

Lexcray Pty. Ltd.

ABN. 48 010 613 751

Nutwood Downs
Daly Waters. NT. 0852



Hon. Justice Rachel Pepper
Chair
Hydraulic Fracturing Taskforce
GPO Box 4396
Darwin, NT 0801, Australia

Submission

On 14 September 2016 the Northern Territory Government announced a moratorium on hydraulic fracturing of onshore unconventional reservoirs including the use of hydraulic fracturing for exploration, extraction, production and including Diagnostic Fracture Injection Testing (DFITs).

Executive Summary

- **The Northern Territory Government owns the natural gas underlying the land and the Right Title and Deed of Nutwood Downs.**
- **The Northern Territory Government appoints entities under the provisions of the Petroleum Act to prospect and extract Oil and Gas using the delegated authority of a Minister.**
- **Falcon Oil and Gas Australia and Origin Energy are the recipients of that delegated authority of Exploration License 98 (EP98^[1]) and duly appointed by the Minister under the Petroleum Act to carry out a work program set out in the body of the Instrument.**
- **The appointment of Falcon and by default Origin by a Minister, acting for the Crown in Right of the Territory by Instrument (EP98) transforms the legal status of Falcon and Origin to “public official”^[2].**
- **In their dealing with Lexcray with the presentation and negotiations of the Access Agreement, Origin has not acted in our best interests and has not complied with section 5 of EP98.**
- **The Northern Territory did not disclose at any point the Conditions of EP98 to Lexcray nor were they party to any discussions between Origin and Lexcray in the presentation of the Access Agreement to determine compliance with the legal responsibilities that Origin was**

¹ See Attachment 7

² Criminal Code 1995; the Dictionary

- to transfer to Lexcray as part of its responsibilities under its delegated authority, at section 5 of EP98.
- Origin insists in the Access Agreement (Attachment 4) that they limit their risk to less than the standard specified at section 5 of EP98, which would when applied will damage Lexcray.
 - The Territory is negligent in that it failed to disclose to Lexcray the basis of its explicit Indemnity clause within EP98 and to enforce Origin's compliance with section 5.
 - Lexcray was unaware of any or all the Conditions that Origin was required to comply with by the EP98 Instrument and which it must reflect in its dealings with Lexcray until I obtained a Title search on or about 24th February 2017 from the Department of Industries and Resources.
 - Lexcray cannot protect itself by obtaining Insurance; the activities of the Territory and Origin under EP98 are uninsurable by a private entity because of the potential for significant and unquantifiable Risk. (see Attachment 10)

Recommendation

- That the Northern Territory Government review Property Rights currently held over land in the Territory of Land for Agricultural purposes to reflect these recommendations^[3];
1.2 Examine the relationship between land owners and miners so that a partnership can be secured to make for more harmonious interaction and exploitation of resources with all landowners sharing in the economic upside (not dissimilar to what can be obtained under the Aboriginal Land Rights Act 1976 (NT)). Australia is ready for this discussion. All States and Territories have a critical interest in the outcome of such a national conversation as they hold the legislative 'key' to meeting the expectations of their land owning citizens and at the same time encouraging the resource sector to continue their important contribution to our national wealth creation.
- Land owners property rights must include;
 - i. Right of veto over mining and/or oil and gas production over their Title; the right to say yes or no.
 - ii. Right to compensation and indemnity compensation must include "Consequential Losses" which flow from the authorized activities as well as negligent and default of the operator and its associates and by implication, the Territory, within the meaning of EP98 and common law natural justice generally.

³ http://industry.gov.au/ONA/whitePaper/Documents/northern_australia_advisory_group_advice.pdf ;
para.1.2

- iii. **Right to receive a royalty on minerals (oil and gas) extracted based on wellhead production of each well on the landowners land.**
- **The Petroleum Act must be amended to address the requirement for a share of the income of the production of natural gas to the landowner as a percentage of actual gas extracted from our land within the Petroleum Act itself.**
 - **The Petroleum Act must be amended by imposing a statutory Access Agreement standard within the Petroleum Act rather than the current situation whereby an ordinary Contract which is not supported or contemplated by the Act that are not in compliance with the Exploration Permit; are enforced by the Gas Industry company/Operators without any oversight whatsoever by the Territory.**
 - **The Petroleum Act must be amended to enact official Territory Government oversight as the primary source of the presentation and negotiation all statutory Access Agreements authorized under the Petroleum Act; Access Agreements construction, design and presentation should not be the sole domain of the Gas Industry company/Operators.**
 - **It is paramount that the Petroleum Act contain a standard to clearly define what compensation means within the context of the different activities contemplated in the Access Agreements – in the case of compensation for irrevocable Environmental Disaster; that definition must be the “Spencer Rule”, Spencer v Commonwealth [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907) by the Territory should the Landowner elect to do so.**
 - **Access agreements must be transparent and to a legislative standard where the Minister representing the Territory is a signatory and party to the agreement and the Territory must be bound in the agreement; whereby the Territory itself indemnifies the land owner in all aspects of Compensation under the Petroleum Act.**
 - **The Territory must maintain an assurance fund for each Exploration/Extraction License granted; the fund should contain a reference to and the particularization of all wells constructed within the License area, whether they are during the Exploration phase or the Extraction phase; the fund must contain a record of all statutory Access Agreement entities within the Licence area; the fund amount should be sufficient to remedy all phases of compensation and indemnity contemplated in the Access Agreements combined, within the License area; the fund must also be applied to complete the decommissioning phase should the Exportation Licensee fail or be declared bankrupt.**

- **In the event of an environmental disaster where the land is so degraded either on its surface or underground and/or where the aquifers are contaminated to the degree where ordinary agricultural economic activity is either severely diminished or where there is a reduced or no possibility of agricultural economic activity on the land as it was before the environmental disaster, then Acquisition (the application of Eminent Domain) of the land by the Northern Territory Government and payment of full compensation to the landowner to the standard of the Spencer Rule is applied; the Petroleum Act must be amended to reflect that; including a definition for ‘Acquisition’ to include the partial severance of property and instructed by a “No Fault” clause.**
- **That the decommissioning phase be clearly detailed within the statutory Access Agreement; that a clear assurance that decommissioning be to a prescribed standard; that it be completed to that standard under the supervision and enforcement of the Territory; all future matters connected with infrastructure under Nutwood are the responsibility of the Territory.**
- **The Access Agreements must contain an absolute assurance by the Territory that replacement bores will be constructed to replace dry or contaminated bores currently in use and producing water prior to Gas Industry operations on Nutwood; the guarantee should be a Territory responsibility not a Gas Industry responsibility.**
- **All statutory Access Agreements which are signed and executed must be registered on the Title and Deed under the Provisions of the Land Title Act for each NT Portion and Lot.**

Introduction

1. My name is Rod Dunbar, I am Managing Director of this company; it is a family owned cattle specific breeding, growing and fattening enterprise based at Nutwood Downs, Daly Waters, in the Northern Territory.
2. We operate as a Group consisting of “Lexcray Pty Ltd”, the principal corporation, and a subsidiary corporation, “Australian Livestock and Land Pty Ltd”; a family Partnership (started by my mother [deceased] and father in about 1948); my wife Rayna Dunbar, my daughter Rebecca and my two sons William and Cameron.
3. Lexcray Pty Ltd is the Registered Proprietor, within the meaning of the *Land Title Act* for Nutwood Downs, NT Portion 1513, Volume 765, Folio 134.
4. My family has owned and operated cattle enterprises successfully for several generations; firstly in Queensland from 1894 until 1984 and since 22nd April 1984 our family businesses have been based at Nutwood Downs.
5. On 1st January 2014 Falcon Oil and Gas Australia Limited (Falcon) was granted an Exploration Permit (EP98) by the Northern Territory under the provisions of the Petroleum Act. (see Attachment 7)

6. On 10th September 2014 Falcon wrote to Lexcray (Attachment 1) and advised that Falcon had entered into an Agreement with Origin Energy and others to prospect on the EP98 License area which includes the southern half (approximately) of our land area of Nutwood Downs.
7. Relationship between the Territory and the entities appointed by Instrument under the provisions of the Petroleum Act;
 - a) I refer to the Northern Territory Self-Government Act section 69(4); the Territory owns all the Minerals including the Gas reserves underlying Nutwood; the Territory licenses the exploration and extraction of its minerals under relevant Territory legislation in exchange for payment to the Territory in a legally binding financial arrangement with its Licensee's; therefore mining exploration and extraction companies can only operate within the terms and conditions of their Authority, which is contained within and the Act and the License granted by a Minister.
 - b) The appointment of Falcon and Origin within the meaning of EP98 and the Petroleum Act activates the provisions of the Commonwealth Criminal Code Act 1995; the Dictionary specifies that;

public official includes:

 - (c) an individual who performs work for the Commonwealth, or for a State or Territory, under a contract; and
 - (d) an individual who holds or performs the duties of an office established by a law of the Commonwealth or of a State or Territory;
 - c) Therefore Falcon and Origin are bound to the Territory as public officials by the authority of the Minister for Mines by virtue of EP98 and the Petroleum Act.
8. On the 11th June 2015 we received an email from Origin Energy advising of the proposed Gas Well site on Nutwood, Nutwood Downs W1. (Attachment 2)
9. In communication with Origin on 8th December 2015, prior to negotiations with Origin, Lexcray reserved its rights at common law and in equity, and under the Privacy Act 1988. (Attachment 3)
10. On 28th January 2016 Origin advised Lexcray by email of their proposed drilling activities and presented us with a Contract (and map), a Land Access Agreement to agree to and sign. (Attachment 4).
11. On 21st February 2016 we communicated to Origin our concerns regarding their proposed Land Access Agreement. (Attachment 5)
12. On Friday 11th March we met with Origin staff at Nutwood homestead. Until this meeting, we did not understand that the Origin plan that is already being implemented by the proposed construction of this well

consists of at least 400 wells in the first stage, and could be considerably more as the field is established. This is the first we knew of the extent of the Gas field that exists under Nutwood. Undoubtedly there will be hundreds of kilometres of pipelines and the need for a processing facility somewhere so that the refined gas can enter the existing gas pipeline system.

13. On 29th March 2016 Lexcray set out further concerns regarding Origin's proposed Access Agreement and Lexcray advised Origin that we intended engaging solicitors to obtain legal advice. (Attachment 6)
14. At some point after 14th September 2106, after the Territory announced the Moratorium, Lexcray ceased communications with Origin at least until the Inquiry is concluded; Lexcray will not agree to Origin's proposed Access Agreement in its current form.

Terms of Reference.

1. "Assess the scientific evidence to determine the nature and extent of the environmental [4] impacts and risks, including the cumulative impacts and risks, associated with hydraulic fracturing of unconventional reservoirs and the associated activities in the Northern Territory."

15. For our family, the interference in our cattle production operation on Nutwood Downs *the cumulative impacts and risks, the nature and extent of the environmental impacts and risks, associated with hydraulic fracturing of unconventional reservoirs and the associated activities in the Northern Territory* will be enormous and personally unquantifiable.
16. These activities will impede and/or restrict our operations for many years to come. Not to mention the devaluation of Nutwood itself, because the Gas field is now a known connected entity underlying the property, which will restrict the type and scope of purchaser that would be prepared to live with a major Gas Field – that loss has already occurred and cannot be overturned – so a loss in damage has already occurred.

The Exploration License EP98

17. The license to which Origin are legally bound in exploration for oil and gas in our land, is EP98 (see attachment 7) granted by the Territory within the terms of the *Petroleum Act*, *Petroleum (Environment) Regulations* and Schedule of Onshore Petroleum Exploration and Production Requirements 2016.

⁴ <https://frackinginquiry.nt.gov.au/terms-of-reference> : Definition; 'Environment'

18. Clearly this Instrument binds Origin Energy to the Territory^[5]; Origin is bound by the terms and conditions prevailing upon them by *Schedule 3; Conditions, General Principals* and accordingly the Territory has a legal responsibility to oversee and manage the activities of Origin to the standard of the *manner and form* of its legislative powers under the *Northern Territory Self Government Act 1978*^[6], the *protection of life and property*^[7]; in this case Lexcray's Property.
19. I refer to *Schedule 3; Conditions, General Principals* (see Attachment 7) section 5, an Indemnity Clause which includes Lexcray by virtue of our *Registration of Title* under the *Land Title Act* and the relationship between Lexcray and the Territory under the *Pastoral Land Act*^[8] of *Lessor of the land*^[9].
20. Additionally, *Schedule 3; Conditions, General Principals* section 5 stipulates that the Indemnity is not restricted, in that it includes an unqualified reference that remedies are subject to and include the common law; i.e. the application of common law Torts which must be preserved in any agreement between Origin or any permittee and Lexcray.

Access Agreement

21. I refer to the Access Agreement (attachment 4); the Agreement is not agreed to by Lexcray and it is not signed or executed by the Directors of Lexcray.
22. Therefore, section 69, *Confidentially*, does not apply to Lexcray regarding this submission or the analysis of the Access Agreement. Section 69 prevents Lexcray from speaking to the Media or for that matter discussing or disclosing the contents of the Access Agreement or discussing or disclosing any operational facts or evidence regarding Origin's activities. Section 69 is effectively a control order over Lexcray to prevent all communication of all Origin matters to any entity not expressly identified in section 69 permanently.

Compensation

23. I refer to s16 and s17; this is the absolute maximum compensation payable by Origin and the Territory it "*is in full and final satisfaction of the compensation payable to the Pastoralist under sections 81 and 82 of the Petroleum Act;*" and "*compensates for all of the impacts of the Activities, including all cost, damage and loss for or in respect of all*

⁵ See Attachment 1

⁶ Section 6

⁷ Quick and Garran: page 513

⁸ http://www.austlii.edu.au/au/legis/nt/consol_act/pla142/s4.html

Section 4; a; b (i), (ii), (iii); section 5

⁹ http://www.austlii.edu.au/au/legis/nt/consol_act/pla142/s4.html ; s132

Activities, the loss of use of part of the Pastoral Property, all noise impacts and loss of quiet enjoyment.”

24. Bearing in mind, this Contract once signed, cannot be terminated by either party, only by agreement by both parties (s43 and s44). This means it is permanent, and generational.
25. How then do we accommodate the rise in property values and compensation values when we are fixed at 2016 values; Property values are rising at a much higher rate than CPI?
26. Sections 58 - 60 are a restriction on the sale of the property; there must be a signed Deed executed by the Purchaser before the Title can be transferred; operating like an Instrument over the Title; this diminishes the value of Nutwood Downs because there would be a *smaller number* of prudent, knowledgeable, experienced purchasers who *would* be prepared to buy Nutwood Downs knowing that they will have to deal with ongoing mining problems and likely civil actions and associated risks.
27. The execution of Exploration License 98 is an uncompensated Taking by the Territory.
28. There is no compensation identified for sections 58 -60 in the contract.
29. Compensation and compensation scope in the contract and in Schedule 1 specifically is totally inadequate.

Infrastructure

30. Section 20; This is in effect an agreement that the land owner agrees that it (in this case Lexcray) will accept the Liability from the point in time when Origin and the Territory vacate the property, after the decommissioning phase, of any well leaks, pipeline leaks or any other environmental damage or damages per se emanating from the infrastructure that was installed under the property, and remains there.

Privacy

31. Section 73 requires Lexcray to agree to Origin's Privacy Policy; Lexcray is not permitted the right to have our private information managed in accordance with the Privacy Act 1988; this is totally unacceptable.

Indemnity and Insurance

Indemnity

32. The Access Agreement, whilst it contains reference to Indemnity it severely restricts the application to access, by Lexcray, any sort of indemnity protection for environmental damage which is more likely than not to occur during Origin's activities to produce and extract the natural gas owned by the Territory underlying Nutwood Downs.

33. Section 39 details the restrictions regarding Indemnity;
- No coverage of matters already compensated in Schedule 1
 - **Excludes** Consequential Losses *arising out or caused by the neglect or default of the Operator or its Associates to observe or perform any of their obligations under the Petroleum Title, Relevant Laws or this Agreement in respect of the Activities.*
 - The difficulty with section 41 particularly pertaining to environmental damage is that damage may not be apparent until sometime after the actual incident occurred as has occurred and history records in relation to Asbestos extraction and the unintended consequences that followed in its use.
34. Consequential Losses stand for the proposition that "consequential damages" are recoverable where a contract is breached by a party that knows - or is imputed to know - that ordinary expectancy, reliance, or restitution damages will not suffice to meet damages^[10] caused by, in this case, operator negligence or default of the operator and/or the Territory.
35. Origin and the Territory know^[11] and are imputed to know that environmental damage to our ground water will destroy our business; cattle need a continuous supply of fresh clean potable drinking water; water not polluted by chemicals, methane, Hydrogen Sulphide^[12], or ancient salts contained in the underlying shale disturbed by the fracking process.
36. Additionally, gas processing areas of a hundred hectares or more have ponds of toxic waste and in some cases radioactive waste where the liquid is evaporated off; if those areas are breached in severe weather conditions like cyclonic and monsoon, severe surface watercourse environmental damage will occur; our cattle would be contaminated and be detected at abattoirs and quarantine measures applied; the Territory knows this and therefore Origin must know.
37. Availability of ground water for Pastoral Purposes is a serious concern; the projected water usage by the gas industry in the Georgina Basin is double the sustainable yield of the current underground aquifers. (see Attachment 12)
38. There is no guarantee from Origin or the Territory that adequate supplies of potable ground water will be available to Lexcray for our business for stock and domestic use in accordance with our common law rights of owning land alienated from the Crown where provision of water is a Crown guarantee; the right of quiet enjoyment of the land.

¹⁰ [Hadley v. Baxendale](#)

¹¹ See Attachments 6, 7

¹² Attachment 8

39. The Territory and Origin refuse to Indemnify Lexcray against these environmental incidents; they have refused to include such matters in the Access Agreement; they refuse to Indemnify Lexcray for any consequential damages whatsoever whether intended or unintended.

Breach of Section 5 of EP98

40. Origin has included an Indemnity section in the Access Agreement (Section 39); that section however is inconsistent with the authority granted to Origin by the Territory in EP98.

41. The Access Agreement contains a qualification that prevents Lexcray from access to Indemnity compensation from “*Consequential Losses*”; damage to our property “*arising out or caused by the neglect or default of the Operator or its Associates to observe or perform any of their obligations under the Petroleum Title*”

42. The application of section 39 by Origin in its representations to Lexcray is in itself, a breach of the Exploration License (EP98). EP98 contains indemnity protection; Origin’s Access Agreement demands the opposite.

43. The Territory has a responsibility to ensure that their Regulations are being complied with; clearly the Territory is not acting in our best interests and that they are Negligent by not enforcing the provisions of EP98 over Origin to protect Lexcray.

Insurance

44. On 16th February 2017 I received our annual Insurance renewal notice by email. (see Attachment 9)

45. In reply on the 20 February 2017, I gave official notice under section 5 of our Insurance Policy (see Attachment 9) to MGA Insurance Brokers of possible Contractual Liabilities arising from the demand by Origin and the Territory for Lexcray to enter into an Access Agreement with regard to the activities specified in EP98 on Nutwood.

46. I attached a copy of the Contract that Origin and the Territory presented to Lexcray for signing. (See attachment 4)

47. I advised MGA Insurance Brokers that we have not signed any agreement with Origin Energy at this point.

48. In the correspondence (see Attachment 9) to MGA Insurance Brokers my direct questions were;

- *In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – how would the application of the Contract effect our current Insurance? Would our Insurance premium rise and by how much?*
- *In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – What would be the cost to Lexcray if Lexcray were to*

insure against any damages arising out of the activities of Origin on Nutwood Downs discussed and covered in this correspondence.

49. Mr. Jon Bourke, Senior Associate with MGA Insurance Brokers replied on 20th February;

“Very Glad you have not signed anything here and we would recommend that you do not do so.”

- *In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – how would the application of the Contract effect our current Insurance? Would our Insurance premium rise and by how much?*

Under current insurance arrangements you are NOT insured for Contractual Liability.

Specifically – You are Not Insured for Liability in respect of any obligation assumed by You under any agreement except to the extent that:

- a) The liability would of been implied by law.**
- b) The liability arises from provision in a contract for lease of real or personal property other than a provision which obliges the insured to effect insurance or provide indemnity in respect of the subject matter of the contract**
- c) The liability is assumed by You under a warranty of fitness or quality as regards the products**

Additionally the policy (as does all standard Public Liability policies) does not cover any Pollution Liability, which would be a large exposure to you under this contract.

We believe the underwriters would load your Farm Insurance premium by approximately 100% on the assets insured, simply because of the increased risk of fire & explosion.

Under the terms of the contract also the Liability Limit must be increased to \$20,000,000 from the current level of \$10,000,000. In premium terms this would cost approximately \$750 more per year.

- *In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – What would be the cost to Lexcray if Lexcray were to insure against any damages arising out of the activities of Origin on Nutwood Downs discussed and covered in this correspondence.*

Essentially to provide cover against their activities you would require a Contractual Liability Insurance coverage & Pollution Liability Insurance for a significant limit, but the maximum available with most insurers capacity for this is only \$25,000,000.

The amount of information and documentation required to obtain quotes for these are substantial, most of the detail would need to come from Origin, the insurers would need to have full risk management reports conducted to refer to their risk engineers etc and the insurance premium costs we would consider enormous, if cover could even be obtained which we would consider is doubtful.

We only deal with Authorised Insurers that have licenses to conduct business in Australia and we do not consider any of them would provide insurance protection for these risks with these unfair contracts with Origin Energy.

Additionally under point 39 in the contract it excludes any Consequential Loss that you may occur to your farm as a result of the operators negligence or negligence of its contractors.

This is not something that you could insure, so you would be left exposed for this also.

50. Essentially Lexcra faces the next 25 - 40 years of at least 110% increased premiums for increased risk under normal retail insurance on our buildings and other property.
51. There is no cover for environmental pollution liability obtainable to Lexcra.
52. Contractual Liability Insurance coverage & Pollution Liability Insurance that could be available to Lexcra is limited to \$25,000,000 whereas we believe it would need to be at least \$100 million at today's values, which is unobtainable using normal commercial insurers; even if cover could be obtained we would be unable to pay the premiums.
53. The bottom line is that for the activities that Origin and the Territory propose under EP98 we cannot protect ourselves by applying Insurance; Indemnity of that kind is unavailable to Lexcra; it is uninsurable.

Term of Reference

3. For every environmental risk and impact that is identified in Item 1, advise the level of environmental impact and risk that would be considered acceptable in the Northern Territory context

54. There should be no consideration by the inquiry panel to prescribe any environmental risk as acceptable where that risk destroys ground water either by pollution or degradation of the aquifers themselves (so that they are unfit for human or animal consumption according to WHO standards) or by over-use of available water supply within the aquifers by the oil and gas industry in its exploration or extraction activities, I refer specifically to the 'Precautionary Principle' as applied throughout Australian jurisdictions.

55. There should be no consideration by the inquiry panel to prescribe any environmental risk as acceptable where that risk destroys surface water or water courses any sort of pollution, chemical spills, escape of radioactive material from well heads, escape of material and/or toxic chemicals from oil and gas processing areas.
56. Any risk that disrupts or irrevocably changes or destroys the environment where the destruction is not reversible is unacceptable; any risk to the availability of access to abundant uncontaminated potable water, that prevents Lexcray from operating our agricultural business that is irreversible, is unacceptable.

Contamination of Ground water

57. In all our dealings with Origin our main concerns are contamination of ground water, contamination of the land and the loss and damage that Lexcray would suffer as a result; our secondary concerns are of course how do we operate with hundreds of Gas wells and the associated disturbance that is part of that.
58. Origin has always given unequivocal verbal assurances that contamination events are completely impossible; that the risk level was virtually zero; that is the reason they said they would not foreshadow such events in the Access Agreement. This proposition is manifestly absurd.
59. In November 2016 Origin released the Amungee Mungee NW1 Gas Well Environmental Management Plan (EMP); in that Plan at pages 17 – 18 (see attachment 11) sets out in detail the dangers associated with drilling in the Nutwood region;

6) EXPLORATION DRILLING ENABLES CROSS FORMATIONAL FLOW BETWEEN SHALLOW AQUIFERS IN CONTRAVENTION OF WATER ACT REGULATIONS.
Assessed Risk Level: HIGH
Consequence: Serious

There is potential that incomplete casing/cementing of shallow utilised aquifers will allow cross formational flow. Assuming there is a contrast in water quality between the aquifers and a driving pressure gradient, potential also exists for the deterioration in groundwater quality, which in turn could impact existing groundwater users and/or environmental dependencies.

7) CROSS FORMATIONAL FLOW FROM DEEPER FORMATIONS TO A UTILISED AQUIFER RESULTS IN GROUNDWATER CONTAMINATION.
Assessed Risk Level: LOW to MEDIUM
Consequence: Serious

There is potential that the cross formational flow of water/hydrocarbons/gas from deeper formations to a utilised aquifer will result in groundwater contamination and impact existing users and environmental dependencies. Possible causes leading to cross-formational flow include:

- Well failure due to incomplete cement placement or casing failure during operation or post abandonment

- Blow out during drilling causes annular leakage
- Breach of aquitard by hydraulic fracture propagation
- Hydraulic fracturing opens pathway through an abandoned exploration well
- Leakage along faults intersected by drilling or induced fracturing

8) HYDRAULIC FRACTURING INDUCES SEISMICITY INCREASING CONNECTION BETWEEN FORMATIONS AND ENHANCING THE POTENTIAL FOR CROSS FORMATIONAL FLOW
Assessed Risk Level: LOW

Consequence: Serious

There is a risk that hydraulic fracturing induces local seismicity leading to greater connection between deeper formations and utilised aquifers. This may enhance the potential for cross formational flow of saline groundwater/hydrocarbons/gas causing groundwater contamination in utilised aquifers and impacting existing groundwater users and environmental dependencies

60.No such information has ever been disclosed by Origin at any point to the Dunbar family or our servants or agents, even though it was a major discussion point in our dealings with Origin over the several months prior to the moratorium.

Summary

61.

- a) The Territory is determined to hydraulic fracture the shale underlying Nutwood Downs,
- b) The Territory has appointed Origin Energy and others to carry out that operation on behalf of the Territory by delegating authority using a Statutory Instrument, EP98,
- c) Origin Energy (and indirectly the Territory) is seeking to have Lexcray enter into a common law contract that seeks to transfer the liability of the risk(s) of hydraulic fracturing to Lexcray in the first instance; to limit payment of damages to Lexcray as a result of the activities of the Territory and Origin; to limit the indemnity available to Lexcray whereby Consequential Losses are not indemnified whatsoever, even in the face of negligence of Origin; nor is breaches of Origin's obligations under the Petroleum Act and EP98 including unintended consequences of its staff and contractors; and to finally transfer all future environmental damage and issues arising from the prescribed activities to Lexcray, once Origin (or any other entity that Origin appoints) has completed its prescribed activities and vacated Nutwood.
- d) The actions of Origin in c) are not authorized by the terms and conditions of EP98; therefore, the Territory is negligent as it has not enforced its regulations contained in EP98, in order to protect Lexcray.

- e) Our greatest concerns are about water;
 - i) With Nutwood being on the outer rim of the Tindal Aquifer it is almost a certainty that any drawn down of the aquifer by the Gas industry will affect us first; ie our bores on the Tindal Aquifer will dry up first,
 - ii) Water quality; if/when contamination occurs there is no contingency plan to provide adequate water supplies for stock and domestic as is our right at common law,
 - iii) The Territory has made no provision to guarantee adequate water supply to Nutwood; the Amungee NW-1 Environmental Statement models water usage on 2009 Water Resources projections whereas the revised water allocations in 2014 call for vastly reduced water usage in order to maintain supply to properties like Nutwood.

- f) There is no plan or assurance by the Territory that replacement bores will be constructed to replace dry or contaminated bores currently in use on Nutwood; that guarantee should be a Territory responsibility and part of the statutory Access Agreements.

That concludes my submission, thank you.

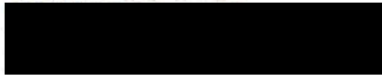
Mr. Rod Dunbar
Managing Director
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852



ABN 53 132 857 008

2 September 2014

Mr and Mrs R Dunbar
Nutwood Downs



Dear Mr and Mrs Dunbar

On 2 May 2014 I advised you that Falcon Oil & Gas Australia (Falcon) had entered into an agreement with Origin Energy Resources Limited and Sasol Petroleum Australia Limited to undertake the next phase of exploration for Exploration Permits 76, 98 and 117 in the Beetaloo Basin.

I also informed you that Origin Energy would be the operator of the permits for the purposes of the Northern Territory Petroleum Act. Following the completion of the agreement between Falcon, Origin and Sasol, Origin has now been formally appointed as operator and is responsible for managing all aspects of the exploration project including working with pastoralists. Falcon retains a significant minority interest in the Permits.

If you need to contact Origin for any general issues, you can send an email to community.team@originenergy.com.au and your question will be directed to the appropriate person within Origin to respond. For all day to day operational matters your contact will be Mr Adam Hill on [REDACTED]

I have included with this letter, a copy of the map which overlays the current Beetaloo Permit Areas with the local leasehold boundaries.

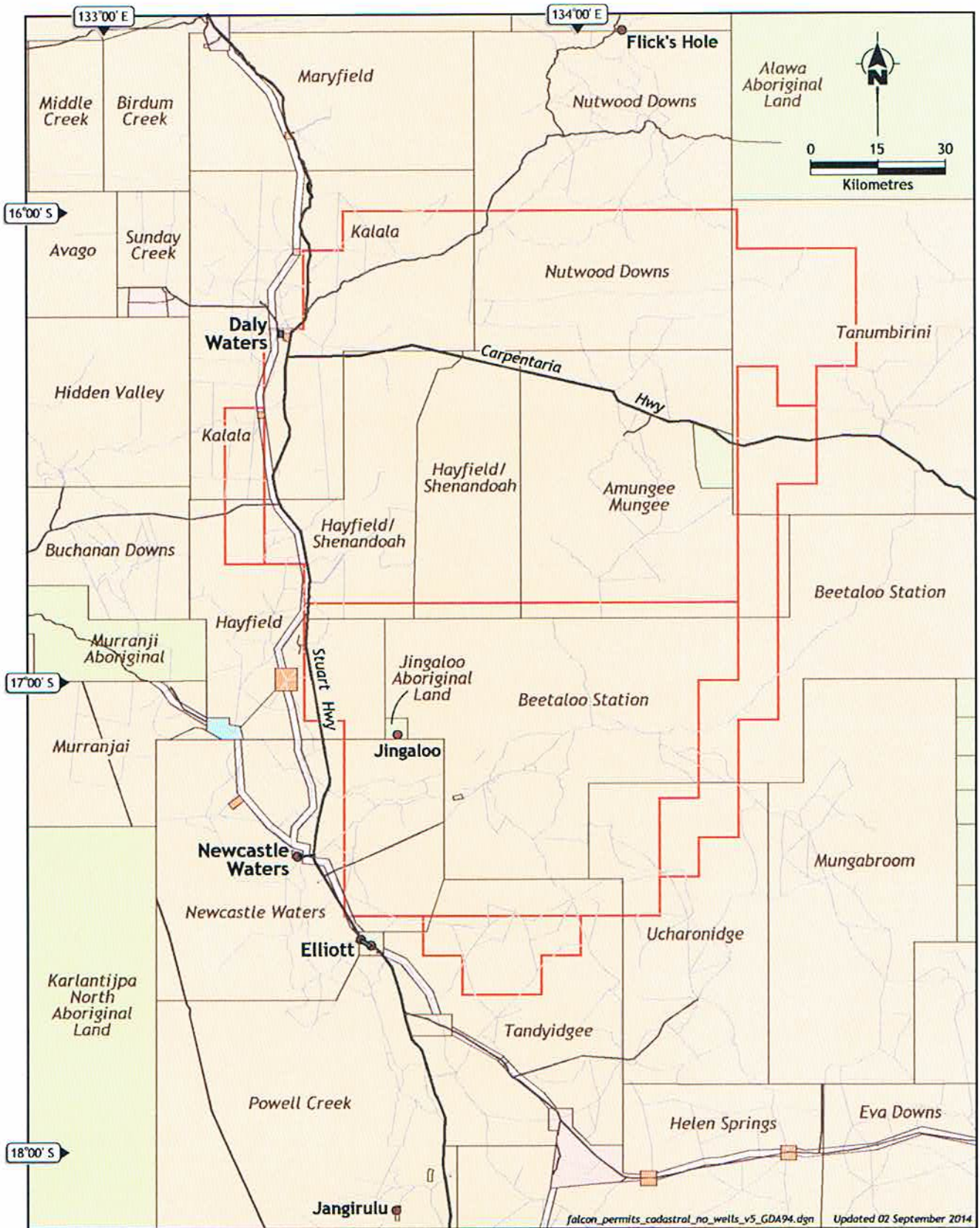
Falcon appreciates the co-operation you have given us over the last five years as we have undertaken exploration on your pastoral leasehold. Should you require any additional information, please do not hesitate to contact me.

Yours sincerely

A handwritten signature in blue ink, consisting of a large, stylized 'J' followed by a long horizontal line that loops back to the right.

John Carroll
Country Manager Australia





falcon_permits_cadastral_no_wells_v5_GDA94.dgn Updated 02 September 2014

Legend

- | | | |
|------------------|----------------------|-------------------|
| Beetaloo permits | Pastoral Lease | Government |
| Sealed road | Freehold | Vacant Crown Land |
| Unsealed road | Crown Lease | Reserve |
| Unsealed track | Aboriginal community | Town |

Permit/Property Boundary Location Map

Rod Dunbar

From: Hill, Adam [REDACTED]
Sent: Thursday, 11 June 2015 2:40 PM
To: 'nutwooddowns [REDACTED]'
Subject: Well site location

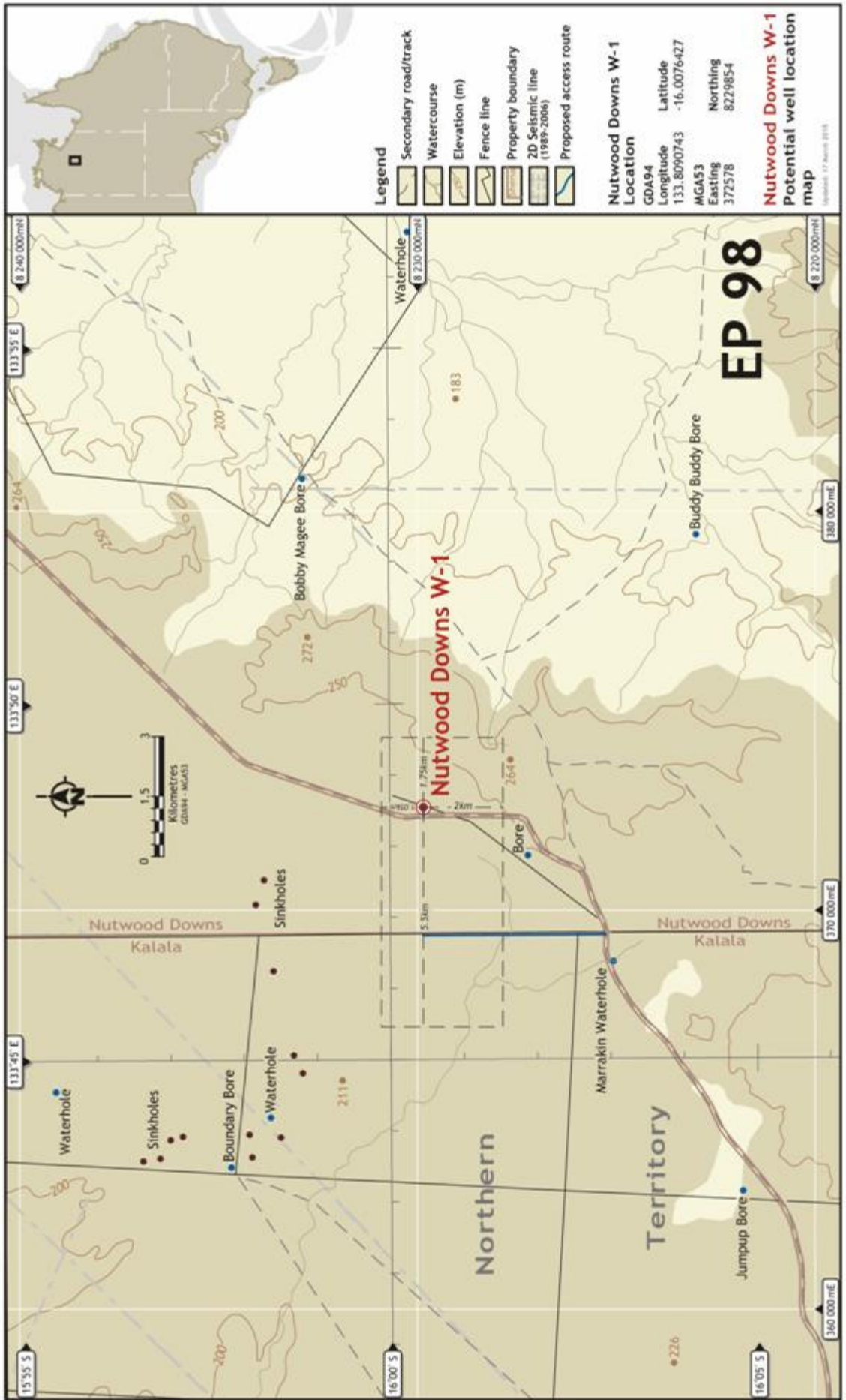
Follow Up Flag: Follow up
Flag Status: Flagged

Afternoon Rod & Rayna,

Below is the map location of the well site we discussed earlier Rayna. We require sacred site clearances for this site through the NLC which is available to do so over the next week or so.

Can you look at this and advise any concerns, but initially this is part of our approvals process and there is no work program planned for drilling as yet. That may come about in the future and I can assure you we will approach you with all relative information around that if it arises.

Our requirements at this stage would simply be a couple of light vehicles to inspect the area and would only take a matter of hours at the most.



Best Regards,
 Adam Hill

Community Relations Specialist

Origin

Level 1, 339 Coronation Drive, Milton QLD 4064



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Rod Dunbar

From: Rod Dunbar [REDACTED]
Sent: Tuesday, 8 December 2015 11:47 AM
To: 'Hill, Adam'
Subject: RE: 2016 program // Origin energy

Yes Wednesday morning should be ok.

Also, there is media hype here re the NT Cattlemen's Assoc. being involved with mining access ...etc..; well Origin needs to be aware that this family and our corporations are not members of NTCA and NTCA (or "industry") is not authorized to act, negotiate, or speak for us on any matter whatsoever, for or on behalf of our property, real and personal.

We reserve our right at common law and in equity on all matters concerning our Property; We reserve our right not to be compelled to perform under any unrevealed contract or commercial agreement that we did not enter knowingly, voluntarily and intentionally. We do not accept the liability of the compelled benefit of any unrevealed contract or commercial agreement.

Additionally, any and all material gathered by Origin in the normal course of our negotiations, that is between the Dunbar Family and our corporations and Origin, must be maintained by Origin in accordance with the Privacy Act (C'wth) Privacy Principals and cannot be released to any third party whatsoever without our written consent.

Having said that, we look forward to a professional working relationship, one built on friendship and trust, and we look forward to meeting you and Grant Wednesday next week.

Kind regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Hill, Adam [REDACTED]
Sent: Tuesday, 8 December 2015 6:25 AM
To: Rod Dunbar
Subject: RE: 2016 program // Origin energy

Thanks for this Rod,

I have passed on to the relevant people for their knowledge.

As discussed I will be up in the area next week and was wondering if you were able to meet me and my colleague Grant Higgs on Wednesday sometime? The earlier in the day the better for us.

Look forward to catching up then.

Regards

Adam Hill

██████████

From: Rod Dunbar ██████████
Sent: Saturday, 5 December 2015 11:13
To: Hill, Adam
Subject: RE: 2016 program // Origin energy

Adam

The status of the bores identified are;

- RN002876 -- abandoned
- RN000645 -- abandoned
- RN034175 -- unequipped
- RN034182 -- unequipped
- RN031635 -- unknown and unidentified – maybe in Kalala
- RN025208 and RN027524 -- believed to be at the site of All Tree No.1 & No. 2, an Oil bore sunk by Pacific Oil and Gas, maybe 20 years ago, drillers log available from the Mines Dept. Believed to be sealed and capped.

There were 3 bores sunk by Water Resources in Nutwood along the Main Road last year, no indicated on your map, in the vicinity of your proposed oil bore, they said they were sunk for “monitoring” purposes, they may be of use to you, they are unequipped buy you could retrieve samples of water out of them; they have locks on them so you would have to talk to Water Resources.

Kind Regards
Rod

From: Hill, Adam ██████████
Sent: Thursday, 3 December 2015 2:57 PM
To: Rod Dunbar
Subject: RE: 2016 program // Origin energy

Hi Rod,

As part of the scouting work, AECOM would like to take water samples from some of the surrounding bores.

There are 4 that have been identified but not sure of their state, so can I ask that you have a look at the attached map and confirm whether or not they are in working order and if we are able to take these samples? If so they would just need to run the bores briefly and collect the samples, but would prefer to do this with your help or guidance given each one may be set up differently.

Purpose of the sampling is to log the baseline data of the water table prior to any activity occurring which is part of our environmental management.

Regards

Adam Hill
██████████

From: Rod Dunbar ██████████
Sent: Thursday, 3 December 2015 11:24
To: Hill, Adam
Subject: RE: 2016 program // Origin energy

Hi Adam

Yes of course you can have access of or about the 14th December. I should be around to meet you I should think, we had some welcome rain last night (55mm) but it should be dry by the time you are coming.

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Hill, Adam [<mailto:Adam.Hill@upstream.originenergy.com.au>]
Sent: Wednesday, 2 December 2015 10:55 AM
To: Rod Dunbar
Subject: 2016 program // Origin energy

Hi Rod,

I'm sorry we're a bit slow in getting a land access agreement through to you in draft for review. It is currently going through internal review. As soon as this is done I'll let you know.

We do however need to do some scouting for civil design and construction work which is a 1-2 day field trip where we engage AECOM to assess the area and then can work on those designs leading into next year.

Are we able to do this the week of the 14th? I will also be in the area that week and would like to come out and meet with you if possible? I can bring along all information on the program and we can go through that then if you have the time.

I will try to call you in the mean time.

Best Regards,

Adam Hill

Land Access

Origin

Level 2, 144 Montague Road, West End, Brisbane, 4101
[REDACTED]
[REDACTED]
[REDACTED]

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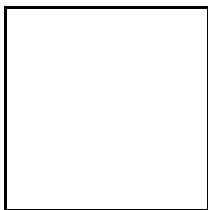
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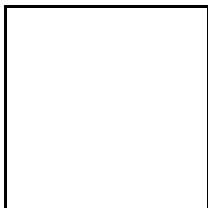
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Pastoral Land Access and Compensation Agreement (Petroleum Activity)

‘Nutwood Downs’

Lexcray Pty Ltd ACN 010 613 751

Operator's Commitments

8. The Operator must carry out the Activities:
 - (a) in a way that minimises interference with the Pastoralist's lawful rights and activities on the Pastoral Property;
 - (b) in accordance with all Relevant Laws and this Agreement; and
 - (c) in accordance with good exploration and petroleum industry practice.
9. The Operator acknowledges and agrees that it will be responsible for all of the Petroleum Activities carried out by or on behalf of the Operator on the Pastoral Property.
10. The Operator must give the Pastoralist written notice at least 14 days before commencing the Activities.

Pastoralist's Commitments

11. The Pastoralist warrants that it is the sole owner and occupier of the Pastoral Property for purposes of the Petroleum Act.
12. The Pastoralist and the Pastoralist's Associates will:
 - (a) not interfere with the Activities;
 - (b) allow the Operator to use roads and tracks on the Pastoral Property for the purpose of the Activities;
 - (c) not object to the issuance of petroleum titles on the Pastoral Property or the Activities on the Pastoral Property;
 - (d) promptly give any consent or authority reasonably required by the Operator concerning any application the Operator wishes to make in relation to the Activities; and
 - (e) comply with any reasonable directions and requirements from the Operator relating to workplace health and safety in relation to the infrastructure or the Activities.

Terms of Access

13. The Pastoralist and the Operator will act in Good Faith in dealings towards each other under this Agreement.
14. The Operator will undertake Petroleum Activities on the Pastoral Property in accordance with the Terms of Access. If there is any inconsistency between this Agreement and the Terms of Access, then the provisions of this Agreement will prevail.
15. The parties acknowledge that the Terms of Access may be amended or replaced as agreed between the parties.

Compensation

16. The Operator will pay the compensation as set out in Schedule 1 to the Pastoralist.

17. The Pastoralist acknowledges that the compensation set out in Item 1 of Schedule 1:
 - (a) is in full and final satisfaction of the compensation payable to the Pastoralist under sections 81 and 82 of the Petroleum Act; and
 - (b) compensates for all of the impacts of the Activities, including all cost, damage and loss for or in respect of all Activities, the loss of use of part of the Pastoral Property, all noise impacts and loss of quiet enjoyment.
18. Nothing in this Agreement limits any entitlement the Pastoralist may have to compensation under laws other than the Petroleum Act.

Infrastructure

19. The Pastoralist and the Operator agree that the Infrastructure will remain the property of the Operator irrespective of whether the infrastructure is permanently attached to the Pastoral Property.
20. When the Operator is decommissioning the Operator may leave behind infrastructure that was installed under the Pastoral Property.
21. The Pastoralist must not carry out any activities within the Well Pad Area without the prior written consent of the Operator.

Operator's Restricted Areas

22. The Operator must erect and maintain appropriate temporary fencing to exclude cattle from the well site within the 'Activities Area' as shown on the map in Schedule 3.
23. The Pastoralist may make suggestions to the Operator about the Activities where the activities affect (or may later affect) the Pastoral Property.
24. The Operator must consider in Good Faith all suggestions and must promptly consult the Pastoralist about the suggestions.
25. The Operator must contact the Pastoralist to discuss any issues and seek to respond to any questions the Pastoralist has regarding Petroleum Activities within 30 days of a written request by the Pastoralist
26. The Operator agrees to provide the Pastoralist with an opportunity to inspect the Activities in the presence of the Operator, at times reasonably agreed between the parties and having regard to the safety of the Operator's personnel and the safety of the Pastoralist.
27. If the Operator believes that, for material and reasonable occupational health, safety or security reasons related to the Petroleum Activities the Pastoralist must not enter an area within the Access Area then the Operator may direct the Pastoralist to not enter a particular area.
28. Except in the case of an emergency, a direction in paragraph 27 should be by way of notice specifying the reason for the restriction, the relevant area and the time period (if any).
29. Except in the case of an emergency, the Operator will not specify an area as a restricted area unless:
 - (a) the Operator has discussed the proposal with the Pastoralist and considered any of the Pastoralist's comments; and

- (b) the restricted area is appropriate (in terms of size and coverage) to deal with the occupational health, safety or security reasons for restricting access to the area.

Reviews

30. If a party experiences a material change of circumstances in respect of the activities that party carries out or intends to carry out on the Pastoral Property, that party may give the other party a notice in writing specifying that it wishes to renegotiate part or all of this Agreement (**Review Notice**). A Review Notice must describe the changes sought to be made to the Agreement.
31. If a Review Notice is given, the parties acknowledge and agree that they will work together in the spirit of mutual cooperation and respect to seek to reach agreement with respect to any changes sought, with the intention to be fair and reasonable in all circumstances. If the parties cannot agree, it will be treated as a dispute under clauses 45 to 52.

Variation of Activities

32. The Operator may make Minor Changes to the Activities and will promptly inform the Pastoralist about such changes which may include providing the Pastoralist with a map showing the details of the Minor Change.
33. The parties acknowledge and agree that:
- Minor Changes to the Activities do not alter the Operator's compensation liability to the Pastoralist;
 - Minor Changes to the Activities do not constitute a material change of circumstances under clause 30; and
 - subject to clause 32 of this Agreement, the Operator and its Associates may enter the Pastoral Property to carry out the activities the subject of the Minor Change.
34. If Operator proposes to make a Significant Change to the Activities, the following process applies:
- Operator must give the Pastoralist a notice describing the proposed change(s) including any change to the Compensation (**Variation Notice**);
 - if a Variation Notice is given, the Operator will consult with the Pastoralist about the proposed change(s) and the parties agree that they will work together in the spirit of mutual cooperation and respect to seek to reach agreement with respect to any change(s) sought;
 - if the Pastoralist agrees with any proposed change(s), the parties may vary this Agreement in accordance with clause 57 which has the effect of amending the Activities; and
 - if the Pastoralist does not agree with any proposed variation set out in a Variation Notice, it will be treated as a dispute and clauses 45 to 52 will apply.
35. The parties acknowledge and agree that:
- a Significant Change to the Activities may alter the Operator's compensation liability to the Pastoralist; and
 - a Significant Change to the Activities may constitute a material change of circumstances under clause 30 of this Agreement.

Unauthorised Damage

36. If the Pastoralist observes any damage caused by the Operator or its Associates that is not authorised under this Agreement, it must give written notice of the damage to the Operator.

37. If the Operator causes and observes that it has caused any unauthorised damage that is not promptly remedied and/or the Pastoralist gives Operator notice of damage, the Operator will notify the Pastoralist of the proposed repair works and timing and will repair the damage as proposed.
38. If the Operator does not repair the damage as proposed by it, the Pastoralist in consultation with the Operator may carry out the repairs and the Operator will compensate the Pastoralist for the reasonable costs and time of carrying out the repairs.

Indemnity

39. The Operator will indemnify the Pastoralist and keep the Pastoralist indemnified from any claims or liabilities (other than those for which Compensation has been, or will be, paid under this Agreement) made against or properly incurred by the Pastoralist in respect of any injury to any person, or any loss or damage to property (excluding Consequential Losses) arising out or caused by the neglect or default of the Operator or its Associates to observe or perform any of their obligations under the Petroleum Title, Relevant Laws or this Agreement in respect of the Activities, except to the extent that it is caused by the negligence or wilful or malicious act or omission of the Pastoralist or their Associates.
40. The Pastoralist will take reasonable steps to mitigate any loss that it incurs or may incur as a result of the Activities.
41. Where the Pastoralist has the benefit of an indemnity under this Agreement, the Pastoralist must give written notice to the Operator of the nature and, to the extent reasonably known at the time, the quantum of the liability as soon as reasonably practicable after the commencement of the circumstances giving rise to the liability. The Pastoralist must also provide reasonable information and documentation relating to such claim and liability to the Operator on a continuing basis.

Insurance

42. The Operator must effect and maintain public liability insurance for an amount not less than \$20 million in respect of the Activities for the Term.

Termination

43. Neither party may terminate this Agreement for a breach of this Agreement but all other remedies are available to a party in respect of a breach of this Agreement.
44. The Agreement may be terminated by agreement between the parties.

Dispute Resolution

45. All disputes under this Agreement must be resolved in accordance with clauses 46 to 52.
46. Either party may give notice to the other party that a dispute in relation to this Agreement exists, by setting out the nature of the dispute and giving reasons for the dispute (**Dispute Notice**).
47. If a Dispute Notice is given under clause 46, both parties must in the first instance use reasonable endeavours to resolve the dispute within 20 Business Days from the date that the Dispute Notice is given.
48. If the dispute remains unresolved after a period of 20 Business Days for the date the Dispute Notice is given, the parties may agree to appoint a mutually agreed mediator (**Mediator**) to mediate the dispute in accordance with the Australian Institute of Arbitrators and Mediators

Mediation Rules, and in the absence of Agreement either party may apply to the Northern Territory president of the Australian Institute of Arbitrators and Mediators for the appointment of a mediator (**Mediation Notice**).

49. The costs incurred in relation to clause 48 will be determined by the Mediator.
50. The parties must use reasonable endeavours to attend the mediation and to resolve the dispute within 20 Business Days after the Mediation Notice is given.
51. If the dispute remains unresolved after a period of 20 Business Days from the date that the Mediation Notice is given, either party may seek to resolve the dispute in a court of competent jurisdiction. Without limiting either party's rights, the parties acknowledge that the Lands, Planning and Mining Tribunal is an independent statutory body that has jurisdiction in resolving disputes over the compensation that may be payable to the Pastoralist under Section 81(3) and Section 82(6) of the Petroleum Act.
52. If the dispute is not resolved within 20 days, either party may seek to resolve the dispute in a court of competent jurisdiction.
53. Nothing in clauses 46**Error! Reference source not found.** to 52 prevents a party from seeking any injunctive, declaratory or any other relief from a court which may be urgently required.

No Waiver of Rights

54. Any failure by a party to enforce a clause of this Agreement, or any forbearance, delay or indulgence granted by a party to the other will not constitute a waiver of the party's rights.
55. No provision of this Agreement will be deemed to be waived unless that waiver is in writing and signed by the waiving party.
56. No waiver of a breach of a term of this Agreement operates as a waiver of another breach of that term or of a breach of any other term of this Agreement.

Variation

57. The Agreement may be varied in writing signed by the parties.

Assignment

58. If the Operator transfers operatorship of the Petroleum Title to another person then the Operator will:
 - (a) give the Pastoralist notice of the transfer and the identity of the other person; and
 - (b) ensure that the Operator and the other person sign a Deed of Assumption of this Agreement in the form set out in Schedule 5 to this Agreement,as soon as practicable following receipt of the Deed of Assumption, the Pastoralist shall execute the Deed of Assumption and shall provide an executed copy to the Operator.
59. If the Pastoralist transfers the Pastoral Property to another person then the Pastoralist will:
 - (a) give the Operator notice of the transfer and the identity of the other person; and
 - (b) ensure that the Operator and the other person sign a Deed of Assumption of this Agreement in the form set out in Schedule 5 to this Agreement.
60. As soon as practicable following receipt of the Deed of Assumption, the Operator shall execute the Deed of Assumption and shall provide an executed copy to the Pastoralist.

Warranties

61. The Operator warrants that it is the holder of the Petroleum Title.
62. The Pastoralist warrants that:
 - (a) all owners and occupiers for the Pastoral Property are a party to this Agreement;
 - (b) the name, ABN (if any) and the capacity in which the Pastoralist enters this Agreement, as disclosed in Item 4 of the Reference Schedule are true and correct; and
 - (c) if any payment made by the Operator to the Pastoralist under or in connection with this Agreement is for a supply made by the Pastoralist to the Operator, then that supply is not in the course or furtherance of an enterprise carried on by the Pastoralist in Australia within the meaning of section 12-190 of Part 2-5 of Schedule 1 to the *Taxation Administration Act 1953* as amended from time to time.
63. If the Pastoralist is a trustee, the Pastoralist warrants that it has all necessary power as a trustee to enter into and execute this Agreement.
64. If the Pastoral Property is owned and/or occupied by the Pastoralist in partnership, the Pastoralist warrants that it has all necessary power to enter into and execute this Agreement on behalf of the partnership.

Severability

65. If any provision of this Agreement is determined to be invalid, unlawful or unenforceable for any reason then:
 - (a) that part will, to the extent of the invalidity, unlawfulness or unenforceability, be severed from the rest of this Agreement; and
 - (b) the remaining terms will continue to be valid and enforceable to the fullest extent permitted by law.

Entire Agreement

66. This Agreement constitutes the entire agreement between the parties in relation to its subject matter.

Governing Law

67. Each party hereby submits to the jurisdiction of the appropriate courts of the Northern Territory and the Commonwealth and any courts competent to hear appeals therefrom.

Notice

68. All notices given under this Agreement must be in writing and be delivered to the relevant party using the Notice Details in Item 4 of the Reference Schedule.

Confidentiality

69. The parties may disclose information contained, or associated with, any matter referred to in this Agreement to any person including, without limitation, their employees, related companies, financiers, insurers, professional advisors and third parties considering acquiring an interest in all or part of the Pastoral Property or the Petroleum Title.

Taxation

70. The Pastoralist will be solely liable to pay taxes that may be imposed in relation to Compensation under this Agreement.
71. If the Operator is required to withhold an amount in respect of tax from a payment made to the Pastoralist under this Agreement:
 - (a) the Operator may withhold the tax from the payment and pay the tax to the relevant taxing authority and such payment will be a good discharge of the Operator's obligation to pay or provide the Compensation to the Pastoralist; and
 - (b) the Pastoralist indemnifies the Operator for any loss suffered by the Operator as a result of the Operator failing to withhold from the payment an amount in respect of tax.
72. All amounts in this Agreement do not include GST. The supplier will add the prevailing rate of GST onto all taxable supplies made in connection with this Agreement, and the recipient agrees to pay that GST following the receipt of a tax invoice from the supplier. The GST applicable to any taxable supplies made in connection with this Agreement is payable at the same time as the consideration for those supplies. Where a party reimburses the other party for an expense or other amount, the reimbursement will be net of any input tax credit the supplier is entitled to claim. In this clause, all terms that are defined in the GST law (as that term is defined in the *A New Tax System (Goods and Services Tax) Act 1999* have the same meaning in this clause.

Privacy

73. The Pastoralist and the Operator acknowledge that:
 - a. the Pastoralist has been provided with access to the Privacy Collection Statement for Landholders;
 - b. where applicable, Personal Information of the Pastoralist will be collected by the Operator for the purposes of this Agreement; and
 - c. any Personal Information of the Pastoralist collected by the Operator will be collected, held, used and disclosed in accordance with the Privacy Policy.

Exchange of Counterparts

74. This Agreement may be executed in any number of counterparts. Each counterpart is an original but the counterparts together are one and the same Agreement.
75. This Agreement is binding on the parties on the exchange of counterparts. A copy of a counterpart delivered in person or sent by facsimile machine or electronic mail transmission must be treated as an original counterpart and a facsimile copy or a copy sent by electronic mail is capable of constituting a written agreement between the parties.

EXECUTED as an agreement.

Executed by Lexcray Pty Ltd ACN 010 613 751)
In accordance with section 127(1) of the)
Corporations Act 2001 (Cth):)

Director

Director/Secretary

Name of Director

Name of Director/Secretary

SIGNED for and on behalf of Origin Energy)
Resources Limited ABN 66 007 845 338 by its)
duly authorised representative in the)
presence of:

Signature of witness

Signature of authorised representative

Name of authorised representative

Name of witness

Title of authorised representative

Reference Schedule

- ITEM 1
Pastoral Property: NT Portion 1513, Volume 765, Folio 134
(Property known as 'Nutwood Downs')
- ITEM 2
Petroleum Title: Exploration Permit 98, including any exploration permit granted in
substitution or replacement of Exploration Permit 98.
- ITEM 3
Responsible Person: **Pastoralist Responsible Person**
Rod Dunbar
Phone: [REDACTED]
Mobile: TBA
Email: [REDACTED]

As amended from time to time by the Pastoralist advising the
Operator in writing of a change to the Pastoralist's notice details.

Operators Responsible Person
Grant Higgs, Landholder Relations Advisor PO Box 1135, Chinchilla
QLD 4413
Mobile: [REDACTED]
Email: [REDACTED]

As amended from time to time by the Pastoralist advising the
Operator in writing of a change to the Pastoralist's Responsible
Person details.
- ITEM 4
Notices: **Pastoralist**
Rod Dunbar
Phone: [REDACTED]
Mobile: TBA
Email: [REDACTED]

As amended from time to time by the Pastoralist advising the
Operator in writing of a change to the Pastoralist's notice details.

Operator
Level 3, 135 Coronation Drive
Milton, Qld 4064
Attention: Glen Fields, Manager Landholder Relations
Phone: [REDACTED]
Mobile: [REDACTED]
Email: landaccessexecution@originenergy.com.au

As amended from time to time by the Operator advising the
Pastoralist in writing of a change to Operator's notice details.

ITEM 4
Pastoralist Details:

Name	Owner and/or Occupier (for the purposes of the Petroleum Legislation)	Capacity	ABN
Lexcray Pty Ltd	Owner and Occupier	Company	ABN 48 010 613 751

**Schedule 1
Compensation**

1. The Operator will pay the Pastoralist Compensation as follows:
 - (a) an upfront payment of \$12,500 within 30 Business Days of the Agreement Date;
 - (b) \$3,500 per annum for the second year and each subsequent year of this Agreement, in advance on or before each anniversary of the Agreement Date for the remainder of the term of this Agreement (prorated for any partial years of the Term);
 - (c) \$5,000 within 30 Business Days of the Agreement Date for personal inconvenience incurred in negotiating this Agreement (on phone or in person), driving the Operator's Personnel around the Pastoral Property, considering the Operator's work programs and variations to them (or this Agreement), visiting with the Operator, the Operator's sites and considering and providing consent in accordance with this Agreement; and
 - (d) up to \$5,000 for legal and accounting costs reasonably and necessarily incurred by the Pastoralist in respect of the negotiation of this Agreement. Payment will be made within 30 Business Days of receipt of an Itemised Bill invoiced to the Pastoralist or the Agreement Date, whichever is the later.

2. All annual payments that fall due on or after the second anniversary of the Agreement Date must be varied by the CPI calculated in accordance with the following formula:

$P_n = P_o \times \left(1 + \frac{CPI_n - CPI_o}{CPI_o} \right)$	
Where:	
P _n =	the compensation for the year for which the compensation is being determined
P _o =	the previous annual compensation payment (or appropriate apportionment of the last payment prorated as described above in paragraph 1(b) above).
CPI _n =	the CPI most recently published by the Australian Bureau of Statistics
CPI _o =	the CPI for the same quarter of the previous year as published by the Australian Bureau of Statistics

Schedule 2 Activities, Timetable and Map

Item 1: Activities

- All activities and works carried out on the Pastoral Property by, or on behalf of, the Operator that are reasonably associated with the construction and operation of one (1) exploration well and one (1) water bore on the Pastoral Property, including, but not limited to the following:

Activity	Construction, testing and drilling phase	Interim rehabilitation phase	Maintenance and monitoring phase	Decommissioning and rehabilitation phase
Gates, grids, fences and access points	<p>The establishment of access points to the Pastoral Property, including turn in areas.</p> <p>The installation and use of new gates, grids and fences to allow entry by trucks, drill rigs and other vehicles.</p> <p>The modification as necessary and use of existing gates, grids and fences to allow entry by trucks, drill rigs and other vehicles.</p>	Ongoing access to, use of, and maintenance of, the gates, grids or fences.	Ongoing access to, use of, and maintenance of, the gates, grids or fences.	Removal and rehabilitation of the gates, grids and fences in accordance with this Agreement and relevant laws.
Existing access road/s or track/s	The use of, maintenance and modification of existing access roads or tracks on the Pastoral Property.	Ongoing access to, use of, maintenance and modification of the existing access roads or tracks.	Ongoing access to, use of, maintenance and modification of the existing access roads or tracks on the Pastoral Property.	Rehabilitation in accordance with this Agreement and relevant laws.
New access track/s	The construction of, use of and maintenance and modification of a new access track from the existing access roads or tracks to the well site	Ongoing access to, use of and maintenance and modification of a new access track from the existing access roads or tracks to the well site	Ongoing access to, use of and maintenance and modification of a new access track from the existing access roads or tracks to the well site	Rehabilitation in accordance with this Agreement and relevant laws
Well	The construction of 1 well site, within a fenced area measuring approximately 2	Within a reasonable period of time after the completion of the well, any agreed initial rehabilitation	Ongoing access to the well site. Ongoing testing,	The plugging and abandonment of the well upon cessation of petroleum

Activity	Construction, testing and drilling phase	Interim rehabilitation phase	Maintenance and monitoring phase	Decommissioning and rehabilitation phase
	<p>hectares.</p> <p>The mobilisation and set up and later demobilisation of the drilling rig equipment, casing and drilling consumables.</p> <p>The drilling of the well to a target depth of between 1200m and 3000m sub-surface.</p> <p>The testing, operation and maintenance of the well and the testing, operation and maintenance of infrastructure within the well site.</p> <p>The Well Intervention of the well if required for the Operators work program.</p> <p>The re-entry of the well to undertake additional works if required for the Operators work program.</p> <p>The suspension of the well if required by the Operators work program.</p> <p>Any other necessary petroleum engineering operation carried out within the confines of the fenced well site, including the installation of caravans, dongers, pits, flare pits, sumps and stockpiles of topsoil.</p>	<p>of the drilling site area.</p>	<p>monitoring, and maintenance of the well and initial rehabilitation area.</p> <p>Any other necessary petroleum engineering operation carried out within the confines of the fenced well site.</p>	<p>activities.</p> <p>The subsequent rehabilitation of the well site areas upon cessation of petroleum activities.</p>

Activity	Construction, testing and drilling phase	Interim rehabilitation phase	Maintenance and monitoring phase	Decommissioning and rehabilitation phase
Laydown area	The construction and use of 1 laydown area measuring approximately 0.5 ha in size per area.	Within a reasonable period of time following the end of the construction and drilling activities, the laydown area will be rehabilitated if it is no longer required for future activities.	Not applicable. Access for rehabilitation only.	Rehabilitation may be required when decommissioning unless the laydown area is rehabilitated within a reasonable period of time following the end of the construction and drilling activities.
Water bore	The construction of one (1) water bore site with a disturbance area of up to 1 hectare. The drilling of the bore. The testing, operation and maintenance of the bore. The construction of water tanks located next to the water bore to store water for the construction, drilling, testing and well re-entry and stimulation activities.	Ongoing access to the water bore. Ongoing testing, monitoring, and maintenance of the bore.	Ongoing access to the water bore. Ongoing testing, monitoring, and maintenance of the bore.	The decommissioning of the bore upon cessation of petroleum activities (unless otherwise agreed with the Pastoralist). The subsequent rehabilitation of the bore site area upon cessation of petroleum activities.
Camp site	The construction and use of a camp site measuring approximately 80m x 80m. The camp will house up to a maximum of 40 people at any time.	Within a reasonable period of time following the end of the construction, drilling, testing and well re-entry and stimulation activities, the initial rehabilitation of the camp site will be commenced.	Ongoing access and use of the camp site.	Ongoing access and use of the camp site. Rehabilitation in accordance with this Agreement and relevant laws
Preliminary and Incidental Activities	Scouting, surveys, and soil and water sampling activities. All activities required to comply with the terms of this Agreement. All activities reasonably necessary for or incidental to, those referred to above.			

2. At the completion of the drilling of the exploration well, the Operator may decide to either:
 - (a) plug and abandon the well and rehabilitate the well site, access road and any other associated disturbance if the well is no longer required for technical purposes. or
 - (b) suspend the well for future monitoring, testing, Well Intervention or re-entry for other purposes with the well to be plugged and abandoned and the well site, access road and associated disturbances rehabilitated when it is no longer required for technical purposes.
3. All work phases to be completed within the Term of the Agreement.
4. All Activities are subject to the approval of the Regulator.

Item 2: Location of Activities and Map

1. The Pastoralist acknowledges that:
 - a. as at the Agreement Date, the proposed locations of the Activities are shown on the map(s) behind Schedule 3 and may be located anywhere within the area defined as the 'Activities Area' or are otherwise described in Schedule 2 of this Agreement;
 - b. as at the Agreement Date, the Scouting Activities and the detailed analysis of the results from the Scouting Activities have not been finalised for the Land; and
 - c. the Activities and/or the precise location of the Activities is subject to change after the Agreement Date in light of further detailed design arising out of the Scouting Activities.
2. Following the Scouting Activities, changes may be made to the Activities and the location of the Activities by Origin, including under clauses 33 and 33 of this Agreement.
3. The Landowner acknowledges that Origin may have limited flexibility with respect to any changes to the Activities or to the location of the Activities having regard to matters such as environmental, cultural heritage, topographic, constructability and practical use constraints.

Item 3: Timetable

The approximate timing of the commencement of activities on the Land is Quarter 2 of 2016. The Operator will provide the Pastoralist with written notice prior to the commencement of activities in accordance with clause 10.

Following the construction phase, the Operator and its Associates will require ongoing access to the Pastoral Property for the remainder of the Term to carry out the Activities described in item 1 of this Schedule which are necessary for the ongoing operation.

The Pastoralist acknowledges that the above timing is an estimate only and is subject to change. Further, the Pastoralist acknowledges that the above estimate is subject to weather events, ground conditions, scheduling requirements and events or circumstances that cause or result in delay such as strikes, non-availability or breakdown of essential equipment, supplies or services. The Operator will consult with the Pastoralist regarding any unforeseen timing changes.

Item 4: Hours of Operation

During the construction, testing and drilling phase for the Activities:-

- (1) Operator will perform construction activities (such as preparation of well site areas, access track construction and camp) on a daily basis during daylight hours; and
- (2) drilling activities will take place on a daily basis, 24 hours a day.

During the maintenance phase for the Activities maintenance will generally take place on a monthly basis.

The Pastoralist acknowledges that the frequency and duration described above is an estimate only and is subject to change. Further, the Pastoralist acknowledges that the above estimate is subject to weather events, technological advances, well operation and well performance.

Schedule 3
Map

Schedule 4 Service of s81 of the NT Petroleum Act

81 Compensation to owners

- (1) The holder of a petroleum interest must pay to:
- (aa) the owner of land comprised in the petroleum interest; and
 - (ab) any occupier of land comprised in the petroleum interest who has a registered interest in the land, in respect of the owner's and occupier's respective interests in the land, compensation for:
 - (a) deprivation of use or enjoyment of the land, including improvements on the land; and
 - (b) damage, caused by the permittee or licensee, to the land or improvements on the land.
- (2) A permittee shall not commence his exploration operations unless he has given notice to:
- (a) the owner of land comprised in the exploration permit and any occupier of the land who has a registered interest in that land of the proposed date of commencement, nature and duration of the permittee's exploration operations and served those persons with a copy of this section; and
 - (b) the Minister that he has complied with paragraph (a).
- Maximum penalty: If the offender is a natural person – 400 penalty units or imprisonment for two years.
- If the offender is a body corporate – 2 000 penalty units.
- (3) Where a permittee or licensee and a person entitled under subsection (1) to compensation are unable to agree upon an amount or other benefit, by way of compensation, to which the person is entitled, either party may refer the dispute to the Tribunal.
- (6) No person is entitled under this section to compensation based on the known or potential occurrence of petroleum in or on the land.
- (7) An Agreement in relation to compensation may include compensation for work undertaken under an exploration permit, retention licence or production licence or under all exploration permits and licences held by the permittee or licensee in relation to that land.
- (8) In this section and section 82, registered interest, in relation to land, means an interest registered on the Register kept by the Registrar-General under Part 3 of the Land Title Act.

Schedule 5 Deed of Assumption

#[Insert description of interest being assigned]#

THIS DEED is made the #[Insert]# day of #[Insert]# 20#[Insert]#

BETWEEN:

#[INSERT]# of #[Insert address]# (Assignor)

AND

#[INSERT]# of #[Insert address]# (Assignee)

AND

#[INSERT]# of #[Insert address]# (Continuing Party)

WHEREAS:

- A. The Assignor and the Continuing Party entered into a land access and compensation Agreement with respect to #[insert interest]# dated #[Insert]# (Agreement).
B. The Assignor wishes to assign the Assignor's interest in the #[insert description of either pastoral property or petroleum tenements]# to the Assignee in accordance with the Assignment Document, and the Assignee wishes to accept that assignment and, for that purpose, the Assignor and the Assignee have executed the Assignment Document.
C. The parties have entered into this Deed to document their respective ongoing interests in relation to the Agreement.

NOW THIS DEED WITNESSES the following:

1. Assumption of Duties and Liabilities

The Assignee covenants and agrees with the Assignor and the Continuing Party upon the execution of this Deed to observe, perform, comply with and be bound by the terms and conditions of the Agreement to the extent that the said terms and conditions apply to the Assigned Interest as if it had been expressly named as a party to the Agreement in the place of the Assignor and assumes all the obligations of the Assignor hereunder.

2. Rights of the Assignee

The Assignee, upon the execution of this Deed, shall be entitled to exercise in respect of the Assigned Interest all the rights, powers and privileges (if any) which would otherwise have been the rights, powers and privileges of the Assignor pursuant to the Agreement.

3. Release

The Continuing Party, as a party to the Agreement, releases and discharges the Assignor from all claims, demands and liabilities whatsoever in respect of any and all of its obligations

relating to the Assigned Interest under or in any way arising out of the Agreement after the Effective Date

4. Further Assurances

Each of the Parties covenants to execute and deliver all such assurances, deeds, instruments, notices and directions, to register and file all notices and documents and to do all such other acts and things as may be necessary to perform all their respective obligations under this Deed.

5. Governing Law

Each Party hereby submits to the jurisdiction of the appropriate courts of the Northern Territory and the Commonwealth and any courts competent to hear appeals therefrom.

6. Definitions

In this Deed:

to assign and **assignment** have the meanings *#[given in the Agreement]#*.

Assigned Interest means so much of the interest in the *#[insert description of either pastoral property or petroleum tenements]#* of the Assignor as is being assigned to the Assignee pursuant to the Assignment Document.

Assignment Document means the *#[insert description]#* dated *#[Insert]#*.

Effective Date means the date that the assignment referred to in Recital B takes effect unconditionally.

Party means a party to this Deed.

IN WITNESS WHEREOF the Parties have set their hands and seals.

Schedule 6 Interpretation and Definitions

1. Interpretation

- a. This Agreement comprises the operative provisions of, and schedules to, this document.
- b. If there is any inconsistency between the operative provisions and the schedules to this Agreement, the operative provisions will prevail to the extent of the inconsistency.
- c. A reference to a party includes that party's executors, administrators, liquidators, successors and permitted assigns.
- d. A party to this Agreement that is a trustee will be bound both personally and in its capacity as trustee.

2. Definitions

Access Area means in relation to the Activities, those areas reasonably required by the Operator and its Associates to carry out the Activities in accordance with this Agreement.

Activities means:

- a. the activities described in Item 1 of Schedule 2;
- b. any other activities reasonably necessary for or incidental to the activities described in Item 1 of Schedule 2 of this Agreement;
- c. any activities reasonably necessary for or incidental to the remediation or rehabilitation of the Access Area; and
- d. Minor Changes to the Activities and any changes to the Activities as agreed by the parties.

Agreement means this access agreement and includes all schedules.

Associates:

- a. In respect of the Pastoralist includes that person's family (if the Pastoralist is a natural person), employees, agents, contractors and other invitees; and
- b. In respect of the Operator includes both APLNG's and Operator's employees, secondees, agents, contractors, financiers, Related Bodies Corporate and other invitees.

Business Days means a day other than a Saturday, Sunday or public holiday in Brisbane, Australia.

Commencement Notice means a notice given under s81(2)(a) of the Petroleum Act.

Compensation means the compensation set out in Schedule 1 which, is in full and final satisfaction of all of Origin's compensation liability to the Pastoralist for the petroleum activities.

Consequential Loss includes:

- a. loss of profit;
- b. loss of business opportunity or goodwill;
- c. special or punitive damages;
- d. claims by any third party; and
- e. any indirect or consequential liabilities,

suffered or incurred by the other party, howsoever arising in respect of any circumstances under or in relation to this Agreement or otherwise, regardless of whether a claim for the same is made under this Agreement or otherwise.

Construction Phase Activities means those activities referred to in Item 1 of Schedule 2 under the column 'Construction, testing and drilling phase.'

CPI means the Consumer Price Index (All Groups) of Darwin published each quarter by the Australian Bureau of Statistics provided always that the annual compensation amount in respect of each year of the Agreement will not, by virtue of applying the formula in paragraph 2 of Schedule 1, be less than the annual compensation amount of the immediately preceding year of this Agreement (unless the annual payment is varied following a review carried out pursuant to this Agreement). If the Consumer Price Index (All Groups) of Darwin published each quarter by the Australian Bureau of Statistics no longer exists, or the basis of calculating it changes, it means an index that the President of the Law Society Northern Territory determines to be appropriate.

Good Faith includes: not delaying in responding to questions; giving genuine consideration to the proposals of the other party; disclosing relevant information (other than confidential or commercially sensitive information) in a timely manner; refraining from capricious or unfair conduct that undermines negotiations; making reasonable offers and counter offers; refraining from acting for an improper purpose.

Infrastructure means all temporary and permanent infrastructure, equipment and machinery installed on or under, or brought onto, the Land by the Operator or its Associates.

Itemised Bill in respect of legal costs, has the meaning given in the *Legal Profession Act 2006 (NT)*; and in respect of accounting and valuation costs, means a bill stating, in detail, how the costs are made up in a way that would enable a reasonable person to determine whether or not the costs were reasonably and necessarily incurred in the negotiation of this Agreement.

Minor Change means a change to the Activities that does not create a material adverse impact on the Land or the Pastoralist's use of the Land.

Notice Details means the parties' contact details stated in Item 3 of the Reference Schedule.

OERL means Origin Energy Resources Limited ACN 007 845 338.

Pastoral Enterprise means all activities that the Pastoralist is entitled to carry out on the Pastoral Property.

Pastoral Property means the pastoral property identified in Item 1 of the Reference Schedule.

Personal Information has the meaning given in the Privacy Act.

Petroleum Act means the Petroleum Act NT (which can be viewed at: www.minerals.nt.gov.au)

Petroleum Activities means all activities of the Operator on the Pastoral Property that go toward the exploration, appraisal, development and production of petroleum including without limitation, sacred site clearances conducted by the Northern Land Council and native title holders, initial site surveys and the construction of new roads and use of existing roads as required by the Operator to access petroleum facilities (as per Section 65 of the Petroleum Act).

Petroleum Title means the petroleum title described in Item 2 of the Reference Schedule.

Privacy Act means the *Privacy Act 1988 (Cth)*.

Privacy Collection Statement means the Privacy Collection Statement for Landholders published by Operator at www.originenergy.com.au/privacy and includes any amended versions as updated from time to time.

Privacy Policy means the Privacy Policy published by Operator at www.originenergy.com.au/privacy and includes any amended versions as updated from time to time.

Regulatory Authority means any government department, agency or other governmental entity which has powers or jurisdiction under a Relevant Law.

Related Bodies Corporate has the meaning given in the *Corporations Act 2001 (Cth)*.

Relevant Laws means, where relevant to a party or the performance of by a party of its obligations under this Agreement:

- a. Acts, regulations and other statutory instruments of the Commonwealth and Northern Territory including but not limited to the Petroleum Act; and
- b. binding requirements of a Regulatory Authority including but not limited to the conditions of the Petroleum Title, environmental authorities and other approvals and permits.

Significant Change means a change to the Activities that creates or will create a material adverse impact on the Land or the Pastoralist's use of the Land.

Term means the period described in clause 6 of this Agreement.

Well means the well which forms part of the Agreed Petroleum Activities.

Well Intervention means any works and activities carried out to restore or improve the production of a well including, but not limited to, stimulation activities (e.g. hydraulic fracturing) and modification of surface and downhole equipment (including well servicing activities). Well Intervention includes surface intervention or disturbance with a drill rig, completions rig and other large equipment like wireline.

Well Pad Area means the area defined on the map in Schedule 3 as the 'Activities Area'.

Rod Dunbar

From: Rod Dunbar [REDACTED]
Sent: Sunday, 21 February 2016 10:05 PM
To: 'Higgs, Grant'
Cc: [REDACTED]

Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Tracking:	Recipient	Read
	[REDACTED]	
	[REDACTED]	
	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]
	[REDACTED]	

Dear Grant

On further review of the Agreement and s 81 and 82 of the Petroleum Act there is no definition of Compensation. I have had a bad experience with compensation in the past in particular with the NT Government, specifically where the standard of how compensation is to be calculated was not defined; I have seen a supreme court judge hear argument for four days and he adopted in his decision that just terms compensation was 25% of the market value – consequently we last between \$10 -\$20 million.

I propose we incorporate a defined standard of the value of compensation should a dispute arise regarding some unforeseen event; I propose that compensation conform with the rule of the Spencer Principal (*Spencer v Commonwealth [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907)*)

The only long term dispute that *could* arise, that I can foresee at present, is a detrimental effect on our ground water by the application of Hydraulic Fracturing by **Origin Energy Resources Limited**, an activity which forms part of this Agreement. There could also be other unforeseen disputes which could arise as we progress. I know this is Agreement is only for one well, however if your exploration is successful it could be one of many in the future, and it is imperative that we get the arrangement right in the first instance.

I suggest we insert in Schedule 1

3 In all other instances should a dispute arise where compensation requires interpretation to settle a dispute flowing from the activities carried out under the terms of this Agreement and settlement is achieved by either by negotiation, mediation or a decision of a court, the standard of compensation shall be in accordance with the principals laid down in *Spencer v Commonwealth [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907)* (The Spencer Principle).

And in Schedule 6;

Compensation;

- (a) means the compensation set out in Schedule 1 which, is in full and final satisfaction of all of Origin’s compensation liability to the Pastoralist for the petroleum activities, and;
- (b) **in the event of a dispute arising concerning matters not specifically agreed in schedule 1, and notwithstanding s 81 and s 82 of the Petroleum Act, for any settlement flowing from a dispute, the standard of compensation shall be**

interpreted only in accordance with the principals laid down in *Spencer v Commonwealth* [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907) (The Spencer Principle).

I look forward to hearing from you,

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Thursday, 18 February 2016 8:45 AM
To: 'Higgs, Grant'
Cc: [REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Dear Grant

I refer to your telephone call yesterday regarding this Contract.

There are just a couple of amendments we propose and comments, they are;

1. That a definition of "Pastoralist" be inserted in schedule 6 to say "*Pastoralist means the Registered Proprietor of NT Portion 1513; Volume 765; Folio 134 under the provisions of the Land Title Act*" or words to that effect.
2. That schedule 1 be amended in s1(d) to read;

d) ~~up to~~ \$5,000 for legal and accounting costs reasonably and necessarily incurred by the Pastoralist in respect of the negotiation of this Agreement. Payment will be made within 30 Business Days of ~~receipt of an Itemised Bill invoiced to the Pastoralist or the Agreement Date, whichever is the later.~~

3. Section 53 on page 7 – text needs clarification
4. Page 21 (8) – reference to section 82 – there is on section 82 in this contract – what does this pertain to?

I look forward to hearing from you,

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Higgs, Grant [REDACTED]
Sent: Thursday, 28 January 2016 4:26 PM
To: nutwooddowns@lexcray.com.au [REDACTED]
Cc: Hill, Adam
Subject: Origin Pastoral Land Access and Compensation Agreement

Dear Rod & Rayna,

As discussed with Adam Hill, please find attached Pastoral Land Access and Compensation Agreement in relation to Origin's proposed activities on your property for your review.

Weather permitting and subject to your availability, we would like to meet with you some time in the week commencing 8 February to discuss the activities and the agreement. In the meantime, please feel free to call myself on [REDACTED] if you have any questions.

I look forward to meeting you.

Thanks

Grant

Grant Higgs

Senior Landowner Relations Advisor

Origin

m [REDACTED]

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Rod Dunbar

From: Rod Dunbar [REDACTED]
Sent: Tuesday, 29 March 2016 8:59 AM
To: 'Higgs, Grant'
Cc: 'Hill, Adam'
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Morning Grant

Sorry for my late reply, I have had the flu and have been down since the 13th, and still not fully recovered.

Yes your visit was enlightening, we did not understand that the Origin plan, that is already being implemented by the construction of this well, consists of at least 400 wells in the first stage, and could be considerably more as the field is established. This is the first we knew of the extent of the Gas field that exists under Nutwood. Undoubtedly there will be hundreds of kilometres of pipelines and the need for a processing facility somewhere so that the refined gas can enter the existing gas pipeline system.

Those activities will impede on our operations for many years to come. Not to mention the devaluation of Nutwood itself, because the Gas field is now a known entity underlying the property, which will restrict the type and scope of purchaser that would be prepared to live with a major Gas Field – that loss has already occurred and cannot be overturned – so a loss in damage has already occurred.

With those facts in mind – is this single contract for one well really the way to manage the activities of this as a major Gas Field?

The Indemnity section you mention is separate to Compensation and excludes the compensation section – i would have thought that indemnity is also Compensation – there is no standard as to how the Indemnity is to be calculated (which is getting back to my original request) – any Indemnity claim would not be an arrangement between Lexcra and Origin should it arise ?? It would be between Lexcra and Origin's Indemnity Insurer?? ... would it not? The standard applied in monetary terms must therefore be settled in this Contract – it cannot be left to a Court to dream up some interpretation of what “just terms” is when a standard is in existence.

In addition to the Fracking that we have briefly discussed in our meeting, the other issues which are not in this contract are the disruption and interference in our cattle production/agriculture business with the construction and operations of a major gas field extraction process – they are not subject to Compensation at all – the Indemnity may apply but it is not specific and subject to third party interpretation – I see that as an unacceptable situation, one that will ultimately end in damage and loss being sustained by Lexcra and massive legal costs.

My understanding is that indemnities must be clearly and precisely worded in the contract in order to be enforceable (and that is as late as 2015). This contract is not specific in that area.

Also s40 requires Lexcra to mitigate our losses – that's a Warranty type of requirement - Warranties require the beneficiary to mitigate their losses, while indemnities do not.

In any event I do not think the Indemnity section has sufficient protection, if that's what we are to accept as our only saviour and I will have to seek proper legal advice, Accountants advice and obtain the advice of a registered Valuer in order to set out a Valuation before the rat race begins.

Thanks, I will let you know who our lawyers are once we decide who to engage.

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Higgs, Grant [REDACTED]
Sent: Monday, 21 March 2016 5:22 PM
To: Rod Dunbar
Cc: Hill, Adam
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Rod,

Thank you for your time to meet with us. I hope you found the meeting worthwhile and learned a bit more about what we are looking at doing on Nutwood.

When we met, you were going to consider if you were comfortable with leaving your proposed amendment around compensation out of the agreement because there is already an indemnity clause in it and we are limited to complete the activities listed in the schedule only unless we have an agreed variation or new agreement. Have you considered this any further?

You also mentioned that you will not be using a solicitor. Origin will meet the reasonable costs of you obtaining legal and/or accounting advice should you wish to obtain it. If you will be getting professional advice, can you advise me at your earliest convenience so that we can engage with them.

Thanks

Grant

Grant Higgs
Senior Landowner Relations Advisor
Origin
[REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Friday, 4 March 2016 09:49
To: Higgs, Grant
Cc: Hill, Adam
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Hi Grant

I don't see any reason that I might need to see your colleague re water – I have a fairly good understanding of the water aquifers here and the strata above and below, so probably no real need for him to attend.

Rod

From: Higgs, Grant [REDACTED]
Sent: Thursday, 3 March 2016 12:57 PM
To: Rod Dunbar
Cc: Hill, Adam
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Rod,

We are looking good for meeting with you next week as planned. There is a colleague from our Water team that will also be up there at the time. He was looking at returning to Brisbane on Friday but if you would like to hear from him, we can make those arrangements. Alternatively he will be back up in the next 2-3 months and could catch up then.

Thanks

Grant

Grant Higgs

Senior Landowner Relations Advisor

Origin
[REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Thursday, 25 February 2016 18:20
To: Higgs, Grant
Cc: Hill, Adam
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Yes Friday 11th is good

Rod

From: Higgs, Grant [REDACTED]
Sent: Thursday, 25 February 2016 12:34 PM
To: Rod Dunbar
Cc: [REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Rod,

I tried to organise travel up for next week but couldn't get everything lined up and given the potential of a wet cycle, have arranged to be in the area the week after. Are you available Friday 11 March to meet?

Thanks

Grant

Grant Higgs

Senior Landowner Relations Advisor

Origin

m [REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Tuesday, 23 February 2016 19:22
To: Higgs, Grant

[REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Hi Grant

Yes anytime next week will ok, I have no plans to go anywhere, just the weather – it has been dry since the 4th but we had a storm this afternoon so maybe on a wet cycle. If it rains a fair bit I'll email you.

Kind Regards
Rod

From: Higgs, Grant [REDACTED]
Sent: Tuesday, 23 February 2016 8:29 AM
To: Rod Dunbar
Cc: [REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Rod,

Thank you for your responses. I am looking into your proposed changes and will come back to you shortly.

I think it would be a good idea to meet and discuss the agreement and the works we are proposing. Do you have any time next week and is Nutwood Downs accessible at the moment?

Thanks

Grant

Grant Higgs
Senior Landowner Relations Advisor
Origin
m [REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Sunday, 21 February 2016 22:35
To: Higgs, Grant
Cc: [REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Dear Grant

On further review of the Agreement and s 81 and 82 of the Petroleum Act there is no definition of Compensation. I have had a bad experience with compensation in the past in particular with the NT Government, specifically where the standard of how compensation is to be calculated was not defined; I have seen a supreme court judge hear argument for four days and he adopted in his decision that just terms compensation was 25% of the market value – consequently we last between \$10 -\$20 million.

I propose we incorporate a defined standard of the value of compensation should a dispute arise regarding some unforeseen event; I propose that compensation conform with the rule of the Spencer Principal (*Spencer v Commonwealth [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907)*)

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And in Schedule 6;

Compensation;

- (a) means the compensation set out in Schedule 1 which, is in full and final satisfaction of all of Origin's compensation liability to the Pastoralist for the petroleum activities, and;
- (b) **in the event of a dispute arising concerning matters not specifically agreed in schedule 1, and notwithstanding s 81 and s 82 of the Petroleum Act, for any settlement flowing from a dispute, the standard of compensation shall be interpreted only in accordance with the principals laid down in *Spencer v Commonwealth [1907] HCA 82; (1907) 5 CLR 418 (29 October 1907)* (The Spencer Principle).**

I look forward to hearing from you,

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Rod Dunbar [REDACTED]
Sent: Thursday, 18 February 2016 8:45 AM
To: 'Higgs, Grant'
Cc: [REDACTED]
Subject: RE: Origin Pastoral Land Access and Compensation Agreement

Dear Grant

I refer to your telephone call yesterday regarding this Contract.

There are just a couple of amendments we propose and comments, they are;

1. That a definition of "Pastoralist" be inserted in schedule 6 to say "*Pastoralist means the Registered Proprietor of NT Portion 1513; Volume 765; Folio 134 under the provisions of the Land Title Act*" or words to that effect.
2. That schedule 1 be amended in s1(d) to read;

d) ~~up to~~ \$5,000 for legal and accounting costs reasonably and necessarily incurred by the Pastoralist in respect of the negotiation of this Agreement. Payment will be made within 30 Business Days of ~~-receipt of an Itemised Bill invoiced to the Pastoralist or the Agreement Date, whichever is the later.~~

3. Section 53 on page 7 – text needs clarification
4. Page 21 (8) – reference to section 82 – there is on section 82 in this contract – what does this pertain to?

I look forward to hearing from you,

Kind Regards

Rod Dunbar
Lexcray Pty Ltd
Nutwood Downs
Daly Waters NT 0852
[REDACTED]

From: Higgs, Grant [REDACTED]
Sent: Thursday, 28 January 2016 4:26 PM
To: nutwooddowns@origin.com.au [REDACTED]
Cc: Hill, Adam
Subject: Origin Pastoral Land Access and Compensation Agreement

Dear Rod & Rayna,

As discussed with Adam Hill, please find attached Pastoral Land Access and Compensation Agreement in relation to Origin's proposed activities on your property for your review.

Weather permitting and subject to your availability, we would like to meet with you some time in the week commencing 8 February to discuss the activities and the agreement. In the meantime, please feel free to call myself on [REDACTED] if you have any questions.

I look forward to meeting you.

Thanks

Grant

Grant Higgs
Senior Landowner Relations Advisor
Origin
m [REDACTED]

Note: This email, including any attachments, is confidential. If you have received this email in error, please advise the sender and delete it and all copies of it from your system. If you are not the intended recipient of this email, you must not use, print, distribute, copy or disclose its content to anyone

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NORTHERN TERRITORY OF AUSTRALIA

Petroleum Act

EXPLORATION PERMIT RENEWAL FOR EP98 (R1)

I, JOHN SCOTT PERKINS, the Delegate of the Minister for Mines and Energy, hereby grant to:

FALCON OIL & GAS AUSTRALIA LIMITED (ABN 53 132 857 008)
Suite 13 Level 3
3 Spring Street
SYDNEY NSW 2000

a renewal of exploration permit EP98 in respect of the blocks specified in Schedule 1, subject to the conditions set out hereunder, to have effect for a period of five (5) years commencing 1 January 2014.

INTERPRETATION

In this document, "the Act" means the Northern Territory *Petroleum Act* and includes any Act with which that Act is incorporated and words used in this document have the same respective meanings as in the Act.

The Permittee shall at all times comply with:-

- (a) the provisions of the Act; and
- (b) all directions given to him under the Act and all regulations for the time being in force under the Act.

Dated the 2nd day of May 2014


JOHN SCOTT PERKINS
Chief Executive

Delegate of Minister for Mines and Energy
Pursuant to an Instrument of Delegation dated 4 February 2014

SCHEDULE 1
DESCRIPTION OF BLOCKS

The reference hereunder is to the name of the map sheet of the 1:1 000,000 series prepared and published for the purposes of the *Petroleum Act* and to the numbers of the graticular sections shown thereon.

• **MAP SHEET SE53 (NEWCASTLE WATERS)**
Block Nos

19	20	21	22	23
24	25	26	27	28
90	91	92	93	94
95	96	97	98	99
100	101	102	103	162
163	164	165	166	167
168	169	170	171	172
173	174	175	233	234
235	236	237	238	239
240	241	242	243	244
245	246	247	305	306
307	308	309	310	311
312	313	314	315	316
318	377	378	379	380
381	382	383	384	385
386	387	388	449	450
451	452	453	454	455
456	457	458	459	460
521	522	523	524	525
526	527	528	529	530
531	532	593	594	595
596	597	598	599	600
601	602	603	604	666
667	668	669	670	671
672	673	674	675	676

Assessed to contain 125 blocks.

SCHEDULE 2

WORK PROGRAM COMMITMENTS

Year of Term of Permit	Permit Year Starts	Permit Year Ends	Minimum Work Requirements	Estimated Expenditure (indicative only)
1	01/01/2014	31/12/2014	<p>Interpretation of unrestricted seismic data. Laboratory analyses of core/cuttings/samples from historical wells and outcrop. Complete G&G evaluation on existing data.</p> <p>Development of drilling locations, permitting, tendering and contracting of rig(s) and well services.</p>	\$900 000
2	01/01/2015	31/12/2015	<p>Drill one vertical exploration well to the Lower Velkerri and acquire core over intervals of interest.</p> <p>Formation evaluation, including but not limited to; petrophysical interpretation, routine core analysis, geomechanics studies, and stimulation design.</p>	\$6 600 000
3	01/01/2016	31/12/2016	<p>Drill and hydraulic fracture stimulate a vertical exploration/test well targeting the Velkerri Formation.</p> <p>Formation evaluation, including; petrophysical interpretation, core analysis, stimulation design.</p> <p>Drill and multi-stage hydraulic fracture stimulate a horizontal exploration/test well targeting the Velkerri Formation.</p>	\$40 000 000
4	01/01/2017	31/12/2017	<p>Undertake G&G evaluation of new and existing data and update exploration models.</p> <p>Development of drilling locations, permitting, tendering and contracting of rig(s) and well services core analysis, stimulation design.</p>	\$1 800 000
5	01/01/2018	31/12/2018	<p>Drill and multi-stage hydraulic fracture stimulate two horizontal exploration/test wells targeting the Velkerri Formation.</p>	\$45 000 000

			<p>Exact well location and stimulation strategy are subject to performance of previous wells.</p> <p>Formation evaluation of acquired data, including; petrophysical interpretation, core analysis, stimulation design.</p> <p>Undertake static and dynamic reservoir modelling.</p> <p>Planning of development program.</p> <p>Preparation of application for production license(s).</p>	
--	--	--	---	--

The permittee -

- (a) shall carry out in the year of the term of the permit specified in the first column of the table, in or in relation to the permit area, to a standard acceptable to the Minister, the work specified in the minimum work requirements set out opposite that year in the fourth column of the table;
- (b) may carry out in a year of the term of the permit specified in the first column of the table, in or in relation to the permit area, to a standard acceptable to the Minister, all or part of the work specified in the minimum work requirements of a subsequent year or years of that term set out opposite that year or those years in the fourth column of the table; and
- (c) may carry out in or in relation to the permit area, to a standard acceptable to the Minister, work in addition to the work specified in the minimum work requirements set out in the fourth column of the table.

Any work carried out in accordance with above paragraphs (a) (b) and (c) shall, if the Minister in his discretion by notice in writing so approves, be treated as if it had been carried out in the subsequent year or years of the term of the permit specified by the Minister in that notice.

The permittee shall not commence a seismic survey or drilling of a well unless he has by notice informed the Minister of the relevant details (including the geographic position of the well or area of the seismic survey) and obtained the necessary approval from the Minister.

SCHEDULE 3

CONDITIONS

General Principals

1. The permittee shall comply with the provisions of, and directions lawfully given under the *Petroleum Act* (NT) as in force at 01 January 2014 and all other laws in force in the Territory, as are applicable in relation to its activities on the permit area.
2. Subject to the provisions of the *Petroleum Act*, the permittee shall in the course of their operations remain subject to the provisions of other relevant legislation. The permittee shall ensure that all exploration personnel and their contractors and agents are familiar with such legislative requirements.
3. Within twenty-eight (28) days after the expiration of each 12 month period of this permit or other longer approved period, the permittee shall lodge in writing a comprehensive report on the exploration and other activities within the permit area during that period.
4. The grant of this permit is subject to compliance with the *Schedule of Onshore Petroleum Exploration and Production Requirement 2012* which can be viewed on the Department of Resources website:
http://www.nt.gov.au/d/Minerals_Energy
5. The permittee shall indemnify and hold indemnified at all times the Territory and its servants and agents from claims, actions suits and demands whether debt, damages, costs or otherwise arising out of a breach of the duties and obligations, whether express or implied, of the permittee at common law, or of the Claim or of any law in force in the Territory that is applicable and whether such breach shall be that of the permittee or any of its subcontractors, servants, employees or agents.
6. Exploration shall not take place within one hundred and twenty-five (125) metres of the centreline of any road or railway, unless specific approval is given by the Director of Energy.
7. The permittee shall not significantly disturb any area or carry out blasting activity within 200 metres of a gas or oil pipeline unless prior written approval has been obtained from the Minister responsible for the *Energy Pipelines Act* or the pipeline operator.
8. The permittee shall carry out its activities in such a way as to minimise disturbance to the environment of the permit area, in particular, by minimising:
 - (a) interference with the use of the land by other persons;
 - (b) the disturbance of flora, fauna and other natural resources;
 - (c) pollution, including soil, water and atmospheric pollution;
 - (d) the incidence and effects of soil erosion.

9. To the extent possible the permittee should employ persons and contractors resident in or around the permit area and give them the opportunity of quoting or tendering for contract works.
10. The Minister may at any time determine that the Minister requires a security in the form and for the amount that the Minister thinks fit for the purpose of securing the permittee's compliance with the *Petroleum Act*, to secure the permittee's compliance with these permit conditions and/or for securing the payment by the permittee compensation that may be payable for the effect of the grant, renewal or variation of the permit on native title rights and interests. In the event that the Minister makes such a determination, the permittee shall, within 30 days of the date that the permittee is notified in writing that the security is required; lodge with the Minister a security in the amount and form determined by the Minister.

Consultations with Native Title Parties

11. (a) The permittee shall, prior to the commencement of exploration activities other than reconnaissance, convene a meeting on the permit area (or the nearest convenient locality) with registered native title claimants or holders to explain the exploration activities. The permittee may also invite the relevant pastoral lessee(s) or landholders to this meeting.

This provision does not apply where the Holder is required to consult with registered native title claimants or holders because of the existence of a separate agreement.
- (b) Notice of the meeting shall be by letter and shall be posted to the registered native title claimants or holders and the representative body not less than 17 days before the meeting and shall nominate the date, time and place of the meeting.
- (c) The permittee must have regard to representations made to it at the meeting regarding any aspect of the exploration activities which raises concerns. These representations may deal with access procedures to particular areas of land within the permit area.
12. The permittee shall carry out its activities in such a way as to minimise any impact to any extant native title rights and interests in the permit area, in particular by minimising:
 - a) any interference directly with the carrying on of community or social activities of registered native title claimants or holders; or
 - b) any interference with the areas of sites of particular significance, in accordance with the traditions of registered native title claimants or holders.
13. Compensation for the effect if any of a prescribed petroleum act or petroleum interest on native title is payable to the native title holder by the holder of the petroleum interest and includes compensation for the effect if any on native title of activities done under the prescribed petroleum act or petroleum interest. In the event that the Territory pays any compensation for the effect on native title of the grant of the prescribed petroleum act or petroleum interest, the permittee

shall, upon request of the Territory, reimburse the Territory with thirty (30) days of the date of such request.

14. If and when the permittee applies to the Minister for a retention licence or production licence, any registered native title claimants or holders are to be informed of this fact in writing so as to signal that another future act process may follow which allows them to exercise procedural rights.

Complaint Mechanism

15. Should any native title claimant or holder lodge a written complaint with the Minister that exploration activities are being conducted in a manner that adversely affects native title rights and interests in the permit area, the Minister may do one or more of the following:

- (a) seek an explanation in writing about the matter from the permittee;
- (b) request the permittee attend a meeting with the Minister to discuss the matter;
- (c) request the permittee attend a conference with the Minister and the complainant with a view to resolving the matter;

and, having done one or more of the foregoing, may do one or more of the following:

- (d) direct the permittee to carry out rectification work;
- (e) carry out rectification work at cost to the permittee;
- (f) subject to the *Petroleum Act*, take any other action, including the cancellation of the permit, as the Minister considers appropriate.

Site Protection

16. All exploration personnel and their contractors and agents shall be instructed on the legal necessity to protect sacred sites and other significant archaeological sites and structures which may exist within the permit area.
17. Prior to carrying out any work in the permit area the permittee must consult with the Aboriginal Areas Protection Authority and inspect the Register of Sacred Sites. A permittee wishing to carry out work may apply for an Authority Certificate.

Minimising of Environmental Impact

18. The permittee shall not bring firearms or traps onto the permit area and shall not take or kill any wildlife.
19. All structures, facilities, survey markings or other related infrastructure shall be of a temporary nature and shall be removed from the area at the completion of the exploration programme unless approved otherwise in writing by the Minister.
20. The permittee shall not use fire, unless in accordance with the *Bushfires Act*.

21. The permittee shall not construct new vehicle tracks unless unavoidable. New tracks should be constructed at the minimum width possible to conduct the exploration programme, avoid long straight stretches, and be constructed with sufficient furrows to provide appropriate drainage.
22. The permittee shall keep clearing and/or disturbance of vegetation to a minimum; with particular care taken in regard to preserving mature trees and vegetation along watercourses.
23. The permittee shall take such steps as are reasonably practical to prevent the spread of noxious weeds, including the washing down of vehicles and removal of grass seeds before moving vehicles and equipment to a new area.
24. No sites or structures that may have historic significance shall be disturbed or interfered with in any way unless prior written approval has been given by the Minister.
25. The permittee shall take such steps as are practical to minimise disturbance to the soil, rocks, rock formations, creeks and watercourses.
26. The permittee shall take all precautions necessary to prevent contamination of underground and surface waters in the permit area.
27. Where artesian groundwater is encountered during drilling, the permittee shall advise the Minister of its occurrence and protect the water from wastage, pollution, deterioration or undue depletion.

Environmental Rehabilitation

28. Following any soil disturbance, the permittee shall replace topsoil as near as possible to its original profile and contour.
29. The permittee shall remove all rubbish and waste from the permit area and shall comply with directions of the Minister regarding disposal.
30. To the extent possible the permittee should choose drillhole and excavation sites to minimise environmental impact and after completion of drill holes, the collar should be sealed off and casing plugged.

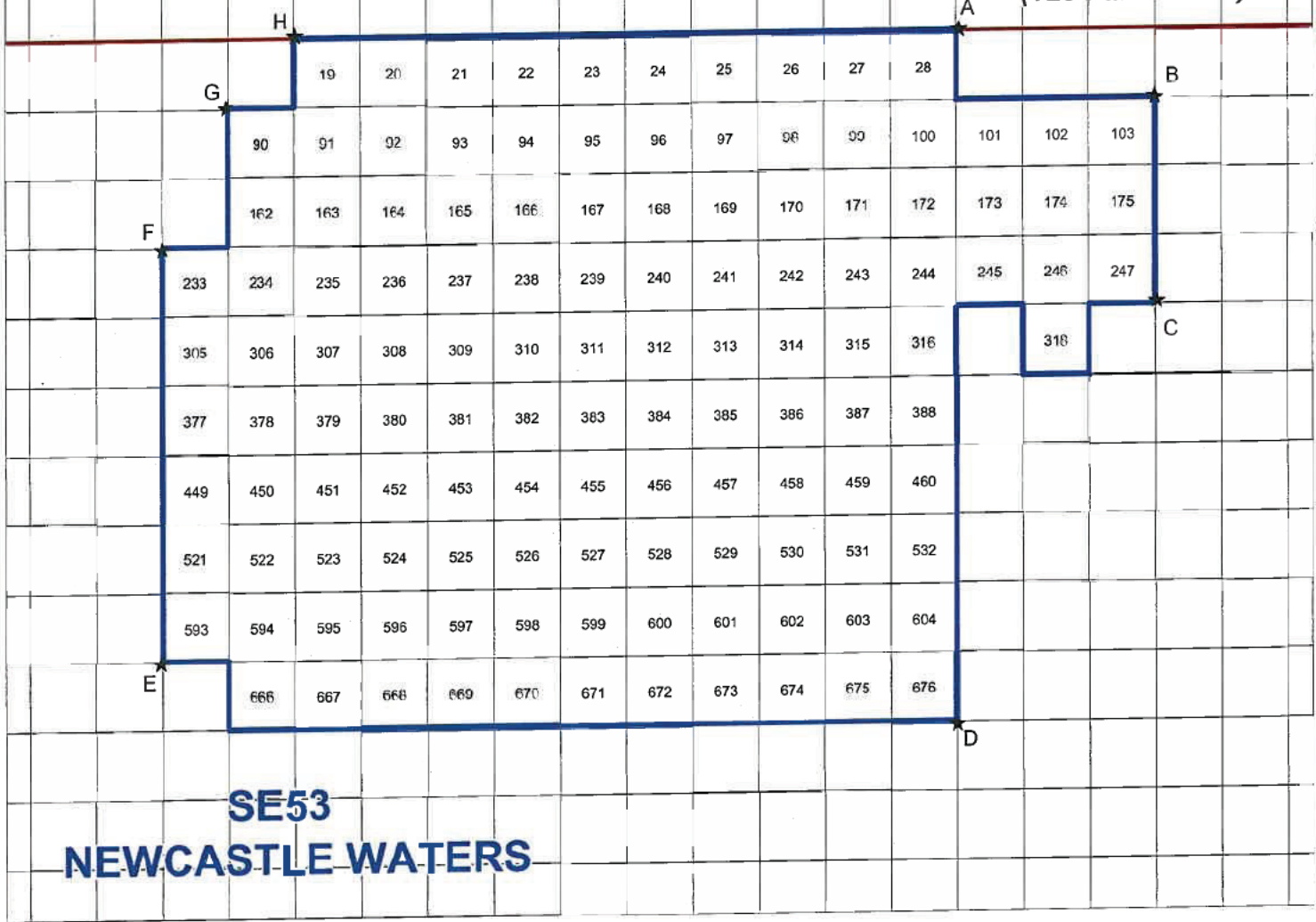
Definitions

"Permittee" means the grantee of the exploration permit and includes its workers, employees, contractors and agents.

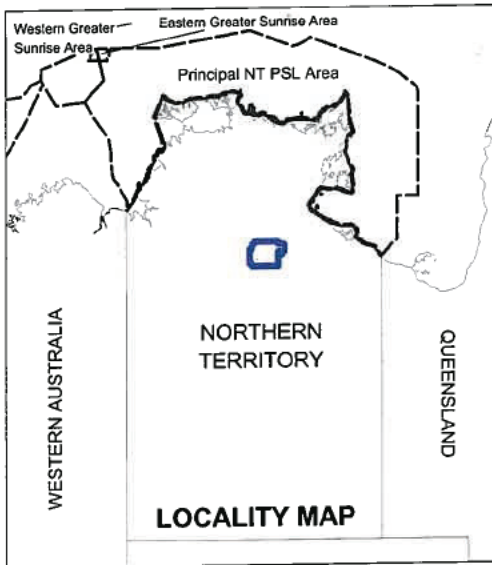
"Minister" means the responsible Northern Territory Minister or delegate appointed under s7 *Petroleum Act*.

**SD53
ROPER RIVER**

**EP98
(125 Full Blocks)**



**SE53
NEWCASTLE WATERS**



COORDINATES

- A 15° 59' 54.71" 134° 20' 04.33"
- B 16° 04' 54.70" 134° 35' 04.32"
- C 16° 19' 54.70" 134° 35' 04.33"
- D 16° 49' 54.70" 134° 20' 04.35"
- E 16° 44' 54.72" 133° 20' 04.37"
- F 16° 14' 54.73" 133° 20' 04.36"
- G 16° 04' 54.72" 133° 25' 04.36"
- H 15° 59' 54.72" 133° 30' 04.35"

PETROLEUM ONSHORE EXPLORATION PERMIT - EP98

Plan produced by Energy Division - Department of Mines and Energy - 31 March 2014.

The displayed grid defining the 5' x 5' blocks is AGD66 and coordinates shown are GDA94.
(Note: Coordinates provided are for those that intersect 'part blocks' only and encompass all full blocks as illustrated.)



Northern Territory of Australia

Petroleum Act

DIRECTIONS

I, JOHN SCOTT PERKINS, as the Delegate of the Minister for Mines and Energy, in pursuance of section 71 of the *Petroleum Act*, direct:

FALCON OIL & GAS LIMITED ('Permittee')
ABN 53 132 857 008
3 Spring Street
SYDNEY NSW 2000

the permittee of **PETROLEUM EXPLORATION PERMIT 98**, in relation to the operations in, or in relation to, the permit areas, to:

1. comply with the requirements contained in the document entitled "*Schedule of Onshore Petroleum Exploration and Production Requirements*", and
2. comply with any law of the Commonwealth, Northern Territory or both.

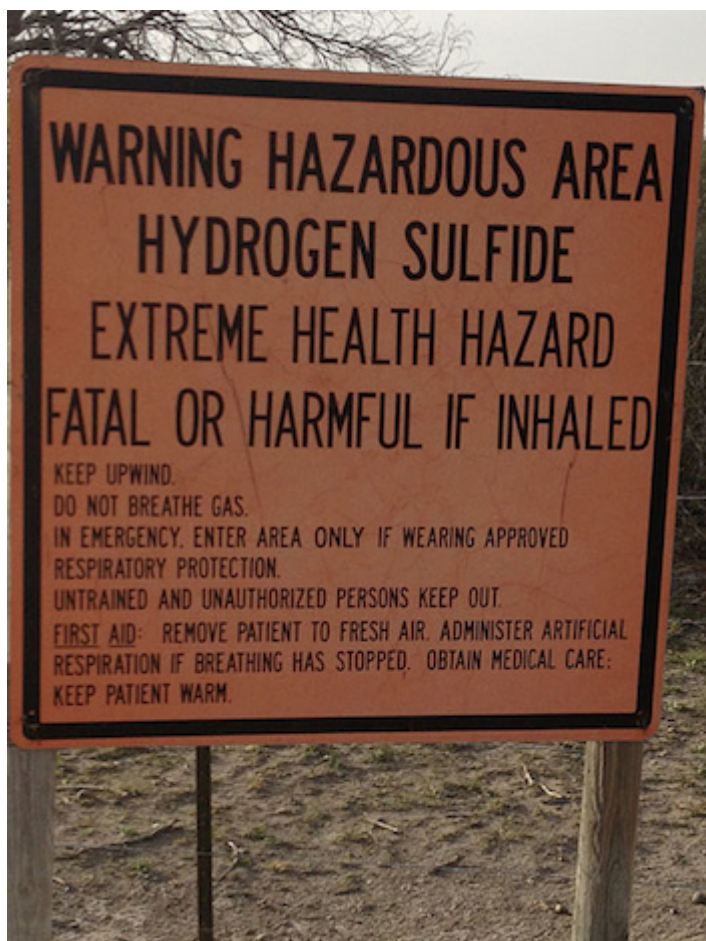
Dated this 2nd day of May 2014

Made under the *Petroleum Act* of the Northern Territory of Australia



JOHN SCOTT PERKINS
Chief Executive

Delegate of the Minister for Mines and Energy
Pursuant to the instrument of delegation dated 4 February 2014



Hydrogen Sulfide gas warning sign in Texas' Eagle Ford Shale.

Hydrogen sulfide gas is found in petroleum and natural gas. Oil or natural gas is considered sour if it has a high percentage of hydrogen sulfide. Natural gas can contain up to 28 percent hydrogen sulfide gas, consequently, it may be an air pollutant near petroleum refineries and in oil and gas extraction areas. The principal source of anthropogenic hydrogen sulfide is as a by-product in the purification of natural gas and refinement of crude oil. Atmospheric releases of hydrogen sulfide represent the most significant public health concern for the geothermal energy industry.

Properties

Hydrogen sulfide gas is a naturally occurring chemical. The gas has a characteristic rotten egg odor at low concentrations. About half of the population can smell it at concentrations as low as 8 parts per billion (ppb) in air, and more than 90% can smell it at levels of 50 ppb. At higher concentrations, hydrogen sulfide rapidly deadens the sense of smell. For most people, this occurs at approximately 150 ppm.

Hydrogen sulfide is heavier than air, and it often settles in low-lying areas where it can accumulate in concentrations that can injure or kill livestock, wildlife, and human beings. Additionally, hydrogen sulfide has been found to migrate into surface soils and groundwater.

Sour Gas

As mentioned above, oil or natural gas is considered sour if it has a high percentage of hydrogen sulfide. It has been estimated that [15 to 25% of natural gas in the U.S. may contain hydrogen sulfide](#). Worldwide, the percentage could be as high as 30%. It has been reported, as well, that new drilling is increasingly being focused on deep gas formations that [tend to be sour](#). Although the exact number of sour wells are not available, the [EPA has reported](#) that in the U.S. "the potential for routine H₂S emissions [at oil and gas wells] is significant."

Releases of hydrogen sulfide from sour gas wells or facilities may occur in a number of ways. [U.S. EPA has collected documentation](#) of sour gas well blowouts, line releases, extinguished flares, collection of sour gas in low-lying areas, and leakage from idle or abandoned wells that have impacted the public near oil and gas extraction sites. Other possible sources of hydrogen sulfide emissions at sour oil and gas operations are gas venting, and fugitive emissions (leaks) from well head equipment and compressors.

Environmental Concentrations of H₂S

Typically, areas that are not exposed to industrial releases of hydrogen sulfide have airborne concentrations of less than 1 part per billion (ppb) hydrogen sulfide. Some non-industrial areas, however, do have higher ambient levels than 1 ppb, because hydrogen sulfide is a natural byproduct of decomposing organic matter that contains sulfur.

In areas with industrial sources of hydrogen sulfide, average concentrations of hydrogen sulfide in nearby neighborhoods may be present in the low parts per billion range, although maximum concentrations can be in the 100s of parts per billion range or higher (e.g., if there has been a large, industrial release). Also, spills, leaks, malfunctions or build-up of hydrogen sulfide in enclosed or low-lying areas can result in much higher, and sometimes lethal levels.

Examples of concentrations of hydrogen sulfide in communities with industrial activities:

- South Karelia, Finland: An air pollution study in the neighborhood of a pulp mill reported an average level of 3 ppb hydrogen sulfide, with a maximum 4-hour measurement of 40 ppb.
- In a neighborhood study near an oil refinery, peak measurements of 10 and 100 ppb were reported.
- Odessa, Texas: Residents living close to an industrial wastewater facility were exposed to levels ranging from 7-500 ppb. H₂S air monitoring in oil and gas communities

When oil and gas wells and facilities are situated near residential areas, there is the possibility that residents will be routinely exposed to hydrogen sulfide.

State agencies from across the United States receive hydrogen sulfide related complaints from citizens. In 2006, Lana Skrtic, a Masters degree student at the University of California at Berkeley, collected information on state studies conducted in response to hydrogen sulfide complaints related to oil and gas operations in Arkansas, Louisiana, New Mexico, and North Dakota. Download the Skrtic report. The table below summarizes the hydrogen sulfide concentrations measured in the four studies.

Briefly, these studies revealed that:

- hydrogen sulfide is present at or near oil and gas facilities, including oil and gas wells, tank batteries, gas processing plants, flares, compressor stations and refineries.
- levels of hydrogen sulfide ranged from the relatively low concentration of 2 ppb (recorded in Louisiana) to concentrations in the 1,000 ppb range (observed in New Mexico). Even the lowest average hydrogen sulfide concentration at these sites was higher than normal urban background levels, which are typically less than 1 ppb.
- As reported by Skrtic, ["The levels measured in this study may be expected to produce a persistent odor, which has been shown in one study to have a negative effect on the mood of nearby residents."](#)

In August, 2005, Wilma Subra and the Oil and Gas Accountability Project spent five days in Monroe, Conecuh and Escambia counties in Alabama. The purpose of the visit was to measure concentrations of hydrogen sulfide and volatile organic compounds (VOCs) in the vicinity of known sources of air emissions, and to measure ambient concentrations of hydrogen sulfide and VOCs in residential neighborhoods. The goal of the project was not to identify facilities that have been breaking air quality laws, but rather, to determine if there is a potential air pollution problem that needs to be investigated and addressed in order to protect the health of the citizens in these Alabama counties.

As reported in the OGAP report, [Air Sampling Conducted in Monroe, Conecuh and Escambia Counties, Alabama](#), hydrogen sulfide levels sampled in residential areas were measured at concentrations in the 100s and 1,000s of parts per billion. This is significantly elevated compared to normal urban background levelsof

less than 1 ppb, but comparable to other oil and gas regions in the U.S., where levels of hydrogen sulfide have been measured in the 100-15,000 ppb range in the vicinity of wells and facilities.

Based on the findings for both hydrogen sulfide and VOCs (which were in the parts per million range), it was recommended to the Alabama Department of Environmental Management that follow-up air monitoring occur both in residential and oil and gas production areas. The monitoring would help to hone-in on operations that may be emitting large quantities of hydrogen sulfide and VOCs, and evaluate whether the concentrations in residential neighborhoods are posing a threat to human health and the environment.

Health Effects from H₂S Exposure

Common symptoms of exposure to long-term, low levels of hydrogen sulfide include headache, skin complications, respiratory and mucous membrane irritation, respiratory soft tissue damage and degeneration, confusion, impairment of verbal recall, memory loss, and prolonged reaction time. Exposure to high concentrations can cause unconsciousness, known as "knockdown," and can be lethal.

The following information on health effects related to exposure to hydrogen sulfide was excerpted from Section 3.1.3 of the OGAP Report Air Sampling Conducted in Monroe, Conecuh and Escambia Counties, Alabama. Please download the report to find the references for the information below.

Exposure to hydrogen sulfide is one of the leading causes of sudden death in the workplace. At concentrations greater than 500 parts per million, inhalation of hydrogen sulfide can lead to immediate collapse and unconsciousness. A single breath at 1,000 ppm results in immediate loss of consciousness, cardiac arrest and death unless the unconscious victim is successfully revived. Unconsciousness and death have occurred in situations of prolonged exposure to hydrogen sulfide at concentrations of 50 ppm. Many occupational and community studies have documented the adverse health effects of exposure to relatively high levels of H₂S.

Almost all organ systems are affected by hydrogen sulfide, but the most susceptible are those with exposed mucous membranes (e.g., eyes, nose and throat) and those with high oxygen demands (e.g., lungs, brain). Neurotoxicity of the central nervous system (causing nausea, dizziness, confusion, headaches and sleeping problems) and pulmonary edema (build-up of fluid in the lungs) are other well-documented effects of hydrogen sulfide poisoning. Cardiovascular and gastrointestinal toxicity are also associated with H₂S exposure.

Research conducted by Kaye Kilburn, a medical doctor and professor of medicine at the University of Southern California, suggests that exposure to hydrogen sulfide may cause long-term, irreversible human health effects. Kilburn performed physiologic and psychological measurements on nineteen exposed individuals, and compared results with 202 unexposed subjects. Of the 19 exposed subjects, 10 were exposed at work sites, which included four oil and gas operations, and nine were exposed in their residences, which were near various sources of hydrogen sulfide. The concentrations to which the subjects were exposed are not known. Kilburn found that depression, anger, fatigue, tension, confusion and respiratory ailments were significantly higher in exposed subjects than the control group.

Increasingly, scientific research is revealing that even low concentrations of hydrogen sulfide (in the low parts per million or even the parts per billion range) can affect human health, especially when exposure occurs over an extended period of time. Some findings include:

- A study of hydrogen sulfide in the workplace found that workers complained of eye pain at a level of 6.4 ppm.
- Clinical studies suggest that short-term exposure to hydrogen sulfide at concentrations of 2 ppm may induce bronchial obstruction. In a study investigating the effects of hydrogen sulfide on asthmatics, two out of ten subjects exhibited a pronounced response when exposed to 2 ppm hydrogen sulfide. Airway resistance and conductivity were affected by more than 30%, suggesting significant bronchial obstruction.
- Former workers and residents living downwind of a crude oil processing plant had neurophysiological abnormalities. Residents in this study were exposed to hydrogen sulfide at 10 ppb, although concentrations occasionally reached 100 ppb.

- Residents near pulp and paper mills in Finland have reported an excess of health symptoms compared to residents living in a community without any industrial hydrogen sulfide sources. The annual mean concentrations of hydrogen sulfide in the affected community was 8 µg/m³ (5.7 ppb). Symptoms included respiratory, eye and nasal problems). Residents in the pulp and paper community were also exposed to other sulfur compounds, but hydrogen sulfide accounted for more than two-thirds of the sulfur compounds monitored in the community.
- Symptoms of adverse health effects experienced by residents in Odessa, TX and Puna, Hawaii, two communities with industrial sources of hydrogen sulfide were compared to the same symptoms in three communities without industrial sources of hydrogen sulfide. The residents in Odessa were exposed to hydrogen sulfide concentrations of 7-27 ppb (annual average), with maximum 8-hour measurements between 335 and 503 ppb. Exposure in Puna is less clear, but some data from the 1990s indicate hourly averages in the low-ppb range, with most below 1 ppb. Between June 1996 and 1997, peak hydrogen sulfide concentrations was 301.7 ppb. In other years, releases of hydrogen sulfide between 200-500 ppb were reported. The two hydrogen sulfide-exposed communities were similar with respect to the adverse health effects (e.g., central nervous systems, ear/nose/throat, respiratory, muscle/bone, skin, immune, cardiovascular, digestive, teeth/gums, urinary, blood) reported by residents. Percentages of affected residents in the hydrogen sulfide-exposed communities were statistically different (higher) than the non-exposed communities.

H₂S Regulations

There are no international health-based standards for hydrogen sulfide. The World Health Organization (WHO) has an air quality guideline of 150 µg/m³ (10.6 ppb) hydrogen sulfide, averaged over a 24-hour period. This guideline is based on the avoidance of eye irritation. Also, WHO recommends that hydrogen sulfide concentrations not exceed 0.005 ppm (5 ppb; 7 µg/m³), over a 30-minute period, to avoid substantial complaints about odor.

Within the United States, there is no federal ambient air quality standard for hydrogen sulfide, but more than 30 states have chosen to independently regulate hydrogen sulfide levels to protect the public from adverse effects related to hydrogen sulfide exposure. Some states have standards based on short-term hydrogen sulfide levels (averaged over 15 minutes), while others use an average over a much longer period of time (extending up to one-year). The table, below, includes information for states that have ambient air quality standards (or guidelines) for hydrogen sulfide.

The most stringent one-hour standard - found in New Mexico, New York and Kentucky - is 10 parts per billion (ppb). In other words, those states believe there will be some effect on citizens exposed to hydrogen sulfide at a level of 10 ppb for at least one hour. The effects may be health-related or the odors may create a nuisance for the citizens.

At least twelve states have standards for hydrogen sulfide measured over a 24-hour period. These levels are lower than the 1-hour limits, and vary from concentrations of 0.65 ppb (Massachusetts) to 200 ppb (Oklahoma).

Tagged with: [public health](#), [oil and gas](#), [hydrogen sulfide](#), [fracking](#)

Related

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Tim Ruggiero | January 4, 2012

Rod Dunbar

From: Rod Dunbar [REDACTED]
Sent: Monday, 20 February 2017 10:36 AM
To: 'Alana Brown'; 'Jon Bourke'
Cc: [REDACTED]
Subject: RE: Farm Pack Insurance - Policy Invoice from MGA Insurance Brokers
Attachments: 20160128_FINAL VERSION_Lexcray_Nutwood_CCA_CGApproved.pdf

Tracking:	Recipient	Read
	[REDACTED]	[REDACTED]
	[REDACTED]	
	[REDACTED]	[REDACTED]
	[REDACTED]	

Dear Alana and Jon,

I acknowledge receipt of your email below for renewal of our Insurance and it is all in order.

However, I refer to section 5 of the Policy;

WARNING - CONTRACTUAL LIABILITIES

Caution should be exercised when entering into any written contractual agreements. These contractual agreements may impact on the terms and conditions of your insurance policy which may significantly prejudice your rights to indemnity under your insurance policy. In essence, Underwriter(s) will not respond to claims arising out of any liability assumed under contract whether by express warranty and/or agreement. You should not sign any contract without prior agreement with your insurer particularly contracts that could prevent other insurers from recovering the loss from a third party. If in any doubt, seek legal advice.

MGA Insurance Brokers ("MGA") and its Authorised Representatives expressly disclaim, to the extent permitted by law, any liability for any loss, damages and/or costs incurred either directly or indirectly in respect of you entering into any written contractual agreements whether in the past, now or in the future which alters and/or effects the terms and conditions of your insurance policy arranged through MGA on your behalf.

Please be advised that the Northern Territory Government has issued Exploration/Extraction Licences over the whole of Nutwood Downs to Origin Energy and Hancock Prospecting some time ago.

Origin Energy has indicated to us in 2015/2016 that they intend to commence drilling for Oil and Gas on Nutwood in 2017 and have presented us with a Contract to sign called an Access Agreement (please see attachment). We have not signed any agreement with Origin Energy.

We have obtained legal advice and that advice is that we are exposed to liability on several matters; our principal concerns are;

- The Contract is permanent and cannot be reviewed; the compensation proposed ***is the only compensation offered;***

- At sections 39,40, 41 - Origin will not disclose to Lexcray the identity of their Indemnity Insurer or agree to provide proof that Lexcray is mentioned as a party to their Indemnity Policy. (in other areas in Australia like Miles/Chinchilla QLD Origin has no indemnity insurance even though the Access agreements there have this clause inserted)
- The proposed agreement transfers liability to Lexcray for all matters including environmental damage once Origin has vacated the Mineral Lease area
- Origin have disclosed that they intend to construct 400+ Gas wells in this region – and there will be a large amount of these on Nutwood
- In the event of an environmental disaster where the land so degraded either on its surface or underground and/or where the aquifers are contaminated to the degree where ordinary agricultural economic activity is either severely diminished or where there is no possibility of agricultural economic activity on the land as it was before the environmental disaster, then Acquisition of the land by the Oil and Gas Company and/or the Government and payment of full compensation to the landowner to the standard of the Spencer Rule is applied; and the Petroleum Act must be amended to reflect that. The Territory has no such requirement the damage falls to the Landowner. Origin will not even discuss this let alone agree to having a section inserted in the agreement to reflect this.

Please take this correspondence as our formal advice to our Insurers about this matter; I state again we have not signed anything at this point.

We would like our Insurer to answer these two questions in relation to this matter please;

- In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – how would the application of the Contract effect our current Insurance? Would our Insurance premium rise and by how much?
- In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – What would be the cost to Lexcray if Lexcray were to insure against any damages arising out of the activities of Origin on Nutwood Downs discussed and covered in this correspondence.

Jon, is there anything I have missed? What is your advice.

Please advise in writing as this will be going to our Brisbane Solicitors.

Kind Regards
 Rod Dunbar
 Lexcray Pty Ltd
 Nutwood Downs
 Daly Waters NT 0852
 [REDACTED]

From: Alana Brown [REDACTED]
Sent: Thursday, 16 February 2017 1:13 PM
To: 'nutwooddowns' [REDACTED]
Subject: Farm Pack Insurance - Policy Invoice from MGA Insurance Brokers

Good afternoon,

Rod Dunbar

From: Jon Bourke [REDACTED]
Sent: Monday, 20 February 2017 12:46 PM
To: 'Rod Dunbar'; Alana Brown
Cc: [REDACTED]
Subject: RE: Farm Pack Insurance - Policy Invoice from MGA Insurance Brokers

Hi Rod,

Very Glad you have not signed anything here and we would recommend that you do not do so.

In terms of your insurance we agree with the legal feedback you have had to date in that you will be exposed to some additional liabilities under the terms of this contract.

I have made comments below to your questions:-

We would like our Insurer to answer these two questions in relation to this matter please;

- In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – how would the application of the Contract effect our current Insurance? Would our Insurance premium rise and by how much?

Under current insurance arrangements you are NOT insured for Contractual Liability.

Specifically – You are Not Insured for Liability in respect of any obligation assumed by You under any agreement except to the extent that:

- a) The liability would of been implied by law
- b) The liability arises from provision in a contract for lease of real or personal property other than a provision which obliges the insured to effect insurance or provide indemnity in respect of the subject matter of the contract
- c) The liability is assumed by You under a warranty of fitness or quality as regards the products

Additionally the policy (as does all standard Public Liability policies) does not cover any Pollution Liability, which would be a large exposure to you under this contract.

We believe the underwriters would load your Farm Insurance premium by approximately 100% on the assets insured, simply because of the increased risk of fire & explosion.

Under the terms of the contract also the Liability Limit must be increased to \$20,000,000 from the current level of \$10,000,000. In premium terms this would cost approximately \$750 more per year.

- In the event of this Contract being forced upon Lexcray by provisions of the Petroleum Act – What would be the cost to Lexcray if Lexcray were to insure against any damages arising out of the activities of Origin on Nutwood Downs discussed and covered in this correspondence.

Essentially to provide cover against there activities you would require a Contractual Liability Insurance coverage & Pollution Liability Insurance for a significant limit, but the maximum available with most insurers capacity for this is only \$25,000,000.

The amount of information and documentation required to obtain quotes for these are substantial, most of the detail would need to come from Origin, the insurers would need to have full risk management reports conducted to refer to there risk engineers etc and the insurance premium costs we would consider enormous, if cover could even be obtained which we would consider is doubtful.

We only deal with Authorised Insurers that have licenses to conduct business in Australia and we do not consider any of them would provide insurance protection for these risks with these unfair contracts with Origin Energy.

Additionally under point 39 in the contract it excludes any Consequential Loss that you may occur to your farm as a result of the operators negligence or negligence of its contractors.

This is not something that you could insure, so you would be left exposed for this also.

I hope this helps if you would like us to formally approach insurers to get the ball rolling with trying to get quotes for this please advise accordingly.

Kind Regards

Jon Bourke



Jon Bourke
Broker
ANZIIF (Snr Assoc)



Darwin Office | Suite 207, Level 2, 12 Salonika St Parap NT 0820 | PO Box 1513 Darwin NT 0801



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From: Rod Dunbar [mailto:]
Sent: Monday, 20 February 2017 10:36 AM
To: Alana Brown; Jon Bourke
Cc: []
Subject: RE: Farm Pack Insurance - Policy Invoice from MGA Insurance Brokers

Dear Alana and Jon,

I acknowledge receipt of your email below for renewal of our Insurance and it is all in order.

However, I refer to section 5 of the Policy;

WARNING - CONTRACTUAL LIABILITIES
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MGA Insurance Brokers ("MGA") and it's Authorised

- An upward pressure gradient between deep formations and the CLA (Fulton and Knapton, 2015)

These factors suggest that any drawdown response resulting from cross flow will be localised and is unlikely to result in a water level decline that will affect existing users/environmental dependencies. The level of this risk is assessed as low.

6) EXPLORATION DRILLING ENABLES CROSS FORMATIONAL FLOW BETWEEN SHALLOW AQUIFERS IN CONTRAVENTION OF WATER ACT REGULATIONS.

Assessed Risk Level: HIGH

Consequence: Serious

Likelihood: Likely

There is potential that incomplete casing/cementing of shallow utilised aquifers will allow cross formational flow. This will contravene Water Act (NT) regulations, which require effective isolation of multiple aquifers to prevent cross formational flow. Assuming there is a contrast in water quality between the aquifers and a driving pressure gradient, potential also exists for the deterioration in groundwater quality, which in turn could impact existing groundwater users and/or environmental dependencies.

The risk that incomplete casing/cementing of shallow aquifers will allow cross formational flow in contravention of Water Act (NT) regulations is assessed as High for drilling site Beetaloo-W1 where multiple aquifers (basal Cretaceous Sandstone, Anthony Lagoon Beds, Gum Ridge Formation) are expected. The risk is lower at the northern well sites (Amungee-NW1, Kalala-S1, Kalala NE-1, Nutwood Downs SW-1) where the Gum Ridge Formation is the only expected aquifer above the proposed surface casing shoe. The high risk level specifically relates to legal/regulatory implications, the consequence level for environmental and community impact is assessed as medium – see Appendix B for further detail.

7) CROSS FORMATIONAL FLOW FROM DEEPER FORMATIONS TO A UTILISED AQUIFER RESULTS IN GROUNDWATER CONTAMINATION.

Assessed Risk Level: LOW to MEDIUM

Consequence: Serious

Likelihood: Remote to Unlikely

There is potential that the cross formational flow of water/hydrocarbons/gas from deeper formations to a utilised aquifer will result in groundwater contamination and impact existing users and environmental dependencies. Possible causes leading to cross-formational flow include:

- Well failure due to incomplete cement placement or casing failure during operation or post abandonment
- Blow out during drilling causes annular leakage
- Breach of aquitard by hydraulic fracture propagation
- Hydraulic fracturing opens pathway through an abandoned exploration well
- Leakage along faults intersected by drilling or induced fracturing

The level of risk associated with cross formational flow leading to groundwater contamination is assessed as Low to Medium for the range of risk causes (see Appendix B for further detail). The risk of well failure is mitigated by the exploration well design. Utilised aquifers will be isolated from producing formations by a triple barrier of cemented casing (surface casing, intermediate casing and production casing). Aquitards separating utilised aquifers from fracture targets are generally of significant thickness (>100 metres) in the Beetaloo basin (Fulton and Knapton, 2015). The combined aquitard thickness at the proposed well sites is likely to be significantly greater than any potential fracture growth resulting from hydraulic fracturing. Well locations Kalala S-1, Amungee NW-1 and Beetaloo W-1 are located away from major structural zones, which limits the likelihood of intersecting and inducing leakage along existing faults. The likelihood of intersecting faults is higher for proposed sites Nutwood Downs SW-1/Kalala NE-1 as they are situated closer to the Walton High which forms the bounding structure in the north of the Beetaloo Basin and is associated with regional fault structures.

8) HYDRAULIC FRACTURING INDUCES SEISMICITY INCREASING CONNECTION BETWEEN FORMATIONS AND ENHANCING THE POTENTIAL FOR CROSS FORMATIONAL FLOW

Assessed Risk Level: LOW

Consequence: Serious

Likelihood: Remote

There is a risk that hydraulic fracturing induces local seismicity leading to greater connection between deeper formations and utilised aquifers. This may enhance the potential for cross formational flow of saline groundwater/hydrocarbons/gas causing groundwater contamination in utilised aquifers and impacting existing groundwater users and environmental dependencies.

The pressure exerted in hydraulic fracture stimulations is not sufficient to induce seismicity of a magnitude capable of deforming the volume of rock (>1500 m, Origin Energy, 2015a) separating the target formation and utilised aquifers. Most induced seismicity associated with fracture stimulation is microseismicity. Larger events are uncommon and generally associated with pre-stressed faults (RSRAE, 2012).

9) THE LOSS OF A RADIOACTIVE SOURCE DURING GEOPHYSICAL LOGGING RESULTS IN GROUNDWATER CONTAMINATION.

Assessed Risk Level: LOW

Consequence: Moderate

Likelihood: Remote

There is a risk that during wireline logging a radioactive source could be lost leading to groundwater contamination of a utilised aquifer with potential impacts on existing groundwater users and the environment. The loss of a radioactive source is likely to be associated with the tool becoming stuck and the wireline cable breaking during logging.

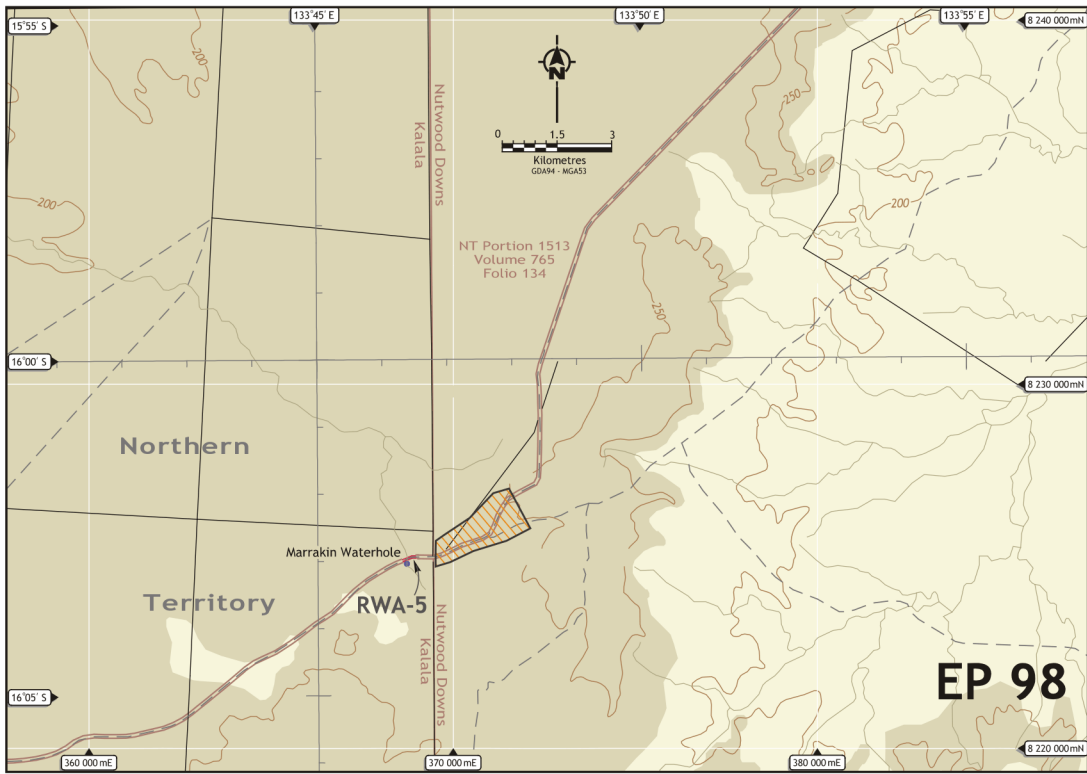
Wireline logging in the exploration wells is only proposed for the lower formations. This will occur after shallow utilised aquifers are sealed with a cemented casing string. Wireline tools are less likely



Basin	Basin area (km ²)	Number of shale gas wells	Water needed for fracking (GL)	Fracking water per year (GL)	Groundwater sustainable yield (GL/yr)	Groundwater abstraction (GL/yr)	Water footprint compared to gas footprint
Amadeus	162,294	12,679	190.2	7.6	142	14	26
Arckaringa	87,331	6,823	102.3	4.1	12	11	167
Bowen	161,559	12,622	189.3	7.6	224	101	17
Canning	534,046	41,722	625.8	25.0	834	22	15
Clarence-Morton	45,861	3,583	53.7	2.1	705	168	1.5
Cooper	121,382	9,483	142.2	5.7	20	29	139
Galilee	337,973	26,404	396.1	15.8	106	99	73
Georgina	362,638	28,331	425.0	17.0	241	64	34
McArthur	198,480	15,506	232.6	9.3	749	9	6
Officer	333,657	26,067	391.0	15.6	249	<1	31
Otway (onshore)	44,105	3,446	51.7	2.1	1,998	238	0.5
Perth	186,678	14,584	218.8	8.8	1,609	677	3
Sydney	60,630	4,737	71.1	2.8	896	79	2
Wiso	138,586	10,827	162.4	6.5	106	4	30

Table 2: Shale gas basins in Australia showing the potential number of wells (assuming well space of 800 metres and fairways making up 5% of the basin). The estimated volume of water needed to frack these wells assumes 15 ML/well. The volume of fracking water per year assumes a 25 year life span of the field.

Groundwater sustainable yield and groundwater abstraction values from NLWRA (2001) and AWR2005 (<http://www.water.gov.au/>). Shale gas basin boundaries were used to clip all groundwater management units (GMUs) within the shale gas basin and a *pro rata* estimate of sustainable yield made based on NLWRA 2001. Water footprint is the factor by which the area of land needed to sustainably withdraw 15 ML of water for fracking exceeds the area of land (640,000 m²) covered by each gas well.



- Legend**
- Secondary road/track
 - Watercourse
 - Elevation (m)
 - Fence line
 - Property boundary
 - ACTIVITIES AREA

**Nutwood Downs SW-1
Proposed Location**

GDA94 Longitude	Latitude
133.791973	-16.041704
MGA53 Easting	Northing
370770	8226075

EP 98

**Nutwood Downs SW-1
Potential well location
Activity Area map**