



**Queensland Murray-Darling Committee Inc. Comments on Australia Pacific LNG Pty Limited’s Application to Amend Environmental Authorities EPPG 000885313 (Spring Gully) and EPPG 00968013 (Walloons) on Tenures PL 195, 200, 203, 204, 268, 414, 415, 416, 417, 418, 419, and PFL 26, PL 215, 216, 225, 225, 272, 289, ATP 692 to Landspray While Drilling.**

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**Submission to:**

Permits and Licence Management  
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These comments are presented by the Chief Executive Officer, Geoff Penton, on behalf of the Queensland Murray-Darling Committee Inc. (QMDC). QMDC is a regional natural resource management (NRM) group that supports communities in the Queensland Murray-Darling Basin (QMDB) to sustainably manage their natural resources.

**1.0 General comments**

QMDC has made previous submissions on Australia Pacific LNG Project’s (Origin) Landspraying Drilling Fluid Trial Application. QMDC raised a number of concerns regarding the parameters of the trial and other related matters e.g. the significant departure from the original EIS and current EAs; the limited scope of the technical reports submitted by Origin including the lack of science supporting conclusions; the lack of independent peer review of the technical reports and the then proposed landspraying and gas rejection trials. QMDC’s request for *section 310V of the Environmental Protection Act 1994* to be applied to the Application was not successful. Our community position on CSG mining and this particular application is guided by our mining policy and the Regional NRM Plan (both currently being reviewed and updated).

[http://www.qmdc.org.au/publications/download/1162/website-pdfs/qmdc-policy/qmdc\\_policy\\_mining-impacts-qmdb\\_revised111027.pdf](http://www.qmdc.org.au/publications/download/1162/website-pdfs/qmdc-policy/qmdc_policy_mining-impacts-qmdb_revised111027.pdf)

<http://www.qmdc.org.au/publications/browse/plans/regional-nrm-plan>

## 2.0 Grounds for submission

QMDC objects to the application to amend the environmental authority and asserts it should be refused on the basis it:

- 2.1 Fails to uphold the *Environmental Protection Act 1994* (EPA) and the other relevant considerations having regard to the subject-matter, scope and purpose of the Act.

The administering authority has a legal and moral obligation to protect Queensland's environment, which includes (a) *ecosystems and their constituent parts including people and communities; and (b) all natural and physical resources; and (c) those qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and (d) the social, economic, aesthetic and cultural conditions affecting the matters in paragraphs (a) to (c) or affected by those matters.*

- 2.2 Does not in accordance with section 3 *improve the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).*

- 2.3 Is contrary to the precautionary, intergenerational equity principles and conservation of biological diversity and ecological integrity, principles of environmental policy as per the Intergovernmental Agreement on the Environment.

- 2.4 Will have adverse effects on the character, resilience and value of the receiving environment.

- 2.5 Is contrary to the public interest.

QMDC has seen no assessments undertaken to determine whether mitigation measures proposed would have a positive and enduring social, economic, environmental effect for the region's economic and environmental viability including future capacity and liveability.

QMDC argues, that the environmental performance and ethical social practices of the CSG mining sector need to be assessed in terms of the burdens this sector place on regional communities, and the natural resources and ecosystems they rely on to sustain themselves.

QMDC asserts that this application if assessed on its merits will highlight that the degree of community advantage and public benefit is minimal.

A public benefit test although it poses many challenges, provides an opportunity for the Government to make basic human rights meaningful to regional communities so as to assure them social and economic justice, alongside environmental sustainability.

- 2.6 Will cause material and serious environmental harm.

2.7 Would be contrary to appropriate consideration and application of the environmental protection policies on noise, air and water.

2.8 Fails to give effect to the State of Environment report findings:  
<http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/executive-summary.pdf>

Environmental issues facing the QMDB involve significant challenges and constraints for natural resource managers, landholders and developers. QMDC and the communities it works with in QMDB, recognise the need to protect now and in the future the region's valuable natural resources from actual and potential threats and losses resulting from commercial development. QMDB has already been significantly degraded as a result of past human impacts, and actions are required to reverse this trend.

2.9 Would be contrary to relevant Commonwealth and State government plans, standards, agreements or requirements about environmental protection or ecologically sustainable development, including but not limited to the Darling Downs Regional Plan.

2.10 Would be contrary to appropriate consideration and application of an environmental objective assessment, which is as a regulatory requirement and a standard criterion for the decision.

2.11 Inappropriately relies on a proponent's self-determined 'trial' and technical report that has not been peer reviewed and which therefore contains insufficient scientific rigour and integrity.

2.12 Fails to uphold the *Vegetation Management Act 1999* (VMA) and the other relevant considerations having regard to the subject-matter, scope and purpose of the Act.

The administering authority must regulate and enforce vegetation management provisions. Landspraying drilling fluid poses risks to remnant vegetation that is (i) an endangered regional ecosystem; or (ii) an of concern regional ecosystem; or (iii) a least concern regional ecosystem; and may have a detrimental impact on vegetation in declared areas; it cannot ensure the landspraying activities do not cause land degradation; nor prevent the loss of biodiversity. The amendment does not maintain ecological processes nor will it be able to wholly manage the environmental effects of its activities to achieve the matters mentioned above. It increases greenhouse gas emissions; and may prevent sustainable land use.

2.13. Fails to uphold the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) and the other relevant considerations having regard to the subject-matter, scope and purpose of the Act.



The amendment compromises the administering authority's ability to uphold the objectives of the EPBC Act, because it does not protect the environment, especially matters of national environmental significance; it does not conserve Australian biodiversity; it does not enhance the protection and management of important natural and cultural places; it does not promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; it does not recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity, nor does it promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

Origin in its Trial Application identified EPBC protected matters in the Spring Gully area specifically to include 1 wetland of international significance, 3 threatened ecological communities, 16 threatened species, and 10 migratory species that may occur (search conducted on 16/06/2011 with a 1 km buffer). In addition, 5 marine bird species, 3 invasive plants, 5 invasive mammals, and 1 State reserve were listed in the EPBC Act database as potentially occurring in the Spring Gully area.

- 2.14 Fails to provide confidence that the associated Environmental Management Plan (EMP) and its proposed management strategies and actions will adequately avoid and/or manage the environmental harm the amendment will create;
- 2.16 Fails to uphold intent of Nature Conservation Act
- 2.17 Fails to comply with the DRAFT General Beneficial Use Approval for drilling mud
- 2.18 Fails to meet the targets of the Regional NRM Plan;
- 2.19 Fails to satisfy QMDC's mining policy
- 2.20 Sets a dangerous precedent for the region. It has not adequately addressed the legal requirements of the EPA and carries with it an unacceptable risk if permitted. It is an activity that has serious legal and environmental ramifications if authorisation is given to one CSG company and by default to others throughout the QMDB, Queensland, Australia and internationally.

### **3.0 Facts and circumstances relied on in support of the grounds of the submission**

- 3.1 The application at section 1.1 assumes on the basis of the Condabri and Combabula Landspraying While Drilling Trial Interpretative Report and Recommendations, 10 September 2014 prepared by URS (the report) that the "successful completion of the landspraying while drilling (LWD) trials within existing Australia Pacific LNG tenures" equates to being able to successfully apply drilling fluid to other sites without causing detrimental environmental harm.



QMDC asserts this assumption is dangerous, is not supported by the writers of the report, who state that “any proposal for multiple application” needs to “be subject to further field trial” (11 p.94 of the report). It also contradicts the amendment rationale at 3.3. that the ‘trial sites’ are “representative of other project areas” and that the “use of the trial results in Combabula and Condabri” are “appropriate for this application” (p.10 of Supporting Information Report EA Amendment Application) and clearly fails to meet the requirements of the EPA because:

- Limitations of the trials acknowledged by URS at p.102 of the report state that where they were provided information by third parties, they have made “no independent verification of this information unless required as part of the agreed scope of work” AND they do not assume liability for “any inaccuracies in or omissions to that information”;
- Furthermore URS at p.102 of the report state that the information in the report is only considered “accurate at the date of issue”, namely 10 September 2014;
- Additionally at p.102 of the report URS claim that opinions and recommendations presented in the report only “apply to the site existing at the time” of their investigation and cannot necessarily apply to site changes of which URS is either not aware of or has not evaluated;
- URS do not guarantee their work and will not be responsible for any third party using or relying on the report, in fact they state that it is “not suitable for use by any third party” and do not authorise its use by any third party (p.103 of the report); and
- The report is not independently peer reviewed, which, should be a minimum requirement at the very least. QMDC submits that although DERM as the regulator plays the “last card” on “*acceptable risk*”, initial determinations are not the prerogative of a private CSG company nor any scientific researchers it pays to conduct research both with commercial interests in the outcome.

It is common practice that company based risk assessments, are frequently deemed confidential, do not incorporate regional NRM targets, do not respect local knowledge, depend too much on economic modelling which lacks peer review or environmental and social application and do not advocate a community participatory process or a precautionary approach.

The scientific reports relied upon by Origin for the application weaken the intentions of the *Environmental Protection Act* by merely suggesting “preventative measures” which are based on a limited scope to address risks associated with the gas reinjection.



If the primary objective of the *Environmental Protection Act* is to improve the total quality of life, both now and in the future by maintaining ecological processes on which life depends then in relation to the application the science and technical expertise relied upon should be as a matter of routine independently peer reviewed in order to provide the best available science and knowledge to protect, public health, aquifers or waterways. Clearly because LWD carries a risk of environmental or ecological impact this is a given. The vast majority of contaminants associated with LWD for example have had no trigger values set by ANZECC due to “insufficient data” and research. An independent peer review is therefore required to base sound practice on.

3.2 The application at 1.2 relies on associated documents that fall short of providing adequate support to the claim the ‘trial sites’ are “representative of other project areas” and that the “use of the trial results in Combabula and Condabri” are “appropriate for this application”.

### 3.2.1 Risk Management Directive

- No effective risk assessment has been carried out despite the *Risk Management Directive*. The risk management process fails to assess whether the risks to e.g. native flora and fauna, soil integrity, good quality agricultural land, stock and human health, surface and ground water are too high to allow LWD to proceed.
- Origin at the very least when they ask the question “What is Risk?” should have seriously considered the cumulative impacts and risks associated with LWD, which include *spatial extent impacts* – those which occur over an area; *spatial intensity impacts* – when a location is impacted on by the activities of multiple sites; *simple temporal impacts* when impacts have a specific time of commencement and a measured form over time; *offset temporal impacts* when multiple simple temporal impacts are superimposed upon one-another over time; *linked triggered impacts* when one impact, either by its occurrence or by reaching a threshold level, triggers another impact that would not otherwise have occurred. The second impact being the triggered impact.
- The assessment of environmental risk based on the ecotoxicity tests; lettuce germination and growth and earthworm survival is not adequate for the purposes of the proposed CSG activity. The reliance on this environmental risk assessment is inherently flawed because of the paucity of information, related to Spring Gully and Walloons soils, remnant vegetation, regional ecosystems, protected flora and fauna species, waterways and because the assessment has failed to address bioaccumulation in the soils, plants or earthworms over an appropriate period of monitoring and testing. It should therefore not be relied upon in the decision to allow the LWD application to proceed.



- The report does not address environmental and human health (10 p.85) risks fully. QMDC understands that the possible effects of these are as follows:
  - **Environmental and Human Health Hazards of Drilling By-Products**  
Drilling by-products may present an environmental and health risk as a consequence of the additives (i.e. individual components) introduced into the drilling mud and the chemical composition of cuttings.
  - **Environmental Hazards**  
Environmental hazards associated with drilling by-products include potentially toxic additives, salt compounds, heavy metals, hydrocarbons, pH-control additives, and total suspended solids (TSS).
  - **Salt compounds**  
Salt compounds from the drilling fluid and the cuttings can inhibit plant growth by disrupting the ability of plants to uptake water. Increased salt concentration in fresh water can also be toxic to fish, plants, and other aquatic organisms (Bright and Addison, 2002; Arthur and Leuterman, 1992).
  - **Heavy metals**  
Heavy metals from both the drilling fluid and the formation tend to react with drill solids and clays and are not very mobile in the environment. They will not biodegrade and in some instances bioaccumulate and be passed up the food chain causing health problems, such as birth defects (Arthur and Leuterman, 1992).
  - **Organic wastes**  
Organic wastes such as petroleum hydrocarbons can increase oxygen demand load on streams and rivers and carry diseases (Arthur and Leuterman, 1992).
  - **Acids and Bases**  
Acids and bases (used for pH-control) can be detrimental to biota. pH shock from improperly disposed drilling wastes, whether liquid or solids, will disrupt ecosystems immediately (Arthur and Leuterman, 1992).
  - **Total suspended solids**  
Total suspended solids can impact receiving surface water by reducing the amount and the quality of available light necessary for plant growth. This additional loading also affects the fauna through mechanical toxicity. The increase suspended solids contain organic fractions which, as they degrade, diminish the surrounding waters of oxygen (Arthur and Leuterman, 1992).
  - **Human Health Hazards**  
The most common health hazard associated with drilling fluids is contact dermatitis (International Petroleum Industry Environmental Conservation Association (IPIECA), 2009). However, drilling muds (or fluids) may present a range of other health hazards depending on the exposure pathway.



➤ **Skin Contact**

Upon skin contact to drilling fluids, the skin may become irritated. The symptoms and the seriousness of the condition vary and are dependent on the type and length of exposure to the drilling fluid and the susceptibility of the individual (IPIECA 2009).

Skin irritation can be associated with petroleum hydrocarbons, which may be present in the drilling fluid. In addition, several drilling fluid additives may have irritant, corrosive or sensitising properties (IPIECA 2009). For example, zinc bromide is corrosive whilst a polyamine emulsifier may have sensitising properties.

The contact dermatitis hazards associated with known additives used by Origin are as follows: AUS-GEL is believed to cause minor irritation. Biocides are known to be corrosive to the skin. Brief contact causes irritation whilst chemical burns can occur if not promptly removed. Staining is also a concern with long-term exposure. Skin contact with PAC-R is not expected to cause prolonged or significant irritation. It is not expected to be harmful to internal organs if absorbed through the skin.

➤ **Inhalation**

Drilling operations often involve the circulation of drilling fluids in an open system at elevated temperatures with agitation that can result in a combination of vapours, aerosols, or dust above the sump (IPIECA 2009).

The main inhalation risks associated with the additives used by Origin are:

- Prolonged inhalation of silica dust related to Aus-Gel has been known to **cause silicosis** and other effects.
- Biocide inhalation may cause severe irritation of the nose, throat, and respiratory tract. Repeated, or prolonged, exposure may cause productive cough, running nose, bronchopneumonia, pulmonary edema, and reduction of pulmonary function. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury (chemical pneumonia).
- Inhalation of PAC R dust may produce mechanical irritation to the mucous membranes of the eyes, nose, throat, and upper respiratory tract.

➤ **Eye Contact**

Specific drilling fluid additives may be corrosive or irritating to the eyes (IPIECA 2009). Common hazards associated with the additives used by Origin through eye contact are:

- AUS-GEL, which may cause mechanical eye irritation if dust is excessive.
- Biocides, which can be extremely corrosive and contact with eyes will cause conjunctivitis (redness and swelling of conjunctiva). Severe corneal injury may occur, with possible permanent impairment of vision.
- PAC R is not expected to cause prolonged or significant eye irritation. The material is dusty and may cause mechanical irritation and scratch the surface of the eye.



➤ **Ingestion**

Drilling fluids are not intended for ingestion and consequently it is considered an unlikely risk compared to other routes of exposure. Some additives; however, do present a health hazard. The health effects that may arise from ingestion of the drilling fluids used by Origin are:

- The health effects associated with ingestion of AUS-GEL are unknown
- Biocide causes severe burning and pain in the mouth, throat and abdomen. Vomiting, diarrhoea and perforation of the esophagus and stomach lining may occur.
- PACR is not expected to be harmful if swallowed.”

QMDC asserts that the information on impacts (informal hazard assessment), does not attempt to look at possible exposure to stock, native fauna, or humans, apart from a comment that the site would be checked to ensure no animals were present.

- See also identified health impacts in *Drilling fluids and health risk management A guide for drilling personnel, managers and health professionals in the oil and gas industry* IPIECA <http://www.ogp.org.uk/pubs/396.pdf>

### 3.2.2 Environmental Offset Strategy

[http://www.aplng.com.au/pdf/lng\\_facility/App\\_G\\_Environmental\\_Offset\\_Strategy.pdf](http://www.aplng.com.au/pdf/lng_facility/App_G_Environmental_Offset_Strategy.pdf)

- Construction of a total of 10,000 wells is expected over the life of the APLNG Project. The Project Clearing Footprint is expected to include an area of 7,348ha involving the clearing of the following areas of remnant vegetation and regrowth Brigalow: LNG Facility – 176ha; Gas Pipeline – 914ha; Gas Fields – 6,282ha.
- Origin is required to implement mitigation measures during construction and operation to minimise impacts. Where impacts are still significant the impacts are to be offset. Origin state that it “is anticipated that these offsets will provide a long-term net ecological benefit”. The application refers to the *Environmental Offsets Strategy* as a supporting document to the application yet the trials did not test the impacts of drilling fluid on any of vegetation and biodiversity threatened by the project activities including LWD onto land. The trials and the application have not addressed whether LWD onto land at the Walloons and Spring Gully sites will create additional impacts or compromise regional ecosystems, remnant vegetation, protected species, or undermine or require further offset efforts?
- A comprehensive analysis of the impacts of LWD is needed especially if this application opens the floodgates to further applications to LWD within the associated bioregions and subregions the total Project drilling footprint transects or is located.



- Origin are required to offset over the life of the Project based on the proposed clearing footprint and with consideration of current policy requirements the below areas. What impact does the application to LWD have on these requirements and/or areas?:
  - 90ha *Environment Protection Biodiversity Conservation Act 1999* (Cth) (EPBC Act) listed Threatened Ecological Communities (includes non-remnant regrowth Brigalow)
  - 91ha of Endangered Regional Ecosystems
  - 204ha of Of Concern Regional Ecosystems
  - 815ha of EPBC Act listed fauna habitat
  - 23ha of EPBC Act listed flora habitat
  - 44ha of NC Act listed threatened flora habitat
  - 36ha1 of terrestrial marine environments
  - 8ha of intertidal and sub-tidal areas
  - 21ha of sea-grasses
  
- EPBC Act listed fauna habitat impacts are proposed for the following species along with the area impacted. What impact does the application to landspray have on these areas/species?:
  - Paradelma orientalis* (Brigalow Scaly-Foot) (Vulnerable) – 800ha
  - Furina dunmalli* (Dunmall's Snake) (Vulnerable) – 256ha
  - Egernia rugosa* (Yakka Skink) (Vulnerable) – 75ha
  - Xeromys myoides* (Water Mouse)<sup>11</sup> (Vulnerable) – 16ha
  
- EPBC Act listed flora offsets are proposed for the following species along with the area impacted. What impact does the application to landspray have on these requirements and/or areas/species?:
  - Cycas megacarpa* (Endangered) – 23ha
  
- 77 EPBC Act listed Threatened Ecological Communities impacted by the Project are included within the VM Act Endangered and Of Concern Regional Ecosystems and are not additional to them, with the exception of regrowth Brigalow. This area represents the cumulative total fauna species habitat impacts taking into consideration overlapping habitat requirements for different species based on broad vegetation groupings and includes all *Nature Conservation Act 1992* fauna habitat impacts. This area is wholly contained within the area of NC Act listed threatened flora species habitat and is not additional. This area is already partially included within the VM Act Endangered and Of Concern. Regional Ecosystems and are not additional to them. The potential presence of Water Mouse is being confirmed. What impact does the application to LWD have on these communities?
  
- NCA Act listed threatened fauna habitat offsets are proposed for the following species along with the area impacted. What impact does the application to LWD have on these requirements and/or areas/species? :
  - Paradelma orientalis* (Brigalow Scaly-Foot) (Vulnerable) – 800ha
  - Furina dunmalli* (Dunmall's Snake) (Vulnerable) – 256ha
  - Egernia rugosa* (Yakka Skink) (Vulnerable) – 75ha
  - Acanthophis antarcticus* (Common Death Adder) (Near Threatened) - 293ha



- Calyptorhynchus lathamii* (Glossy Black-Cockatoo) (Vulnerable) – 35ha
  - Strophurus taenicauda* (Golden-Tailed Gecko) (Near Threatened) – 824ha
  - Hemiaspis damelii* (Grey Snake) (Endangered) – 48ha
  - Cyclorana verrucosa* (Rough Frog) (Near Threatened) – 46ha
  - Aspidites ramsayi* (Woma) (Near Threatened) – 346ha
  - Xeromys myoides* (Water Mouse) 12 (Vulnerable) – 16ha
- NCA Act listed threatened flora species offsets are proposed for the following species along with the area impacted. What impact does the application to landspray have on these requirements and/or areas/species?:
  - Cycas megacarpa* (Endangered) – 23ha
  - Acacia pedleyi* (Vulnerable) – 6ha
  - Acacia calantha* (Near Threatened) – 14ha
- Potential freshwater fish habitat impacts are being or have been determined in consultation with government and suitable offsets will be or have been developed where appropriate. What impact does the application to LWD have on these requirements and/or areas/species?
- The application provides no evidence on how LWD supports the *Environmental Offset Strategy* to mitigate its “project clearing footprint”. Ecological communities existing within the Walloons Gas Field include listed ecological communities under the EPBC Act, and Endangered, Of Concern, Least Concern or Not of Concern Regional Ecosystems under the VMA. Within the Walloons Gas Fields, Brigalow Regional Ecosystems consist of REs 11.3.1, 11.4.3, 11.4.7, 11.4.10, 11.9.5 and all are Endangered (EPBC Act and VM Act). Within the Walloons Gas Fields, Semi Evergreen Vine Thicket (SEVT) Regional Ecosystems consist of Res 11.9.4a and 11.9.4b. Both REs are considered Endangered (EPBC Act and EP Act) and Of Concern (VM Act). *Callitris* (Cypress Pine) dominated or co-dominated woodlands are represented by REs 11.3.14, 11.3.19, 11.5.1, 11.10.9, 11.10.11. All of these REs are listed as Least Concern under the VM Act. **Lancewood and Bendee Dominated Woodlands** *Acacia shirleyae* (Lancewood) and *A. catenulata* (Bendee) dominated woodlands are represented by RE 11.7.2 which is listed as Least Concern under the VM Act. Eucalypt dominated or co-dominated woodlands are represented by REs 11.3.2, 11.3.3, 11.3.4, 11.3.16, 11.3.17, 11.3.18, 11.3.25, 11.5.1a, 11.5.20, 11.7.4, 11.7.7 and 11.9.7. These REs are listed as Least Concern and Of Concern under the VM Act/EP Act. 11.4.12 is listed as Endangered under the VM Act/EP Act. Where Weeping Myall (*Acacia pendula*) is present RE 11.3.2 is considered Endangered under the EPBC Act. In Walloons freshwater wetlands are represented by RE 11.3.27b which is considered Least Concern (VM Act) and Of Concern (EP Act).
- The aquatic environment of these water bodies which occur as billabongs no longer connected to channel flow are very diverse with aquatic vegetation. These water bodies are benefitted by large rain events that fill them via overland flows. Surface run off from LWD areas potentially poses risks to aquatic species and ecosystems.



- There is no scientific evidence or data to give confidence to the claim that the trials are representative of other project areas. The baseline vegetation monitoring done is very limited (pp 15 -18 of the report). Vegetation testing and monitoring was conducted on exotic pasture grass, some native grasses and lettuce. “Baseline surveys did not identify any species listed in the *Nature Conservation Act 1992* (Qld) or the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). (p.15 of the report).
- Natural regeneration will be used to rehabilitate areas containing flora species of conservation significance if the soil is not removed. Direct seeding with native tree and shrub species representative of the RE and habitat will also be undertaken. Translocation, propagation and replanting of tubestock of plant species will be undertaken where established to be effective for that particular species (refer to individual Species Management Plans and individual species recovery plans). Specific requirements for propagation by seed, cuttings or other techniques are outlined in Species Management Plans. There are inadequate field trials to provide much needed evidence to prove that area affected by LWD will be able to be rehabilitated according to the above techniques.
- In addition to the general rehabilitation techniques listed above, the following specific control measures may need to be put in place during the rehabilitation process: install erosion and sediment control measures to protect the location/s of conservation significant flora from scouring and sedimentation without significantly altering surface water conditions; avoid broad-scale spraying of herbicides for weed management in proximity to populations of flora species of conservation significance; undertake fencing of areas until plant populations have re-established, to prevent grazing or browsing damage implement weed control measures where weeds are identified a threat to flora species of conservation significance; implement pest animal control measures; implement ecological fire management guidelines. What impact will LWD with regards to providing increased opportunities for weeds or pests to invade and colonise an area? Does LWD increase fire risk? These questions are not addressed as par of the application.

### 3.2.3 Rehabilitation Plan

- “The primary Project objective will be to avoid threatened ecological communities and populations of flora species of conservation significance as outlined in the Protocol and Species Management Plans Flora (Australia Pacific LNG Threatened Flora Management Plan, Q-LNG01-15-MP-0108).” Further impacts likely to be caused by landspraying are avoidable.

<http://www.aplng.com.au/sites/default/files/pdf/15/06/walloons-rehabilitation-plan.pdf>



- According to the *Rehabilitation Plan* the “Walloons development area is generally characterised by level to gently undulating terrain with slopes in the order of 0 to 5%, with some concentrations of steeper slopes and terrain (approximately 10%) in the north central portion of the Walloons development area. In the flatter areas in the northern, eastern and western portions of the development area, flat to gently undulating clay pans with very shallow to deep gilgai are common. Flat to gently undulating plains derived from weathered sandstone are also present in these areas. A band of gently undulating plains to rises/low hills associated with the edges of the brigalow plains is located across the centre of the development area. In the north of the development area, terrain is characterised by plateaus and low sandstone hills with lateritic scarps, with slopes of approximately 10% being common. The Condamine River and Wambo Creek traverse the development area, with the Wambo Creek located over flat to gently undulating sandy alluvial plains, and the Condamine River over river terraces and channels and associated alluvial plains.”

Soil topography of the Walloons contravenes the trials report receiving environment requirements, which must ensure LWD is carried out on land that has a slope of less than 5%; is not within 10m of a road ditch or property boundary, is not within 100m of a downslope water body or within 50 m of a water well(11.2 p.94 of the report)

- A range of soil types (4.4.1. Soil Management Groups, *Rehabilitation Plan*) occur within the Walloons Gas Field development area. “Texture contrast soils, skeletal soils and cracking clays share a roughly even distribution of primary soil types within the Walloons development area. Other than the Vertosols these soil types mainly have shallow sandy or loamy topsoil with an abrupt change to a medium to heavy clay subsoil. **These texture contrast soils commonly have subsoils which are dispersive and very susceptible to erosion, particularly the Sodosols.** Shallow gravely loams (Rudosols), with a predominance of surface stone, are also common within the Development Area. While **Rudosols have a low to medium erosion potential their thin topsoils may necessitate the importing of topsoils from elsewhere during soil reinstatement.** Shallow to deep-cracking and non-cracking clays Vertosols are also present within the Development Area. **Vertosols generally have low erosion potential; however, their subsoils may be sodic and potentially dispersive. Further, the high clay contents in their surface layers can lead to compaction if over-worked, which has implications for rehabilitation success.**”

Soil types of the Walloons contravenes the trials report background soil requirements, which must ensure LWD is not carried out on soils that with background high salinity or sodicity (11.4, p.95 of the report).

Utilising gypsum is a recognised practice but will LWD require overdoing it and result in putting the soil totally out of balance by using too much gypsum?. Overuse of gypsum will result in a soil that is deficient in magnesium and potassium, and is overly high in calcium and sulfur.

- Land Form is depicted in Appendix A of the *Walloons Plan of Operations*. Why is The *Walloons Plan of Operations* not included for consideration as part of the application? Like the *Rehabilitation Plan* it would highlight to the administering authority that the soil types, slopes, alluvial plains and waterways in the Walloons development area are not representative of the trial sites.



Collectively their sodic nature and potential for erosion and compaction render landspraying in this area as an unacceptable risk and hazard to be avoided. Origin in this application chooses to ignore its own knowledge that **“(D)ue to the varied properties of the soils within the Walloons Development Area, soils will need to be managed by their management group to promote efficient and successful rehabilitation.”**

- The application does not refer to the need to manage soil in accordance with the field specific Soil Assessment and Management Plans as prescribed within the Walloons EA, D21-D23 and the Soils Management Procedure Attachment 11, Talinga/Orana EMP. Soil mapping figures are represented within the field specific Soil Assessment and Management Plans and within the Walloons Plan of Operations (Appendix A).
- Origin claims to be minimising the environmental impact of wells, by implementing a Minimal Disturbance Lease (MDL) methodology where practicable. MDLs supposedly occupy the same area as conventional leases but have a much lower surface impact. “The MDL does not require construction of a flat compacted pad (filling) or removal of topsoil. Prior to the rig moving onto previously cleared land, the only site preparation required is for grass to be slashed and sumps installed. It is envisaged that sumps will be replaced with above ground tanks as technology evolves and drilling mud management systems are authorised as the preferred least impact environmental outcome as it facilitates prompt reinstatement.”
- Rehabilitation of well sites will consist of two primary processes, reinstatement and final rehabilitation after decommissioning. Reinstatement will commence within 48 hours of the completion of primary drilling but before the completion rig is mobilised. Works will include the removal of any drilling fluids and the mud within the sumps will be allowed to solidify. Sumps will then be backfilled with subsoil and compacted to create a hard surface. Following the removal of the completion rig, further reinstatement will take place. The disturbance footprint will be reduced to an area of 0.27ha including a hardstand. Ripping of compacted muds will be required before soil is replaced. Reinstatement will include site stabilisation and seeding with grasses as outlined in Section 4.6.2. Re-profiling of cut and fill batters will not occur until final rehabilitation. Final rehabilitation of well sites will include the following steps (5.1.3. Rehabilitation Process, *Rehabilitation Plan*): decommissioning/removal of infrastructure (to be addressed in a separate decommissioning plan); cut and fill batters will be profiled to re-instate the land surface (Section 4.4.6); compacted hardstand areas will be ripped (Section 4.4.7); stockpiled topsoil will be respread (Section 4.4.9); and topsoil will be seeded with pasture grasses, or native species where native vegetation is the required final land use (Section 4.6).

If the current drilling fluid management system is a component of the MDLs and prompt reinstatement is possible what is the benefit gained by changing the method to LWD?



- QMDC asserts the *Alberta Directive 50* which was developed by the Alberta Energy and Utilities Board (EUB), the Alberta Agriculture, Food and Rural Development, and the Alberta Environmental Protection Agency (EUB, 1996) relied on by Origin is inherently flawed. *Guideline value application rate:*
  - Chloride < 400 kg/ha
  - Total Nitrogen < 200 kg/ha
  - Boron < 5 kg/ha
  - Cadmium < 1.5 kg/ha
  - Chromium < 100 kg/ha
  - Copper < 200 kg/ha
  - Lead < 100 kg/ha
  - Nickel < 25 kg/ha
  - Vanadium < 100 kg/ha
  - Zinc < 300 kg/ha

The argument by Origin that using *Alberta Directive 50* provides the application some legitimacy is not supported by QMDC. The Directive 50 is not suitable for Australian conditions, when evaluated as a whole. A focus on managing the drilling by-products together (drilling mud and cuttings), with criteria for loading rates, frequency of application, proximity to sensitive receptors and receiving soil quality allows Origin to ignore to a degree Australian and New Zealand Environment Conservation Council (ANZECC) short-term trigger value (STV) and long-term trigger value (LTV) guidelines for agricultural irrigation water (ANZECC, 2000); as these relate to the application of water over a continuous period of time.

An examination of ANZECC exceedences highlights very quickly why Origin prefer to use the *Alberta Directive 50*.

Although according to the report offered by Origin (not independently peer reviewed) no drilling mud or drill cutting samples exceeded the *Alberta Directive 50* maximum application rates for any of the metal or metalloid constituents, where guideline values exist, the *Alberta Directive 50* guideline for SAR was exceeded suggesting that it may cause structural problems to receiving soils. Adding gypsum is given as the solution.

“Concentrations of aluminum, arsenic, boron, iron, manganese, molybdenum, and vanadium in the Talinga 50 mud samples exceeded the ANZECC (2000) LTV guidelines for irrigation water.

Concentrations of aluminum and iron also exceeded the ANZECC (2000) STV guideline in some samples.

Nine of the fourteen drilling mud samples collected exceeded the LTV for aluminum. Six of these samples also exceeded the STV.

Iron concentrations exceeded the LTV in 12 of the 14 mud samples collected. Three of these samples also exceeded the short-term trigger values.

Molybdenum concentrations exceeded the LTV for all drilling mud samples (14) collected, including the sample taken from the mud tank prior to the commencement of drilling.



Boron concentrations exceeded long-term irrigation guidelines for 4 samples collected from the Lower Juandah and Taroom Coal Measures, and the Eurombah Formation.

Out of the 14 samples collected a small number of samples were found to exceed the LTV for arsenic (2 samples), manganese (1 sample), and vanadium (2 samples). These exceedences came from samples collected from the Westbourne and Springbok formations, Macalister seam, and Macalister seam and Taroom Coal Measures, respectively.”

The report also acknowledges that “detectable concentrations of petroleum hydrocarbons were observed in drilling muds and not the source waters from both sites. The C6–C9 fraction, which consists of the benzene, toluene, ethyl benzene and xylenes (BTEX), may pose a risk from an environmental and human health perspective.”

QMDC notes that there is limited discussion of radioactive substances such as radioactive tracer beads or strontium, which could be expected.

An assessment of the all the components of drilling fluids must be included and the toxicity of the chemicals and levels according to safety parameters. The report’s risk assessment has not assessed fully the “potential toxicity”.

Origin’s discussion on water based muds (WBM) and makes the claim that “most WBM used by Origin contain only a few components, which are added in small amounts to change mud properties to solve specific down-hole problems”.

- QMDC has read reports that many of the drilling fluid and WBM are either hazardous(\*) or are in some cases hazardous:
  - Viscosifiers - Increase viscosity of mud to suspend cuttings - PAC R, (Cellulose derivative) Bentonite, AUSGEL (bentonite 1302-78-9 >98 polyacrylamide\*)
  - Bactericides/biocides - Prevent biodegradation of organic additives. Control or eliminate the bacteria in the water storage tanks - Bleach and grean-cide (Glutaraldehyde\*)
  - Corrosion inhibitors - Prevent corrosion of drill string by formation acids and acid gases - zinc carbonate (products of degradation are more toxic.)
  - Defoamers - Reduce mud foaming - Defoam-X (Glycol Blend 60-100 % - no CAS\*) □Emulsifiers and de-emulsifiers - Facilitate formation of stable dispersion of insoluble liquids in water phase of mud. De-emulsifier used to break emulsions- Versamul® (Fatty acids derivatives 40 - 80 Petroleum distillates, hydro-treated light 64742-47-8 20 – 60, Polyamide\*)
  - Lubricants - Reduce torque and drag on the drill string – Idlube, Lube 100 (Polyether polyol 100 %)
  - Surfactants/Foaming agents - Facilitate formation of stable dispersion of insoluble liquids in water phase of mud - Drilling detergent (???)
  - Shale control inhibitors - Control hydration of shales that causes swelling and dispersion of shale, collapsing the wellbore wall - IDCAP (polymeric shale inhibitor – NO MSD Provided on web) - Polyplus, (Anionic polyacrylamide 20 – 40, Petroleum distillates, hydrotreated light 64742-47-8 -20 – 40%\*) The MSD states:

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Produced by: Geoff Penton & Kathie Fletcher, 6 July 2015  
For further information, contact QMDC on (07) 4637 6200 or visit [www.qmdc.org.au](http://www.qmdc.org.au)

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- *Toxicological Information:*
  - *Do Not Use. Use TXINF019. This product may contain trace amounts (<0.1%) of acrylamide. The International Agency for Research on Cancer (IARC) has designated acrylamide a Group 2A (probably carcinogenic to humans). This designation was based on sufficient evidence in experimental animals for the carcinogenicity of acrylamide (IARC Vol. 60, 1994, p. 389).*
  - *The National Toxicology Program (NTP) classifies acrylamide as "reasonably anticipated to be a human carcinogen" based on sufficient evidence of carcinogenicity in experimental animals (10th Annual Report on Carcinogens, 2002). Acrylamide is a possible mutagen (promotes a mutation (change in chemistry of a gene)) (IARC Vol. 60, 1994, p. 389).*
  - *This product may contain trace amounts of acrylamide (< 0.1%). Acrylamide has been classified by the International Agency for Research on Cancer (IARC) as a Group 2A carcinogen (probably carcinogenic to humans) and a suspect carcinogen by the National Toxicology Program (NTP).*
  - *Polymer stabilisers - Prevent degradation of polymers to maintain fluid properties.- Sodium sulfite (Very hazardous\* )*
  - *Breakers -Reduce the viscosity of the drilling mud by breaking down long chain emulsifier molecules into shorter molecules - Chembreak (citric acid plus enzymes)*
- Similar arguments we have presented above prescribe to the lack of consideration and alignment to the objectives to the Spring Gully Rehabilitation Plan.

<http://www.aplng.com.au/sites/default/files/pdf/15/06/spring-gully-rehabilitation-plan.pdf>

### 3.3 Suitably Qualified Third Party

Employing the services of a certified suitably qualified third party to allow LWD of residual drilling material and drilling fluid is not supported by the trials report. The report recommends much more from that person than what the proposed condition suggests e.g. that s/he is suitably qualified and experienced; that s/he must verify that the receiving environment complies with operating requirements (which include that "potassium chloride, potassium acetate or polyacrylamide containing drilling by products must not be used"; drilling by-products "with 'active' biocides are not to be utilised"; cement returns "must not be managed by LWD" etc), generic mud system and additives are within chemical and toxicity parameters and field sampling of by-products and soils is undertaken and validated by laboratory analysis (11.1& 11.3, pp.94 & 95 of the report).

Amending condition H to allow residual LWD flies in the face of the report recommendations and illustrates Origin's lack of comprehension for potential risk and environmental harm.

### 3.4 Inadequate EMP Protection

Origin, based on the results of a desk top assessment and ground surveys, identified 83 terrestrial fauna species of special conservation significance known or considered possible occurrences within the Talinga/Orana development area (Talinga/Orana EMP). This includes 13 species listed (or pending listing) as threatened under the EPBC Act, 19 species listed as migratory under the EPBC Act, 28 listed as endangered, vulnerable or near

threatened species under the NC Act and 35 listed as non-EVR priority species for the BBS Bioregion under the BAMM (EPA 2008a). The listings are not mutually exclusive. The REs represented within the Walloons development area that are important to, or indicative of, those species known or considered possible occurrences are listed in the Talinga/Orana EMP. Certain species known or expected to occur may occur in all REs, e.g. Rainbow Bee-eater *Merops ornatus*, or are not necessarily associated with any RE found within the Walloons development area or, within the local area, favour highly modified areas. The application to LWD does not refer to the EMP and gives no consideration to the potential harm that may occur to the abovenamed species.

### 3.5 Environmental Harms Identified by the General Beneficial Use Approval Drilling Mud

- Origin has stated that the “majority of proposed wells will require stimulation to enable successful gas production as part of the completion of the well. This will primarily be by hydraulic fracture stimulation, and occasionally by cavitation.” The Draft General Beneficial Use approval for drilling mud (Draft GBUA) does not approve LWD if drilling fluid contains stimulation fluids. Why would this application be approved if the drilling fluid is likely to contain fracturing fluids?
- The Draft GBUA states that “(i)f not characterised and managed appropriately, the use of drilling mud may cause environmental harm including contamination of surface water, groundwater and land, as well as potentially posing a health risk. Best practice environmental management must be considered and implemented” (p.2 Draft GBUA).
- Where chemicals or other substances are used during the drilling process (chemicals or salt may be used), LWD would be inappropriate for certain soil types and topography and should be regulated accordingly. Bentonite and polymers used in the drilling process may be natural substances, however they are specifically used to manipulate the behaviour of soils (e.g. increase fluid viscosity, inhibit clay and shale swelling and sticking, and flocculate drilled solids (Zvomuya et al. 2008)). What issues would this cause to receiving soils in the disposal process?
- LWD on pasture or improved pasture land means drilling fluids remain on the soil surface and on the vegetation. Drilling fluids landsprayed on crop land are not anticipated to be incorporated by Origin. Landholders may add fertilisers or other additives for production improvement. Are there associated issues?
- LWD may potentially adversely affect vegetation and soils. There could be negative effects to plants as a result of the physical coating of the drilling fluids, possibly inhibiting photosynthesis, delay flowering, hinder seed set, or reduce the seed bank. LWD could negatively affect soil chemistry (pH, salinity, sodicity, or nutrients) or soil physical characteristics (water holding capacity, crusting which may inhibit seedling emergence) (Zvomuya et al. 2008). The application has not provided satisfactory evidence on how Origin will manage these potential impacts prior to undertaking any full scale implementation in Australia. Additionally, vegetated habitats may be considered for LWD if they fit the criteria for LWD site selection and are able to support the equipment used.



- Why are these potential impacts not considered with respect to best practice and regulations, particularly with respect to land capability and risks?

### 3.6 Assessment Criteria

#### 3.6.1 Air

- The application will change existing air values and impacts because the drilling fluid will stop from being buried in situ and obviously be exposed to the air environment as it is sprayed on the open surface. This raises increased opportunities for workers, stock and native fauna to inhale vapours and smell odours.
- Drilling fluids if circulated in an open system at elevated temperatures with agitation can result in a combination of vapours, aerosol and/or dust above the ground surface. In the case of water-based fluids the vapours comprise steam and dissolved additives.
- An issue indirectly related to health, but directly related to the working environment is the odour of drilling fluids. Some drilling fluids may have an objectionable odour caused by the main constituents or specific additives. During operations the drilling fluids may be contaminated with crude oil and drilling cuttings, which may change the odorous properties of the drilling fluid. Measurements of headspace volatiles during drilling operations have indicated the presence of, amongst others, dimethyl sulphide and isobutyraldehyde. Both compounds have a pungent odour and may create unpleasant working conditions.

- Neurotoxicity & Pulmonary effects

The most commonly observed symptoms in workers exposed to aqueous fluid aerosols are cough and phlegm. Epidemiological studies of workers exposed to mist and vapour from mineral oils indicated increased prevalence of pulmonary fibrosis. More recent inhalation toxicology studies show that exposures to high concentrations of aerosols from mineral-based oils resulted mainly in concentration-related accumulation in the lung of alveolar macrophages laden with oil droplets. Inflammatory cells were observed with higher aerosol concentrations, consistent with the clinical literature from highly exposed workers. These pulmonary changes appeared to be a non-specific response to the presence of deposited aerosol and are not related to vapour exposure.

In some cases, occupational exposure to drilling fluids is associated with respiratory irritation. It is likely that this is caused by additives in the drilling fluid and/or the physico-chemical properties as water-based drilling fluids have a typical pH of 8.0–10.5d.

- Carcinogenicity (inhalation exposure)

The olefins, esters and paraffins commonly used in drilling fluids (Group III, negligible aromatic content fluids) do not contain specific carcinogenic compounds such as benzene or PAHs. Group II (medium-aromatic content) and especially Group I (high-aromatic content) fluids may contain minimal amounts of benzene. Note that all drilling fluids may be contaminated by crude oil from the reservoir, generating trace contamination with benzene, which is not necessarily expected. Due to the low vapour pressure of benzene, the concentration in the vapour phase may be higher than expected. Benzene exposure at levels well above the current OEL of 0.5 ppm is specifically associated with acute myeloid leukaemia.

<http://www.ogp.org.uk/pubs/396.pdf>

- Origin has not considered occupational exposure limits for several compounds which may be specified in occupational health and safety regulations and state that exposure should not exceed certain levels.

### 3.6.2 Land

The potential impacts to soil and vegetation have not been extensively studied for the Spring Gully and Walloons soil types and topography nor have their REs, remnant vegetation, biodiversity been extensively studied in relation to the potential environmental harm from LWD. An appropriate risk assessment has not been done for these project development areas. Detrimental impact to land has the potential to occur in these areas because of their soil types, topography, vegetation, waterways and the resulting erosion and/or elevated EC, aluminium, iron and cadmium levels. Origin has not validated that sites for LWD will not include any EPBC vegetation or NCA species and whether LWD in the development areas what impacts elevated EC, iron, aluminium, cadmium will have on native flora and fauna. Origin has not comprehensively ensured that land used to manage drilling by-products has the equivalent capability to do so.

### 3.6.3 Noise/Vibration

Not enough evidence is provided to know whether there will be increased levels of noise/vibration and prolonged duration owing to LWD activities especially if over 2000 facilities are involved?

### 3.6.4 Non Indigenous Heritage

There is no reference to the impact of the application on Aboriginal heritage in accordance with Origin's legal requirements under the EPBC Act. So whilst it may not propose changes to existing non indigenous heritage it on the other hand does not recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity, nor does it promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge. Spring Gully has a well-established Aboriginal history. Origin has not validated that sites for LWD will not include sites of significant cultural heritage.

### 3.6.5 Waste

A comprehensive analysis is required to understand the actual waste composition of the drilling fluid by-products and cuttings. There will be an increase in waste being released to land and air for over 2000 facilities. To not address this is contrary to the EPA.

### 3.6.6 Water ( surface and groundwater)

Origin has not validated that sites for LWD will not have an unacceptable impact on surface and groundwater sources.

## 3.7 Rehabilitation

The application contradicts the current rehabilitation schedules of the EAs. A change to the activities by allowing LWD significantly increases the potential need for rehabilitation in relation to the current prescribed methods of rehabilitation and their outcomes e.g. natural generation, planting seeds, seedlings and tube stock, stockpiling, ripping, watering, grazing, cropping etc. Pastoral land occurs within the Walloons Gas Fields area, including Class B limited cropping land and Class C1 and C2 pastoral land as defined by the State Planning Policy 1/92: Development and Conservation of Agricultural Land (GQAL Policy). Class A GQAL (crop land) occurs in the Walloons Gas Fields and Strategic Cropping Land also occurs in the area. If Origin has attempted to locate major infrastructure such as the plants, accommodation facilities and dams to minimise the impact to agricultural land's productive capacity, how will LWD areas be sited to ensure that Strategic Cropping Land (SCL) is avoided? Has the soils survey for representative soils and mapping at a scale of 1:100,000 been undertaken across the Talinga/Orana development area and 1:10000 for Talinga/Orana facilities sites? Did the survey and mapping include Good Quality Agricultural Land and SCL (Walloons, Schedule D, D21)?

Additionally if any organic status for post farming activities is sought, include grazing will they be precluded in perpetuity if LWD has been undertaken on the property? Has Origin sought clarification with the Meat and Livestock Authority, the National residue Survey and the Australian Pesticides and Veterinary Medicines Authority whether additives used in the drilling fluids would impede the sale of livestock and if so what rehabilitation is required?

## 3.8 Assessment Level Decision

The claim that the amendment "will not significantly increase environmental harm" in Table 8(b) is not supported by evidence provided in the trials report, and other relevant information provided by Origin in the supporting documentation. It is not clearly articulated where LWD will be carried out. If it is on land that is not currently directly impacted by CSG activities and infrastructure, LWD will be undertaken in a wholly additional area and in fact significantly increase the footprint and environmental harm of the activities. Areas such as PL 272 are all expressly Priority Agricultural Land and Strategic Cropping land. They should not be subject to such poorly researched activities that are only resulting due to the desperate need to find a way to cheaply dispose of contaminated waste.

According to Origin the "aim of rehabilitation in regard to cropping land is to restore the production potential of cropping land" and "the careful management of topsoil and subsoil will form an important component of the rehabilitation strategy".

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- 3.8.1 There will be a major increase of contaminants being released to land and air through dust, vapours and odours. If more clearing required this may trigger an additional offset. The amendment will potentially increase environmental harm to:
- Environmentally sensitive areas (no testing done on native flora and fauna to address Spring Gully & Walloons NCA, EPA, EPBC Act & Offset requirements)
  - Watercourses, wetlands, lakes or springs (run off contamination due to slope, gilgai presence)
  - Air quality (vapours, dust, odour, noise, vibration)
  - Land and soils (erosion, increased EC, elevated aluminium, iron and cadmium levels)
  - Cultural Heritage (lack of consultation)
  - Final rehabilitation acceptance criteria (residue impacts on pasture & stock health, impedes organic farming certification, ignores slope, soil types & management & offset strategy requirements)
- 3.8.2 The claim at Table 8(c) that the amendment “*will not change any rehabilitation objectives, with disturbance to be rehabilitated in accordance with the rehabilitation schedules of the EAS and other supporting documents*” is not supported by evidence provided in the trials report, and other relevant information provided by Origin in the supporting documentation. Unacceptable risks likely to the Strategic and Priority Agricultural land that forms part of the tenures affected. In the Protocol and the Australia Pacific LNG Threatened Fauna Management Plan Q-LNG01-15-MP-0113 (+addendum Q-LNG01-15-MP-0113\_01), the primary Project objective is stated as “to avoid habitat of fauna species of conservation significance”. This objective is not supported by the application.
- 3.8.3 The claim at Table 8(d) that the amendment “*will not significantly increase the scale and intensity of the relevant activity*” is not supported by evidence provided in the trials report, and other relevant information provided by Origin in the supporting documentation. Disposal to land from over 2000 facilities increases scale and intensity, especially in relation to the proposed disposal areas and their soil types, topography, their agricultural status, vegetation and biodiversity importance. Sensitivity of stock, exotic pastures and native flora and fauna to elevated levels of EC, aluminium, iron, cadmium and rehabilitation parameters (natural generation, planting of tube stock, seedlings, direct sowing of seeds, stockpiling topsoils etc still unknown with regards to the increased volumes disposed to land. If residual waste is included as part of LWD will this not increase scale and intensity of LWD? The potential secondary impacts have not been measured in relation to e.g. air quality and noise impacts on stock, fauna and workers.

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- 3.8.4 The claim at Table 8(f) that the amendment “*will not involve an addition to the surface area*” and is not supported by evidence provided in the trials report, and other relevant information provided by Origin in the supporting documentation. It is understood that LWD will require a larger surface area to spray contaminants on because of the need to avoid destruction of soil, vegetation likely to occur if saturation, clumping and uneven spread occurs. Actual surface area is based on recommended operating requirements. We have not seen a comparative analysis of sump surface area footprint size and LWD surface area footprint size and if residual waste is included as part of LWD and not sent to be disposed at a registered waste facility, will this not increase surface area required to dispose contaminants?

### 3.9 Financial Assurance

LWD will significantly increase the area to which potential CSG drilling contaminants are spread. This must result in an analysis of the adequacy of the financial assurance held. In addition, nearly \$100,000,000 in total is held in financial assurance. Given the market vagrancies and its effect on the industry, securing appropriate monies for any future liabilities must be reassessed with regards to the company’s ongoing fiscal capacity to fulfil its financial assurance obligations.



## 4.0 Recommendations

- 4.1 That the administering authority refuses to allow the amended EA.
- 4.2 That the administering authority refuses the amendment by applying all the mechanisms afforded by federal and state legislation to protect in perpetuity the natural resources (soil, vegetation, air, biodiversity, good quality and strategic cropping agricultural land, surface and groundwater) of the QMDB.
- 4.3 That the administering authority upholds Section 34 EPA and gives effect to environmental protection policies that avoid further destruction of remnant vegetation, MNES, regional ecosystems, habitat and biodiversity.
- 4.4 That the application be refused because a cumulative impact assessment has not been done to illustrate the totality of impact caused by the total footprint of the current EA amendment application, and the existing Origin operations in the QMDB, and the whole CSG industry in the QMDB.
- 4.5 That the trials report and the associated testing results used to support the application be rejected as being representative of the Walloons and Spring Gully project development areas.
- 4.6 That the findings of the trials report and any recommendations for LWD in other areas be rejected because the report is not subject to an independent peer review.
- 4.7 That the trials be rejected as providing a robust scientific basis for landspraying to proceed as a permitted activity because of insufficient data on ecotoxicity/bioaccumulation risks to all potentially affected flora and fauna.
- 4.8 That the application be refused because there is not sufficient data to realise the potential for environmental contamination (e.g. soil residues, pollution of air and water) with persistent heavy metals, salt, hazardous drilling fluids and there is a failure to consider contaminants such as radioactive substances in the Walloons and Spring Gully tenements.
- 4.9 That section 310V of the EPA be upheld requiring Origin to complete an EIS for its proposed landspraying while drilling activities.

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