 23.

as the Environmental Protection Act 1986),³¹⁴ regulatory requirements for the protection of the environment during petroleum activities are contained within the Petroleum Act 1984.³¹⁵ It is an offense under the Act to commit environmental harm, including the release of a contaminant or waste material above or under the land.³¹⁶

Unlike other Australian jurisdictions, there is no separate environmental protection legislation in the NT, which is a source of concern for many in the community.³¹⁷ Provisions within the Petroleum Act 1984 regulate protection of the environment during onshore petroleum activities.³¹⁸ Environmental management requirements (environmental management plan and environmental assessments) are undertaken pursuant to the Environmental Assessment Act (EAA).³¹⁹ Where a petroleum activity could have significant effects on the environment (stipulated in a memorandum of agreement between the Northern Territory Department of Mines and Energy (formerly Northern Territory Department of Resources) and the Northern Territory Department of Environment Protection (formerly Natural Resources, Environment and the Arts), the EAA sets out the procedures to be followed.³²⁰ The proposed activity is referred by Department of Mines and Energy to the Department of Environment Protection through a notice of intent, which

314. See *Environmental Protection Act 1986* (WA) (Austl.) (providing for the Environmental Protection Authority for prevention, control and abatement for pollution and environmental harm).

315. *Petroleum Act 1984* (N. Terr.) ss 117AAA-AAE (Austl.).

316. *Id.* at s 117.

317. See *Stronger Laws*, ENV'T CENTRE NT, <http://ecnt.org.au/stronger-laws/> (last visited Feb. 27, 2014) (discussing five key reforms to address the lack of strong legislation concerning mining and oil and gas including rewriting the Environmental Assessment Act, amending the waste management and pollution control Act, amending the mining management Act, Review and Strengthen the Petroleum Act, and amending the Environmental Protection Authority Act).

318. *Petroleum Act 1984* (N. Terr.) s 117 (Austl.).

319. See N. TERR. ENV'T PROT. AUTH., *supra* note 298, at 3 (stating projects assessed under the EAA and in most cases the Northern Territory EPA requires an Environmental Management Plan).

320. *Environment Law in the Northern Territory*, ENVTL DEF. OFFICE N. TERR., <http://edont.org.au/factsheets/environmental-assessment-mining-activities/> (last visited Feb. 17, 2016).

subsequently assesses the proposal and issues a public environment report and environmental impact assessment if requested by Department of Mines and Energy.³²¹ The assessment of the proposed project by Department of Environment Protection under the EAA is returned to Department of Mines and Energy with environmental recommendations.³²² At present there is no legal requirement for Department of Mines and Energy to enforce these recommendations, although the recommendations usually are enforced.³²³ In addition, matters of “national significance” are referred to the Commonwealth for assessment and approval under the requirements of the Environmental Protection and Biodiversity Conservation Act 1999.³²⁴ The environmental framework was also addressed in the Hawke Report and the EDO Report. Given the outcome of all of these reports, Legislative changes for the management of environmental protection and assessment processes are expected in 2016 or 2017, which are also likely to be similar to those implemented in WA.

D. Harmonisation of Unconventional Petroleum Regulation in Australia

Although the Commonwealth does not have constitutional jurisdiction to regulate shale gas and CSG activities, the Commonwealth, state, and territory energy and resources ministers have nonetheless utilised the Standing Council of Energy and Resources, a subcommittee of the Council of Australian Governments, to address community concerns relating to the development of UPRs. Responding to these

321. *See id.* (including that the Minister of Mines and Energy must refer proposed actions to the Environmental Protection Authority and the Environmental Protection Authority decides if an environmental impact assessment is required).

322. *See id.* (“At the end of the environmental impact assessment process, the Environment Protection Authority must provide its recommendations for the protection of the environment to the Minister for Mines and Energy. The Minister for Mines and Energy makes the decision to approve or refuse the proposed exploration or mining.”).

323. *Environmental Assessment Act* (N. Terr.) s 12 (Austl.).

324. *See Environmental Protection and Biodiversity Conservation Act 1999* (Cth) s 3 (Austl.) (pursuant to the Act the Commonwealth is involved in matters of national environmental significance through a Commonwealth environmental assessment and approval process).

concerns, SCER has developed a framework to address these concerns. This framework, known as the Harmonised Regulatory Framework for Natural Gas from Coal Seams (Harmonised Framework) addresses the following areas of community concerns:

- Sustainability and coexistence (although little treatment of the contentious issue of land access)
- Well integrity
- Water management and monitoring
- Hydraulic fracturing; and
- The use and disclosure of chemicals in operations.³²⁵

Although the Harmonised Framework is called a *regulatory framework*, it does not actually regulate these aspects of CSG development, because the Commonwealth government has no constitutional capacity to regulate in this area. Rather, it identifies leading practices that can be adopted by regulators to provide a harmonised approach to managing activities associated with the development of natural gas from coal seams³²⁶ and provides guidance in developing the regulatory tools required to sustainably manage the development of CSG.³²⁷ Whilst the Harmonised Framework focuses on the regulations of coal seam gas, the SCER recognises that it may have some applicability to shale gas development.³²⁸ Many of the principles that are outlined in the Harmonised Framework are applicable, and as such the frame could be expanded to incorporate shale gas activities.

V. CONCLUSION

This paper has addressed the socio-legal dimension of the development of UPR in Australia, by examining how the legal

325. STANDING COUNCIL ON ENERGY AND RES., NATIONAL HARMONISED REGULATORY FRAMEWORK FOR NATURAL GAS AND COAL SEAMS 15 (2013).

326. *Id.* at 9.

327. *Id.* at 3.

328. *See id.* at 54 (“While the experience in the shale and tight gas sector is not directly analogous to natural gas extracted from coal seams, the shale gas industry has demonstrated that pre-hydraulic fracturing tests (mini-frac) can be used to assist in the design of full fracture stimulations in some site-specific conditions.”).

frameworks through which the states and territories of Australia have addressed the emerging issues that have accompanied the development of unconventional gas. This analysis has demonstrated that although there are universal community concerns regarding the development of UPRs, the legal responses to such concerns have been diverse. Some states, such as WA and SA, have focused on developing a strong, objective-based framework, borne out of decades of experience in onshore conventional petroleum activities. Other states, such as Queensland, have opted for a rule-based, adaptive management approach, which sees constant legislative reform to address concerns and issues. Still other states, particularly NSW and Victoria, have opted for a moratorium on hydraulic fracturing until a suitable and acceptable (to the community) legal framework for it has been established.

Whichever state or territory the activity occurs, the development of UPR in Australia is set to provide many challenges for regulators in the years to come. By analysing these social issues and the legal responses to these challenges, this paper provides not only a narrative of the Australian experience, but also some lessons for other jurisdictions to digest as they navigate the complex path of unconventional petroleum development.