

LAND COURT OF QUEENSLAND

REGISTRY: Brisbane

NUMBERS: MRA092-11 & EPA093-11 (MLA 50229)
MRA098-11 & EPA099-11 (MLA 50230)
MRA105-11 & EPA106-11 (MLA 50231)

Applicant: **XSTRATA COAL QUEENSLAND PTY LTD**
(ACN 098 156 702) and Others

AND

Objectors: **FRIENDS OF THE EARTH - BRISBANE CO-OP LTD**
(QC0239) and Others

AND

Statutory Party: **DEPARTMENT OF ENVIRONMENT AND**
RESOURCE MANAGEMENT

FRIENDS OF THE EARTH BRISBANE CO-OP LTD
CLOSING SUBMISSIONS

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FOE CLOSING SUBMISSIONS
Filed on behalf of the Friends of the
Earth –Brisbane Co-Op Ltd

Environmental Defenders Office (Qld) Inc
30 Hardgrave Road, West End Qld 4101
Telephone: (07) 3211 4466
Facsimile: (07) 3211 4655
Email: edoqld@edo.org.au

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LIST OF ACRONYMS

CCS	carbon capture and storage
CO ₂	carbon dioxide
CO ₂ -e / CO ₂ -eq	Carbon dioxide equivalents
CSIRO	Commonwealth Scientific and Industrial Research Organization
DERM	Department of Environment and Resource Management
EIS	environmental impact statement
EPA	<i>Environmental Protection Act 1994 (Qld)</i>
FOE	Friends of the Earth – Brisbane Co-op Ltd
GDP	Gross domestic product
GHG/GHGs	greenhouse gas / greenhouse gases
Gt	Gigatonnes (i.e. a billion tonnes)
GtCO ₂	Gigatonnes of carbon dioxide
GBR	Great Barrier Reef
GBRCA	Great Barrier Reef catchment area
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-governmental organisation
MRA	<i>Mineral Resources Act 1989 (Qld)</i>
Mt	Megatonnes (i.e. a million tonnes)
O ₃	ozone
ppm	parts per million
t	tonnes
tCO ₂	tonnes of carbon dioxide
SDPWOA	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
W/m ²	Watts per meter squared

INTRODUCTION

1. Xstrata Coal Queensland Pty Ltd and its joint venturers¹ (hereinafter, “Xstrata”) have applied for a mining lease under the *Mineral Resources Act 1989* (MRA) and an environmental authority (mining lease) under the *Environmental Protection Act 1994* (EPA) for an open-cut coal mine, the Wandoan Coal Mine (the mine).
2. The proposed mine is located west of the township of Wandoan, approximately 350 km northwest of Brisbane in the Surat Basin. The thermal coal deposits for the mine are estimated to be in excess of 1.2 billion tonnes. The mine life is projected to be in excess of 30 years, mining at a rate of around 30 million tonnes per annum Run of Mine (ROM) coal. The coal from the mine is proposed to be crushed, processed and blended on site before being transported by rail to port for export or, possibly, for domestic use. The thermal coal produced by the mine is intended to be sold to other companies to be burnt in coal-fired power stations to generate electricity.
3. The Coordinator-General declared the mine a significant project for which an environmental impact statement (EIS) was required under the *State Development and Public Works Organisation Act 1971* (SDPWOA).² The Coordinator-General prepared a report on the proposed mine recommending approval subject to conditions.³ A draft environmental authority was prepared under s 210 of the EPA and conditions recommended by the Coordinator-General were included in the draft.⁴
4. The Friends of the Earth – Brisbane Co-Op Ltd (FOE) lodged an objection to the mine under the MRA and EPA.⁵ The grounds of the objections were based on the considerations listed in s 269(4)(j)-(l) of the MRA and ss 5 and 223 of the EPA. There has been no judicial consideration of these particular provisions in the context of emissions from a coal mine contributing to climate change and ocean acidification that can guide the Court.⁶ Given the lack of applicable case law, the legislative context of these grounds is examined in detail below after considering a preliminary issue of the function of the Court in these proceedings.

FUNCTION OF THE COURT

5. The function of the Court in the objection hearing is similar to a public inquiry and this has important bearing on the nature of the hearing. The function of the Court is similar to the function of the Mining Wardens Court the subject of *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 (*Sinclair*). The Mining Wardens Court previously performed a similar role as the Court presently does in hearing objections regarding mining applications and making a recommendation to

¹ ICRA Wandoan Pty Ltd and Sumisho Coal Australia Pty Ltd.

² Annexed to Exhibit 63 and Exhibit 106.

³ Annexed to Exhibit 106. The Coordinator-General’s report is SP006 in the eTrial documents.

⁴ Annexed to Exhibit 106. The draft environmental authority is SP003 in the eTrial documents.

⁵ Exhibit 23.

⁶ The Land and Resources Tribunal considered these provisions in a similar context (*Re Xstrata Coal Queensland Pty Ltd & Ors* [2007] QLRT 33 (Koppenol P)); however, that decision was overturned on appeal (*Queensland Conservation Council Inc v Xstrata Coal Queensland P/L & Ors* [2007] QCA 338; (2007) 155 LGERA 322). Due to legislative amendments the Court did not rehear the objections (*Queensland Conservation Council Inc v Xstrata Coal Queensland Pty Ltd & Ors* [2007] QLC 0128) and therefore little guidance can be obtained from this series of decisions.

the relevant Minister. Barwick CJ emphasised in *Sinclair* in relation to an objections hearing for a mining lease application:

The purpose of notifying the making of the applications, indicating the time for objections and of the date of hearing, is to afford the applicant on the one hand an opportunity to justify in a public hearing the granting of a mining lease, both in point of area and in point of term, and also to give the public an opportunity of opposition supported by evidence to the grant of a mining lease. I cannot accept the proposition that the hearing of the application and of the objections is a mere formality: nor can I accept the submission made on behalf of the respondent company that the warden cannot be expected to examine in depth matters which would justify a recommendation that the application be refused or which would justify the acceptance of objections raised to the grant of the mining lease. The mining warden's recommendation, whether favourable or unfavourable, is a prerequisite to the grant of a mining lease. Whilst it is clear that the Minister may reject the warden's recommendation, it is also equally clear that a mining lease may not be granted unless there has been a recommendation, either favourable or unfavourable, of a mining warden. This emphasizes the place in the scheme of the grant of mining leases which is occupied by the hearing by the warden of the application and objections.⁷

6. The Court performs important functions in allowing objections to the grant of a mining lease to be heard by an impartial, judicial body and making a recommendation to the relevant Ministers based on the evidence presented before it. While the Minister's are ultimately not bound to accept the Court's recommendations, the findings and reasoning expressed by the Court are clearly intended by the legislation to play an important role in informing the Ministers and, thereby, to promote better decision-making by them. This emphasises the importance of the Court's fact finding role not merely the ultimate recommendation made by the Court.
7. In performing the general functions of holding an objections hearing and making a recommendation under the EPA, s 5 of the EPA provides an obligation that the Court must perform these functions "in the way that best achieves the object" of the Act of ecologically sustainable development.
8. It should also be noted in the context of the present objection that the Court is concerned with the application for a single coal mine. The Court is not ultimately responsible for setting broader policies to address matters such as climate change and ocean acidification or to protect the Great Barrier Reef or other parts of the Queensland environment. The Ministers, as part of the Executive Government, have roles and powers to establish broad policies that are wider than the Court's concerns. In this context the Court has a limited role of assessing the proposed mine against the relevant statutory criteria, informing the Ministers about this assessment, and making a recommendation to the Ministers on whether the mine should proceed. It is important not to lose sight of this role in the context of the wider policy issues that surround the current international and national debate on how to respond to climate change.
9. For the purposes of the present objection the Court is only concerned with whether the application should be approved or refused. The conditions proposed to be imposed on the mining lease and environmental authority are not in dispute. In the

⁷ *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 at 481.

present case the Court does not have the power to recommend new or varied conditions which are inconsistent a Coordinator-General's condition.⁸

STATUTORY CONTEXT

10. Subsection 269(4) of the MRA and s 223 of the EPA provide the criteria for the Court's decisions in the objection hearing; however, these criteria must be understood within their statutory context and interpreted consistently with the objects, nature, scope and terms of the two Acts.⁹

Relationship between the two Acts

11. It is useful, it is submitted, to consider the legislative history of the relationship between the MRA and the EPA. As originally enacted in 1989, the MRA was intended to deal with all aspects of the approval and regulation of mining in Queensland. The enactment of the EPA in 1994 provided another layer of regulation of mining as an environmentally relevant activity. In 2000, the Acts were amended.¹⁰ The primary purpose of the amendments was explained in the explanatory notes to the *Environmental Protection and Other Legislation Amendment Bill 2000*:¹¹

The Bill incorporates the legislative changes necessary to implement the government decision to transfer the environmental regulation of mining from DME [Department of Mines and Energy] to the EPA [Environmental Protection Agency, now the Department of Environment and Resource Management (DERM)]. The amendments primarily amend the *Environmental Protection Act 1994* and the *Mineral Resources Act 1989*. The Bill enables DME to continue to administer mining tenures under the *Mineral Resources Act 1989* and provides for environmental regulation of mining activities by the EPA [now DERM] under the *Environmental Protection Act 1994*.

12. The 2000 amendments focused the MRA on the tenure aspects of mining. However, environmental impacts of mining remain relevant to the objects of the MRA and s 269(4) considerations for the grant of a mining lease. The 2000 amendments focused the Environmental Protection Agency, now DERM, on the environmental assessment and regulation of mining. Both Acts provide a procedure for any person to object to a mining lease and for a joint hearing of the objections in the Court.
13. It is important to recognise that the MRA and EPA are two very different Acts with two very different objects. The MRA provides a system aimed at promoting the development of the mineral resources of the State while the EPA is very much focused on the protection of the environment. These objects overlap to some extent, but they are quite different and it would be wrong to assume that the consideration mining lease application under the MRA and the consideration of the application for the environmental authority under the EPA are the same. A particular feature

⁸ As a draft environmental authority was prepared under s 210 of the EPA and conditions recommended by the Coordinator-General were included in the draft, if the Court decides to recommend approval for the mine, s 222(2) of the EPA requires that the Court's recommendation must include the Coordinator-General's conditions and must not be inconsistent with a Coordinator-General's condition.

⁹ The emphasis on context, both within the statute and more broadly, in construing provisions has been emphasized by McHugh, Gummow, Kirby and Hayne JJ in *Project Blue Sky v Australian Broadcasting Authority* (1998) 194 CLR 355 at 381-384, [69]-[70] and [78].

¹⁰ By the *Environmental Protection and Other Legislation Amendment Act 2000*.

¹¹ *Environmental Protection and Other Legislation Amendment Bill 2000 – Explanatory Notes*, p 2.

that distinguishes the two Acts is that the Court's duty under s 5 of the EPA is to perform its function and exercise its powers "in the way that best achieved the object of the Act" of ecologically sustainable development. There is no such duty under the MRA. The objects of the two Acts are very different and two different recommendations may be appropriate regarding them. These propositions are explained in more detail in the next sections.

Mineral Resources Act 1989

14. The principal objects of the MRA are to promote the development of the mineral resources of the State with appropriate safeguards as stated in s 2:

2 Objectives of Act

The principal objectives of this Act are to—

- (a) encourage and facilitate prospecting and exploring for and mining of minerals;
- (b) enhance knowledge of the mineral resources of the State;
- (c) minimise land use conflict with respect to prospecting, exploring and mining;
- (d) encourage environmental responsibility in prospecting, exploring and mining;
- (e) ensure an appropriate financial return to the State from mining;
- (f) provide an administrative framework to expedite and regulate prospecting and exploring for and mining of minerals;
- (g) encourage responsible land care management in prospecting, exploring and mining.

15. The MRA provides an approval process for a mining lease in Part 7, ss 232-318.

16. Sections 268 and 269 provide for the hearing of the application for an additional surface area and "any objections thereto". Section 268 of the MRA provides in part as follows:

268 Hearing of application for grant of mining lease

- (1) On the date fixed for the hearing of the application for the grant of the mining lease and objections thereto, the Land Court shall hear the application and objections thereto and all other matters that pursuant to this part are to be heard, considered or determined by the Land Court in respect of that application at the one hearing of the Land Court.
- (2) At a hearing pursuant to subsection (1) the Land Court shall take such evidence, shall hear such persons and inform itself in such manner as it considers appropriate in order to determine the relative merits of the application, objections and other matters and shall not be bound by any rule or practice as to evidence.
- (3) The Land Court shall not entertain an objection to an application or any ground thereof or any evidence in relation to any ground if the objection or ground is not contained in an objection that has been duly lodged in respect of the application. ...

17. Subsection 269(4) of the MRA sets out the matters that the Court shall take into account and consider when making a recommendation to the Minister for Mines as follows:

269 Land Court's recommendation on hearing

- (1) Upon the hearing by the Land Court under this part of all matters in respect of an application for the grant of a mining lease, the Land Court shall forward to the Minister—
 - (a) any objections lodged in relation thereto; and
 - (b) the evidence adduced at the hearing; and
 - (c) any exhibits; and
 - (d) the Land Court's recommendation.
- (2) The recommendation of the Land Court upon an application for the grant of a mining lease shall consist of—

- (a) a recommendation to the Minister that the application should be granted or rejected in whole or in part; and
 - (b) in the case of an application that relates to land that is the surface of a reserve and the owner of that reserve does not consent to the grant of a mining lease over that surface area, a recommendation to the Minister as to whether the Governor in Council should consent to the grant of the mining lease over that surface area and, if so, recommend the conditions (if any) to which the mining lease should be subject.
- (3) A recommendation may include a recommendation that the mining lease be granted subject to such conditions as the Land Court considers appropriate, including a condition that mining shall not be carried on above a specified depth below specified surface area of the land.
- (4) The Land Court, when making a recommendation to the Minister that an application for a mining lease be granted in whole or in part, shall take into account and consider whether—
- (a) the provisions of this Act have been complied with; and
 - (b) the area of land applied for is mineralised or the other purposes for which the lease is sought are appropriate; and
 - (c) if the land applied for is mineralised, there will be an acceptable level of development and utilisation of the mineral resources within the area applied for; and
 - (d) the land and the surface area of the land in respect of which the mining lease is sought is of an appropriate size and shape in relation to—
 - (i) the matters mentioned in paragraphs (b) and (c); and
 - (ii) the type and location of the activities proposed to be carried out under the lease and their likely impact on the surface of the land; and
 - (e) the term sought is appropriate; and
 - (f) the applicant has the necessary financial and technical capabilities to carry on mining operations under the proposed mining lease; and
 - (g) the past performance of the applicant has been satisfactory; and
 - (h) any disadvantage may result to the rights of—
 - (i) holders of existing exploration permits or mineral development licences; or
 - (ii) existing applicants for exploration permits or mineral development licences; and
 - (i) the operations to be carried on under the authority of the proposed mining lease will conform with sound land use management; and
 - (j) there will be any adverse environmental impact caused by those operations and, if so, the extent thereof; and
 - (k) the public right and interest will be prejudiced; and
 - (l) any good reason has been shown for a refusal to grant the mining lease; and
 - (m) taking into consideration the current and prospective uses of that land, the proposed mining operation is an appropriate land use.
- (5) Where the Land Court recommends to the Minister that an application for the grant of a mining lease be rejected in whole or in part the Land Court shall furnish the Minister with the Land Court’s reasons for that recommendation. ...

(Emphasis in underlining added)

18. The grounds of the objection relating the grant of the mining lease are based on the considerations in paragraphs 269(4)(j), (k) and (l). Each of these considerations will be considered in turn.

Paragraph 269(4)(j) – “any adverse environmental impact”

19. Section 269(4)(j) of the MRA provides that the Court “when making a recommendation to the Minister that an application for a mining lease be granted in whole or in part, shall take into account and consider whether there will be any adverse environmental impact caused by those operations and, if so, the extent thereof”.

20. First, it is clear from the terms of the preceding paragraph, paragraph 269(4)(i) that “operations” means the “operations to be carried on under the authority of the proposed mining lease”. Thus, the consideration required by paragraph 269(4)(j) MRA is consideration of “adverse environmental impact caused by [the operations to be carried on under the authority of the proposed mining lease]”.
21. Section 234 of the MRA gives some indication of what operations may be carried on under the authority of a mining lease. Section 234 of the MRA provides, relevantly, as follows:¹²

234 Governor in Council may grant mining lease

- (1) The Governor in Council may grant and cause to be issued to an eligible person or persons, a mining lease for all or any of the following purposes—
- (a) to mine the mineral or minerals specified in the lease and for all purposes necessary to effectually carry on that mining;
 - (b) such purposes, other than mining, as are specified in the mining lease and that are associated with, arising from or promoting the activity of mining.
- (2) However, coal seam gas can not be specified in a mining lease. (Emphasis added)

22. “Mine” (the verb) is defined in s 6A of the MRA as follows:

6A Meaning of mine

- (1) *Mine* means to carry on an operation with a view to, or for the purpose of—
- (a) winning mineral from a place where it occurs; or
 - (b) extracting mineral from its natural state; or
 - (c) disposing of mineral in connection with, or waste substances resulting from, the winning or extraction.
- (2) For subsection (1), extracting includes the physical, chemical, electrical, magnetic or other way of separation of a mineral.
- (3) Extracting includes, for example, crushing, grinding, concentrating, screening, washing, jigging, tabling, electro winning, solvent extraction electro winning (SX-EW), heap leaching, flotation, fluidised bedding, carbon-in-leach (CIL) and carbon-in-pulp (CIP) processing.
- (4) However, extracting does not include—
- (a) a process in a smelter, refinery or anywhere else by which mineral is changed to another substance; or
 - (b) testing or assaying small quantities of mineral in teaching institutions or laboratories, other than laboratories situated on a mining lease; or
 - (c) an activity, prescribed under a regulation, that is not directly associated with winning mineral from a place where it occurs.”
- (5) For subsection (1), disposing includes, for example, the disposal of tailings and waste rock.
- (6) A regulation under subsection (4)(c) may prescribe an activity by reference to the quantities of minerals extracted or to any other specified circumstances.¹³

23. “Operations” in paragraphs 269(4)(i) and (j) means the physical activities associated with winning and extracting the coal product. Applying “adverse environmental impact caused by those operations” in its most narrow and direct sense, it includes the impacts of carbon dioxide (CO₂) and other greenhouse gases released by carrying out those physical activities.

24. It is submitted, however, that “adverse environmental impact caused by those operations”, in greenhouse gas terms, is not restricted only to the effects of the

¹² The definition of “mining lease” in the schedule to the MRA, essentially, being circular adds nothing to s 234 of the MRA.

¹³ Parts 7-10, ss 15A-48, of the *Mineral Resources Regulation 2003* provide further administrative provisions relevant to mining leases; however, no activities are prescribed for s 6A(4)(c) of the MRA.

greenhouse gases emitted by activities such as driving vehicles on the mine site or using electricity to power mine site activity. It is submitted that the statutory context of paragraph 269(4)(j) requires a construction of “adverse environmental impact caused by those operations” that includes indirect downstream impacts. Because the operations are for the purpose of winning coal for export for ultimate use in power generation, impacts of those operations include the winning of the coal (to which the operations are directed) and the impacts of transporting and using that coal, including the impacts of the CO₂ and other greenhouse gases produced by that transport and use. The emissions from the burning of coal are an inevitable consequence of the mining of the thermal coal.

25. Part of the statutory context which indicates that “adverse environmental impact caused by those operations” include indirect and downstream impacts of use of the product produced by the operations is the broad meaning given to “environment” in the MRA. “Environment” is defined in the Schedule (Dictionary) of the MRA as having the meaning given by the EPA. Section 8 of the EPA provides this definition:

8 Environment

Environment includes—

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) all natural and physical resources; and
- (c) the 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 that affect, or are affected by, things mentioned in paragraphs (a) to (c). (Emphasis added.)

26. The broadly defined meaning of “environment”, contextually, favours a broad construction of “adverse environmental impact caused by [mining] operations”. The use of a broadly defined concept comprehends that “impacts of mining operations” may be other than localised and may arise indirectly.
27. “Impact” is not defined in the MRA or EPA and its meaning in paragraph 269(4)(j) MRA has not been specifically considered, to our knowledge, previously, by the Court or the Court of Appeal.
28. The ordinary meaning of “impact”, in the context of paragraph 269(4)(j) MRA, is “influence or effect [exerted by a new idea, concept, ideology, etc.]”.¹⁴ The question for the Court posed by the paragraph becomes “whether there will be any adverse environmental influences or effects caused by the mining operations conducted pursuant to the mining lease”.
29. The meaning of “impact” was considered specifically in the context of environmental impact assessment in *Minister for the Environment and Heritage v Queensland Conservation Council Inc* (2004) 139 FCR 24 at [53]-[57] (the Nathan Dam Case). The Full Court held in relation to the meaning of the phrase “all adverse impacts” in s 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act):

¹⁴ *The Macquarie Concise Dictionary* (Revised 3rd ed, The Macquarie Library, 1999), p 564.

‘Impact’ in the relevant sense means the influence or effect of an action: *Oxford English Dictionary*, 2nd ed, vol VII, 694-695. As the respondents submitted, the word ‘impact’ is often used with regard to ideas, concepts and ideologies: ‘impact’ in its ordinary meaning can readily include the “indirect” consequences of an action and may include the results of acts done by persons other than the principal actor. Expressions such as ‘the impact of science on society’ or ‘the impact of drought on the economy’ serve to illustrate the point. Accordingly, we take s 75(2) to require the Minister to consider each way in which a proposed action will, or is likely to, adversely influence or effect the world heritage values of a declared World Heritage property or listed migratory species. As a matter of ordinary usage that influence or effect may be direct or indirect. “Impact” in this sense is not confined to direct physical effects of the action on the matter protected by the relevant provision of Pt 3 of Ch 2 of the EPBC Act. It includes effects which are sufficiently close to the action to allow it to be said, without straining the language, that they are, or would be, the consequences of the action on the protected matter. Provided that the concept is understood and applied correctly in this way, it is a question of fact for the Environment Minister whether a particular adverse effect is an ‘impact’ of a proposed action. ...

It is sufficient in this case to indicate that ‘all adverse impacts’ includes each consequence which can reasonably be imputed as within the contemplation of the proponent of the action, whether those consequences are within the control of the proponent or not. (Emphasis added)

30. Sub-section 75(2) of the EPBC Act, which was the subject of consideration in the extract from the Nathan Dam Case, provides as follows:

- (2) If, when the Minister makes a decision under subsection (1), it is relevant for the Minister to consider the impacts of an action:
 - (a) the Minister must consider all adverse impacts (if any) the action:
 - (i) has or will have; or
 - (ii) is likely to have;
 on the matter protected by each provision of Part 3; and
 - (b) must not consider any beneficial impacts the action:
 - (i) has or will have; or
 - (ii) is likely to have;
 on the matter protected by each provision of Part 3.

31. In the Nathan Dam Case, the “action” being considered was a dam intended to allow, *inter alia*, the growing of cotton in areas not previously able to be used for agriculture through using water stored by the dam. The impacts which the minister had ruled out of his consideration were potential impacts of the run off from cotton farms on the Great Barrier Reef some further hundreds of kilometres downstream. The effect of the decision, at first instance and confirmed on appeal, was that those indirect, downstream impacts on the Reef were impacts of the action for the purpose of the EPBC Act.

32. It is submitted that the reasoning in the Nathan Dam Case is applicable to the present construction question. The construction of a dam is, essentially, a physical activity whose direct impacts on the environment are localised and, relatively, restricted. The dam, like a coal mine, produces product intended for use elsewhere. That product, by being available for use, makes possible activities for which it would not, otherwise, be used. These activities are, in each case, contemplated by the proponent of the action. These subsequent activities have, potentially, broader and more far reaching effects. That is, if the coal stays in the ground (the operations do not occur), it cannot be used for steelmaking or power generation. Similarly, if the water is not stored, it cannot be used for cotton growing. In both cases, the subsequent (facilitated) activities involve the actions of other people but without breaking, as a matter of ordinary usage, the causal relationship between the

original physical activities and the effects of the subsequent activities. In both cases, “impact” is used in the phrase being construed and is used in the context of legislation providing for environmental impact assessment and, in both cases, decisions may be made (or recommended) that the proposal be approved, approved with conditions, or not approved. The analogy between the provision in Nathan Dam and paragraph 269(4)(j) is very close, in our submission.¹⁵

33. The construction is also supported by the use of “any”, in paragraph 269(4)(j) MRA as a determiner or pronoun to qualify “adverse environmental impact”. The obligation to consider whether “there will be any adverse environmental effect ...” in paragraph 269(4)(j) is analogous to the express requirement to consider “all adverse effects, if any” in subs 75(2) EPBC Act. It is submitted that the legislature has acknowledged that impacts of the mining operation may be many and varied, direct and indirect.¹⁶ Read in context and in light of the objects of the Act, “any” means in whatever quantity or number, great or small.¹⁷
34. In *Parramatta v Hale* (1982) 47 LGRA 319, the provision under consideration by the New South Wales Court of Appeal was paragraph 90(1)(b) of the *Environmental Planning and Assessment Act 1979* (NSW) which provides, effectively:

In determining a development application, a consent authority shall take into consideration such of the following matters as are of relevance to the development that development application: ... (b) the impact of that development on the environment ... and, where harm to the environment is likely to be caused, any means that may be employed to protect the environment or to mitigate that harm; ... (Emphasis added)

35. Moffitt P’s discussion the application of paragraph 90(1)(b) at page 342 is as follows:

As the consideration is of “any” means that may be employed to protect or mitigate, the authority would not discharge its responsibility if it considered just one means,

¹⁵ Pain J applied the decision in the Nathan Dam Case in considering the causal relationship between emissions from the use of coal in power stations and the effects of climate change and global warming in *Gray v Minister for Planning* [2006] NSWLEC 720; (2006) 152 LGERA 258, particularly at [98]-[100]. In *Australian Conservation Foundation v Minister for Planning* [2004] VCAT 2029; (2004) 140 LGERA 100, Morris J applied the Nathan Dam Case and held that a planning scheme amendment to facilitate an expansion of a coal mine must consider the indirect impacts of greenhouse gas emissions resulting from the burning of the coal at the nearby Hazelwood Power Station in Victoria. See, in particular, paragraphs [42]-[47]. In *Wildlife Preservation Society of Queensland Proserpine/Whitsunday Branch Inc v Minister for the Environment and Heritage* [2006] FCA 736; (2006) 232 ALR 510, Dowsett J found that the decision-maker under the EPBC Act had considered the greenhouse gas emissions from the mining, transport and use of coal from two coal mines in deciding that the mines were not controlled actions under s 75 of the EPBC Act. However, Dowsett J doubted, in *obiter dicta*, the need to consider greenhouse gas emissions from the use of coal from coal mines under the principles in the Nathan Dam Case at [72].

¹⁶ See generally, *Parramatta City Council v Hale* (1982) 47 LGRA 319 at 342 per Moffitt P.

¹⁷ “Any” is defined in the *The Macquarie Concise Dictionary* (Revised 3rd ed, The Macquarie Library, 1999), p 43, as, “**any** / *determiner* / 1. one, a, an, or (with plural noun) some, whatever or whichever it may be: *if you have any witnesses, produce them.* 2. in whatever quantity or number, great or small: *have you any butter?* 3. every: *any schoolchild would know that.* 4. (with a negative) none at all. 5. a great or unlimited (amount): *any number of things.* – *pronoun* 6. (*construed as singular*) any person; anybody, or (*construed as plural*) any persons: *he does better than any before him; unknown to any.* 7. any single one or any one’s; any thing or things; any quantity or number: *I haven’t any.* – *adverb* 8. in any degree; to any extent; at all: *do you feel any better?; will this route take any longer?*

unless of course this means protected the environment and is secured when the consent is given ...

36. In the context of a coal mine, producing coal for electricity production that, inevitably, will result in the emission of significant amounts of greenhouse gases which, in turn, contribute to climate change and ocean acidification, the “adverse environmental impact” of the mining operations as used in paragraph 269(4)(j) MRA includes, it is submitted, the contribution those greenhouse gases will make to climate change and ocean acidification, including as a result of the downstream activities of transporting and using the coal which has been won by the mining activities.
37. Such an approach is entirely consistent with the normal approach of considering environmental impacts in legislation that provides for an environmental impact statement (EIS) to be prepared, as is provided here through the EIS process in the SDPWOA for consider the application under the MRA and EPA. As a practical tool for decision-making, environmental impact assessment (of which the main type is an EIS) need not be perfect or cover every topic but it is well recognised that it must at least attempt to broadly alert the decision-maker and members of the public to the true effect of the activity and the consequences to the community inherent in the carrying out or not carrying out of the activity.

I do not think the [statute] ... imposes on a determining authority when preparing an environmental impact statement a standard of absolute perfection or a standard of compliance measured by no consideration other than whether it is possible in fact to carry out the investigation. I do not think the legislature directed determining authorities to ignore such matters as money, time, manpower etc. In my opinion, there must be imported into the statutory obligation a concept of reasonableness ... provided an environmental impact statement is comprehensive in its treatment of the subject matter, objective in its approach and meets the requirement that it alerts the decision maker and members of the public ... to the effect of the activity on the environment and the consequences to the community inherent in the carrying out or not carrying out of the activity, it meets the standards imposed by the regulations. The fact that the environmental impact statement does not cover every topic and explore every avenue advocated by experts does not necessarily invalidate it or require a finding that it does not substantially comply with the statute and the regulations.”¹⁸ (emphasis added)

38. A similar, practical approach to identifying the true effects of a proposal is adopted in other jurisdictions. For example, in elucidating a remarkably undefined “environmental impact report” in s 5 of the *National Development Act 1979* (NZ), the New Zealand Court of Appeal stated:

“Obviously there must be a real and sufficient link between the less direct effects likely to flow from projected works if they are to be regarded as relevant. But it could not be Parliament’s intention that in every context a discussion limited to site-specific environmental implications will satisfy an applicant’s responsibility to provide a realistic impact report. If that were the case the ‘green light’ could well be given to some major industrial project which involved insignificant environmental implications considered by reference only to the site itself, but manifold and adverse effects when assessed against the further construction of another undertaking which alone could give it industrial meaning and with which it clearly would be inextricably involved.”¹⁹ (emphasis added)

¹⁸ *Prineas v Forestry Commission of NSW* (1983) 49 LGRA 402, 417 per Cripps J.

¹⁹ *Environmental Defence Society Inc v South Pacific Aluminium Ltd (No 4)* [1981] 1 NZLR 531, 534 per the Court (Woodhouse P, Cooke, Richardson and McMullen JJ).

Paragraph 269(4)(k) – “the public right and interest will be prejudiced”

39. The starting point for a consideration of questions of “public right or interest” in a mining statute is *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 (*Sinclair*), referred to earlier in these submissions.²⁰ The provision under consideration in *Sinclair* was Regulation 39(2) of the *Mining Regulations of 1971* (the 1971 Regulations) which required that the mining warden refuse an application if he were of the opinion that “the public right or interest will be prejudicially affected by the granting of the application”.²¹

40. The objections under consideration in *Sinclair* read as follows:²²

- (a) Until it can be shown that it is in the public interest to grant a mineral lease over the area, no such lease should be recommended;
- (b) The area over which the leases are sought are aesthetically attractive and should be preserved in its natural state;
- (c) A comprehensive survey of the whole of Fraser Island is required to determine the best use in the long term of all the natural resources of the Island and until such a survey has been carried out no further sand mining leases should be granted on the island;
- (d) Sandmining in this area would be generally against the public interest.

41. Barwick CJ said, in respect of the objections in *Sinclair*:²³

It cannot be doubted, in my opinion, that the matters raised and evidenced by the objector were matters of general public interest.

42. Barwick CJ went on to say:²⁴

The interest, of course, must be the interest of the public and not mere individual interest which does not involve a public interest. Clearly enough, the material evidenced by the appellant did relate to a public interest not limited to the interests of a less than significant section of the public.

43. There appears to be nothing in the statutory context of paragraph 269(4)(k) of the MRA that suggests that the phrase “public right and interest” should be given a more narrow meaning than the phrase carried in the context of the 1971 Regulations. The issues raised by the objector in *Sinclair* were broadly concerned with environmental issues and included concern with longer term land use planning. The grounds of the objection by FOE involve the relationship between the resource sought to be exploited and very significant global problems to which the removal and use of the resource will contribute. It is difficult to imagine an issue associated with a recommendation that raises more squarely the public right and interest. It is also submitted that removal and use of the resource does prejudice the public right and interest by contributing to the problem of climate change and ocean acidification while, at the same time, delivering other benefits.

²⁰ There is no material distinction between a public right or the public interest for the purposes of this hearing but these submissions will focus on the public interest as the more relevant term. There are public rights to a healthy and pleasant environment, protected through the tort of public nuisance, as well as a public interest in a healthy and pleasant environment.

²¹ The wording is taken from the paraphrase in the reasons of the mining warden extracted by Barwick CJ at page 477.

²² Extracted from the reasons of Barwick CJ at page 476.

²³ *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 at 479.

²⁴ *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 at 480.

44. Also in *Sinclair*, Jacobs J noted that determining where the public interest lies is a balancing exercise:²⁵

The public interest is an indivisible concept. The interest of a section of the public is a public interest but the smallness of the section may affect the quantity or weight of the public interest so that it is outweighed by the public interest in having the mining operation proceed. It does not however affect the quality of that interest. ...

On an inquiry of the kind which the warden is required to make it is not possible to describe any onus of proof of a public interest against the grant of a mining lease. Nevertheless, generally speaking, there appears to me to be disclosed by the Act an intention that the grant of a mining lease should be recommended unless the grant would be against the public interest. The grant is not dependent on the existence of minerals in the area granted but the proved existence of such minerals and the proved or expected quantity thereof are factors to be considered in determining where the public interest lies, and conversely the absence of such minerals must be weighed against the amount of damage to the environment which mining of the area will produce. The words “public interest” are so wide that they comprehend the whole field of objection other than objection found on deficiencies in the application and in the required marking out of the land applied for. (Emphasis added.)

45. McMurdo J (with the concurrence of McPherson and Jerrard JJA.) referred to *Sinclair* in *Armstrong v Brown* [2004] 2 Qd R 345 at [15]. His honour said:

Sinclair was a case dealing with an earlier statutory regime, but to some extent the statements relied upon are relevant to the operation of s 269.

46. The decision in *Armstrong* was not about the extent of “public right and interest”. However, the Court of Appeal agreed with the approach that economic viability and the likely profitability of the mining for which a lease was sought is a relevant consideration in respect of the matters referred to in paragraph 269(4)(c) of the MRA even though economic viability is not expressly mentioned in that paragraph (which talks about “acceptable level of development and utilisation of the mineral resources”). The Court of Appeal approved of the approach to that same question by Kingham DP in *Salmon v Armstrong* [2001] QLRT 72. It is submitted that, while not concerned with paragraph 269(4)(k) of the MRA or the construction of “public right and interest”, the approach of the Court of Appeal indicates the continued relevance of the decision in *Sinclair* and, also, indicates that a restrictive or narrow approach is not favoured in construing each of the paragraphs in subs 269(4) of the MRA.

47. Tamberlin J provided a useful summary of the concept of the public interest in *McKinnon v Secretary, Department of Treasury* (2005) 145 FCR 70 at [8]-[12]:²⁶

The reference to “the public interest” appears in an extensive range of legislative provisions upon which tribunals and courts are required to make determinations as to what decision will be in the public interest. This expression is, on the authorities, one that does not have any fixed meaning. It is of the widest import and is generally not defined or described in the legislative framework, nor, generally speaking, can it be defined. It is not desirable that the courts or tribunals, in an attempt to prescribe some generally applicable rule, should give a description of the public interest that confines this expression.

²⁵ *Sinclair v Mining Warden at Maryborough* (1975) 132 CLR 473 at 487.

²⁶ Tamberlin J went on to consider some of the case law on the concept. His judgment, as part of a majority, was upheld in *McKinnon v Secretary, Department of Treasury* (2006) 228 CLR 423 and his summary of the law on the meaning of “the public interest” was not doubted.

The expression “in the public interest” directs attention to that conclusion or determination which best serves the advancement of the interest or welfare of the public, society or the nation and its content will depend on each particular set of circumstances. ...

The expression “the public interest” is often used in the sense of a consideration to be balanced against private interests or in contradistinction to the notion of individual interest. It is sometimes used as a sole criterion that is required to be taken into account as the basis for making a determination. In other instances, it appears in the form of a list of considerations to be taken into account as factors for evaluation when making a determination. By way of example, town planning legislation frequently lists a number of factors that a local council or planning body is required to take into account when making a determination, with a concluding consideration being a generalised reference to the public interest and the circumstances of the case. ...

The public interest is not one homogenous undivided concept. It will often be multi-faceted and the decision-maker will have to consider and evaluate the relative weight of these facets before reaching a final conclusion as to where “the public interest” resides. ... (Emphasis added)

48. This reasoning was not questioned on appeal to the High Court where Hayne J also noted in *McKinnon v Secretary, Department of Treasury* (2006) 228 CLR 423 at [55]-[56]:

It may readily be accepted that most questions about what is in ‘the public interest’ will require consideration of a number of competing arguments about, or features or ‘facets’ of, the public interest. As was pointed out in *O’Sullivan v Farrer*²⁷:

‘[T]he expression “in the public interest”, when used in a statute, classically imports a discretionary value judgment to be made by reference to undefined factual matters, confined only ‘in so far as the subject matter and the scope and purpose of the statutory enactments may enable ... given reasons to be [pronounced] definitely extraneous to any objects the legislature could have had in view’²⁸. (Emphasis added)

49. It is submitted that the reference to “encourage environmental responsibility in prospecting, exploring and mining” as one of the objects of the MRA in paragraph 2(a) of the MRA militates in favour of not restricting “public right and interest” in paragraph 269(4)(k) from extending to a consideration of the relationship between the resource sought to be exploited and very significant global problems to which the removal and use of the resource will contribute and ways in which that contribution can be mitigated.²⁹ Equally, the more narrow context of paragraph 269(4)(k) of the MRA includes paragraph 269(4)(j), with its express comprehension of “any adverse environmental impact”. This also suggests that the phrase, which is of widest import should not construed, restrictively, in the context of environmental impacts.

²⁷ (1989) 168 CLR 210 at 216.

²⁸ *Water Conservation and Irrigation Commission (NSW) v Browning* (1947) 74 CLR 492 at 505 per Dixon J.

²⁹ In *Telstra v Hornsby* [2006] NSWLEC 133; (2006) 146 LGERA 10, at [121]-[124], Preston CJ used the subject matter, scope and purpose of the environmental assessment legislation being applied by him to conclude that “public interest” included consideration of the principles of ESD.

Paragraph 269(4)(l) – “any good reason has been shown for a refusal”

50. Section 269(4)(l) of the MRA is an extremely wide consideration that is limited only by the structure and objects of the Act.³⁰ Clearly, there must be a *good* reason, as opposed to a reason that is extraneous to the purposes of the Act.³¹ In *Campbell v United Pacific Transport* [1966] Qd R 465, at 472, Gibbs J stated, when considering whether “good reason” had been shown by an applicant plaintiff for leave to proceed after six years without a step in the proceedings:

In my opinion the question whether good reason has been shown must depend on all the circumstances of the particular case.

51. As discussed in the context of paragraph 269(4)(k), paragraph 2(d) of the MRA includes, as an objective of the MRA: to “encourage environmental responsibility in prospecting, exploring and mining”. For the reasons stated in respect of paragraph 269(4)(k) and its reference to prejudice of “the public right and interest”, “good reason ... for a refusal to grant” comprehends the matters raised by FOE’s objection and proposed conditions. There is nothing in the statutory context which suggests that the phrase should be read down to exclude those matters.

52. It is submitted, however, that the inclusion of two very broad criteria, namely, those in paragraphs 269(4)(k) and (l) involves a mutual reinforcement of the breadth of each criterion. It would be easier to conclude that, if only one “catch all” criterion had been included, it should be read down by reference to parts of the statutory context. The inclusion of two such criteria is a very strong indication that each criterion should be construed according to its generous terms.

53. Further, in considering whether “good reason has been shown for a refusal to grant the mining lease”, one can, it is submitted, consider matters which might, in the absence of the power to recommend “that the lease be granted subject to [appropriate] conditions”, lead to a refusal. That is, in considering whether “any good reason has been shown for a refusal”, one need not conclude that a refusal is the necessary recommendation. That is, one may consider matters which militate in favour of or towards a refusal even if, at the end of that consideration, the matters are more properly dealt with by the recommendation of conditions rather than a refusal.³²

Environmental Protection Act 1994

54. The objects of the EPA are stated in s 3 as follows:

3 Object

The object of this Act is to protect Queensland’s environment while allowing for development that improves 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*).

³⁰ In accordance with the normal rules of statutory interpretation and administrative decision-making. See generally, *Parramatta City Council v Hale* (1982) 47 LGRA 319 at 338-345 per Moffitt P; *Woollahra Municipal Council v Minister for the Environment* (1991) 23 NSWLR 710; *Packham v Minister for the Environment* (1993) 31 NSWLR 65.

³¹ *Water Conservation and Irrigation Commission (NSW) v Browning* (1947) 74 CLR 492.

³² This consideration has also been discussed in slightly different and more general terms above.

55. As the Court is exercising a power under the EPA, s 5 places an obligation on it:

5 Obligations of persons to achieve object of Act

If, under this Act, a function or power is conferred on a person, the person must perform the function or exercise the power in the way that best achieves the object of this Act.

56. The duty in s 5 of the EPA emphasises the distinction between the Court's role in assessing the mining lease application under the MRA, where there is no such duty, and the Court's role in assessing the environmental authority under the EPA.³³ The duty is particularly important in this case.

57. The objects of the Act and the reason for imposing the obligation in s 5 was explained further in the *Environmental Protection Bill 1994 Explanatory Notes* as follows (emphasis in underlining added):

Reasons for the Bill

Existing environmental legislation in Queensland is generally outdated. Despite amendments, the present legislation does not reflect modern environmental management practices, or community expectations for a clean and safe environment. This Bill supersedes the *Clean Air Act 1963*, *Clean Waters Act 1971*, *Noise Abatement Act 1978*, *Litter Act 1971*, *Fig Tree Pocket Noise Emission Act 1984* and the *State Environment Act 1988*. The Bill provides for a range of innovative regulatory mechanisms which enhance accountability, public participation and self-regulation. By providing greater certainty in enforcement and operation, both industry and the community understand their rights and obligations regarding environmental protection. Protection of the environment is ensured by requiring economic development to be ecologically sustainable.

...

NOTES ON PROVISIONS

...

Section 3 defines the object of the Act in the terms of ecologically sustainable development (ESD). ESD is the agreed Government policy for achieving development both in Queensland and nationally in a manner that does not lead to irreversible environmental degradation.

...

Section 5 requires all people who are given power under this Act, to use that power to protect the Queensland environment and to do so consistent with the principles of ESD.

58. To achieve its object, the scheme of the EPA provides a number of mechanisms is to reduce “environmental harm”, a concept defined in s 14 as follows:

14 Environmental harm

- (1) Environmental harm is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.
- (2) Environmental harm may be caused by an activity—
 - (a) whether the harm is a direct or indirect result of the activity; or
 - (b) whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

59. Sections 437 and 438 of the EPA provide criminal offences for unlawfully causing serious or material environmental harm.³⁴ Serious or material environmental harm is lawful if, amongst other things, it is authorised under an environmental

³³ A function conferred by s 219(3) and s 223 of the EPA.

³⁴ Material and serious environmental harm are defined in ss 16 and 17 of the EPA.

authority.³⁵ The EPA therefore directly links the concept of environmental harm to an environmental authority granted under it and it logically should be considered in granting any such authority.

60. It is submitted that the concept of “environmental harm” calls for consideration of the contribution of this mine to the impacts of many other activities such as the burning of coal around the globe.
61. Chapter 5, ss 146-309, of the EPA provides the process for applying for, and amending, environmental authorities for mining activities, including an environmental authority (mining lease). Sections 147 and 149 of the Act define “mining activity” and “mining project” as follows:

147 What is a *mining activity*

- (1) A *mining activity* means an activity mentioned in subsection (2) that, under the Mineral Resources Act, is authorised to take place on—
- (a) land to which a mining tenement relates; or
 - (b) land authorised under that Act for access to land mentioned in paragraph (a).
- (2) For subsection (1), the activities are as follows—
- (a) prospecting, exploring or mining under the Mineral Resources Act or another Act relating to mining;
 - (b) processing a mineral won or extracted by an activity under paragraph (a);
 - (c) an activity that—
 - (i) is directly associated with, or facilitates or supports, an activity mentioned in paragraph (a) or (b); and
 - (ii) may cause environmental harm;
 - (d) rehabilitating or remediating environmental harm because of a mining activity under paragraphs (a) to (c);
 - (e) action taken to prevent environmental harm because of an activity mentioned in paragraphs (a) to (d);
 - (f) any other activity prescribed for this subsection under a regulation.

149 What is a *mining project*

A *mining project* means all mining activities carried out, or proposed to be carried out, under 1 or more mining tenements, in any combination, as a single integrated operation.

62. The application for the Wandoan Coal Mine was for a non-code compliant level 1 mining activity, which is dealt with in Part 6 of Chapter 3 of the EPA. The EPA provides for any person to object to the amendment of an environmental authority (mining lease) under Part 6 of Chapter 3. The right to object and the process for the objections decision hearing is set out in ss 216-226. Section 222 states the nature of the objections decision to be made by the Court in the following terms:

222 Nature of objections decision

- (1) The objections decision for the application must be a recommendation to the MRA Minister that—
- (a) the application be granted on the basis of the draft environmental authority for the application; or
 - (b) the application be granted, but on stated conditions that are different to the conditions in the draft; or
 - (c) the application be refused.
- (2) However, if a relevant mining lease is, or is included in, a significant project and, under section 210, Coordinator-General’s conditions were included in the draft, any stated conditions under subsection (1)(b)—
- (a) must include the Coordinator-General’s conditions; and

³⁵ Section 493A(2)(d) of the EPA.

- (b) must not be inconsistent with a Coordinator-General's condition.
- (3) The Land Court must give a copy of the decision to the EPA Minister as soon as practicable after the decision is made.

63. While the application considered by the Court relates, ostensibly, only to the “mining activity” the subject of the application (which, in this case does not include the transport and use of the coal), it is clear from the criteria that must be considered by the Court that its consideration of the application must be considered in its proper context, rather than in an artificial isolation.³⁶ This matter will be developed further with reference to the criteria that must be considered by the Court.

64. Section 223 states the matters to be considered, relevantly as follows:

223 Matters to be considered for objections decision

In making the objections decision for the application, the Land Court must consider the following—

- (a) the application documents for the application;
- (b) any relevant regulatory requirement;
- (c) the standard criteria;
- (d) to the extent the application relates to mining activities in a wild river area—the wild river declaration for the area;
- (e) each current objection;
- (f) any suitability report obtained for the application;
- (g) the status of any application under the Mineral Resources Act for each relevant mining tenement.

65. The “standard criteria” are defined in the dictionary of the EPA as follows:

standard criteria means—

- (a) the principles of ecologically sustainable development as set out in the ‘National Strategy for Ecologically Sustainable Development’; and
- (b) any applicable environmental protection policy; and
- (c) any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and
- (d) any applicable environmental impact study, assessment or report; and
- (e) the character, resilience and values of the receiving environment; and
- (f) all submissions made by the applicant and submitters; and
- (g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—
 - (i) an environmental authority;
 - (ii) an environmental management program;
 - (iii) an environmental protection order;
 - (iv) a disposal permit;
 - (v) a development approval; and
- (h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and
- (i) the public interest; and
- (j) any applicable site management plan; and
- (k) any relevant integrated environmental management system or proposed integrated environmental management system; and
- (l) any other matter prescribed under a regulation. (Emphasis added)

³⁶ In a similar manner to the reasoning of the New Zealand Court of Appeal in *Environmental Defence Society Inc v South Pacific Aluminium Ltd (No 4)* [1981] 1 NZLR 531 at 534, the mine must not be divorced from other activities (in this case the sale and intended use of the coal from the mine) that “alone could give it industrial meaning and with which it clearly would be inextricably involved.”

66. The principles of ecologically sustainable development (ESD) as set out in the National Strategy for ESD are as follows:³⁷

The Goal is:

Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The Core Objectives are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations
- to provide for equity within and between generations
- to protect biological diversity and maintain essential ecological processes and life-support systems

The Guiding Principles are:

- decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations
- where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- the global dimension of environmental impacts of actions and policies should be recognised and considered
- the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised
- the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised
- cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms
- decisions and actions should provide for broad community involvement on issues which affect them.

These guiding principles and core objectives need to be considered as a package. No objective or principle should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ESD.

67. The considerations prescribed by s 223 of the EPA operate at a number of levels. The standard criteria call up a number of criteria including the ESD principles. The ESD principles, themselves, have a number of sub-criteria. There has been no detailed consideration of the principles of ESD under the EPA by Queensland courts but recent decisions in NSW provide important judicial consideration of them.³⁸

The Core Objectives

68. While the standard criteria of the EPA refer to the principles of ESD, the principles cannot be divorced from the core objectives that immediately pre-cede them in the text of the National Strategy for ESD. These emphasise development that “safeguards the welfare of future generations”, “provide for equity within and between generations” and “protect biological diversity and maintain essential ecological processes and life-support systems”.

³⁷ Exhibit 138.

³⁸ *Gray v Minister for Planning* [2006] NSWLEC 720; (2006) 152 LGERA 258 (Pain J); *BGP Properties Pty Ltd v Lake Macquarie City Council* [2004] NSWLEC 399; (2004) 138 LGERA 237 at [90]-[94] (McClellan CJ); *Bentley v BGP Properties* (2006) 145 LGERA 234 at [58] – [62] and 245, [67] (Preston CJ); *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59; (2007) 161 LGERA 1 at [67] - [74] (Preston CJ).

69. The first two of the core objectives reflects the concept of Intergenerational Equity, which Pain J considered in *Gray v Minister for Planning* [2006] NSWLEC 720; (2006) 152 LGERA 258 at [118]-[126]. Of particular relevance after the matters her Honour discussed at [122]:

In terms of environmental impact assessment which takes into account the principle of intergenerational equity ... one important consideration must be the assessment of cumulative impacts of proposed activities on the environment. ... failure to consider cumulative impact will not adequately address the environmental impact of a particular development where often no single event can be said to have such a significant impact that it will irretrievably harm a particular environment but cumulatively activities will harm the environment.

70. Pain J found in *Gray v Minister for Planning* [2006] NSWLEC 720; (2006) 152 LGERA 258 at [126] that:

... a failure to take the principle of intergenerational equity into account by a requirement for a detailed [greenhouse gas] assessment in the [environmental assessment report] if the major component of [greenhouse gases] which results from the use of the coal, namely scope 3 emissions, is not required to be assessed. That is a failure of a legal requirement to take into account the principle of intergenerational equity. (Emphasis added.)

71. Although a decision made in the context of judicial review under a different legislative regime, the conclusions of Pain J are particularly apposite to the present discussion in that the failure complained of in *Gray*, as can be seen from the words in the citation underlined, was a failure to require that an Environmental Assessment Report for a proposed coal mine include an assessment of scope 3 emissions.

72. ESD considerations materially identical to the third core objective to “protect biological diversity and maintain essential ecological processes and life-support systems” were discussed by Preston CJ in *Bentley v BGP Properties* (2006) 145 LGERA 234 at [58] – [62].³⁹

[58] The conservation of biological diversity and ecological integrity is one of the pillars of ecologically sustainable development. ...

[60] At a macro level, ecological integrity involves conservation of the ecological processes that keep the planet fit for life. They “shape climate, cleanse air and water, regulate water flow, recycle essential elements, create and recreate soil, and enable ecosystems to renew themselves”: IUCN, UNEP, WWF, *Caring for the Earth: A Strategy for Sustainable Development*, Oxford University Press, 1992 at p. 9.

[61] Maintaining ecological integrity involves maintaining ecosystem health. Ecosystems become unhealthy if their community structure (species richness, species composition or food web architecture) or ecosystem functioning (productivity, nutrient dynamics, decomposition) has been fundamentally upset by human pressures: M Begon, C R Townsend and J L Harper, *Ecology: From Individuals to Ecosystems*, 4th ed, Blackwell Publishing, 2006, p. 645.

[62] Maintaining ecological integrity also involves maintaining ecosystem functioning and ecosystem services. Ecosystem functioning is “the sum total of processes such as the cycling of matter, energy, and nutrients operating at the ecosystem level”: R A Virginia and D H Wall, “Ecosystem Function, Principles of” in S A Levin (ed), *Encyclopaedia of Biodiversity*, Academic Press, 2001, Volume 2, p. 345. Ecosystem services are “the wide array of conditions and processes through which ecosystems,

³⁹ See also, *BGP Properties Pty Ltd v Lake Macquarie City Council* [2004] NSWLEC 399; (2004) 138 LGERA 237 at [90]-[114] (McClellan CJ).

and their biodiversity, confer benefits on humanity; these include the production of goods, life support functions, life-fulfilling conditions, and preservation of options”: G Daily and S Dasgupta, “Ecosystem Services, Concept of”, in S A Levin (ed), *Encyclopaedia of Biodiversity*, Academic Press, 2001, Volume 2, p. 353.

[63] The conservation of threatened species is an essential action in the conservation of species diversity, and hence of biological diversity, and of ecological integrity.

Principles of ESD involving long-term and global considerations

73. Within the context of the core objectives, the first and third principles of ESD involve weighing economic and global considerations in decision-making. They are discussed together because they raise analogous considerations which are at the heart of the ESD principles. The first principle requires that the objections decision be neither short sighted nor mono-dimensional, requiring that economic, social and equity considerations be taken into account. The principle emphasises that environmental impacts of the operations (action) authorised by the mining lease be subject to an environmental authority that recognises the global dimension of the environmental impacts of those operations.
74. Limiting the consideration of greenhouse gas emissions from the mining of the coal from the mine alone would be piece-meal and inconsistent with the first principle of ESD, that decision making processes should, effectively, integrate both long and short-term economic, environmental, social and equity considerations. This principle seeks to assess the true effects of activities in a holistic rather than piece-meal way.
75. Preston CJ noted in the context of objections to a proposed windfarm in *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* [2007] NSWLEC 59; (2007) 161 LGERA 1 at [74], after discussing the policy context for climate change (emphasis in underlining added):

[74] The attainment of intergenerational equity in the production of energy involves meeting at least two requirements. The first requirement is that the mining of and the subsequent use in the production of energy of finite, fossil fuel resources need to be sustainable. Sustainability refers not only to the exploitation and use of the resource (including rational and prudent use and the elimination of waste) but also to the environment in which the exploitation and use takes place and which may be affected. The objective is not only to extend the life of the finite resources and the benefits yielded by exploitation and use of the resources to future generations, but also to maintain the environment, including the ecological processes on which life depends, for the benefit of future generations. The second requirement is, as far as is practicable, to increasingly substitute energy sources that result in less greenhouse gas emissions for energy sources that result in more greenhouse gas emissions, thereby reducing the cumulative and long-term effects caused by anthropogenic climate change. In this way, the present generation reduces the adverse consequences for future generations.

76. Limiting the consideration of greenhouse gas emissions from the mining of the coal from the mine would be inconsistent with the third principle of ESD, in that the global dimension of environmental impacts of actions and policies should be recognised and considered. The third principle requires consideration of impacts across the globe as well as the resulting impacts upon the Queensland environment of climate change, itself.

Second principle of ESD: the Precautionary Principle

77. The second principle of ESD is now widely known as “the Precautionary Principle”.⁴⁰ Failing to consider the impacts of GHG emissions from the mine contributing to climate change because the impacts of climate change or the contribution of these particular emissions are uncertain, would be inconsistent with this principle. Pain J observed in *Gray v Minister for Planning* [2006] NSWLEC 720 at [131] that:

... inherent in the precautionary principle ... is the need for careful evaluation to avoid serious or irreversible damage to the environment and an assessment of the risk weighted consequences for various options. The role of environmental assessment is to assist in providing information to the decision-maker to enable him or her to consider that scientific uncertainty in relation to the serious, irreversible environmental threat, in this case climate change/global warming ... Amongst several matters identified as necessary to include in environmental assessments to inform the precautionary approach [are] that long term, ongoing or cumulative impacts of a project including the use and disposal of associated products and by products should be assessed.

78. The science of climate change or the impacts that are expected are not disputed in this case and, therefore, it is unnecessary for the Court to draw upon the second ESD principle. The Court can take these matters as admitted.

Principles of ESD involving economic considerations

79. The fourth and fifth principles of ESD emphasise a need to balance economic and environmental considerations. The two principles are also intended to balance the exhortations of the first, second and third principles.

80. The sixth principle of ESD urges cost effective and flexible policy instruments. In making the principles of ESD applicable to the objections decision, the EPA recognises the environmental authority as a policy instrument which can be used to achieve ESD objectives. These objectives, however, are subject to meeting the goal of ESD and the core objectives such as maintaining essential ecological processes and life-support systems.

The character, resilience and values of the receiving environment

81. The character, resilience and values of the receiving environment is a matter that the Court must also consider as one of the standard criteria. In the context of the objection, the receiving environment for the emissions of CO₂ and other greenhouse gases that are emitted due to the mining and use of the coal is the atmosphere and the oceans.

82. Dr Meinshausen’s opinion was not challenged and should be accepted in his adoption of the work of Dr James Hansen and his colleagues, which is attached as Appendix E to his report,⁴¹ that indicates the safe level of CO₂ in the atmosphere is less than 350 ppm. As CO₂ are already at 390 ppm and rising by 2 ppm per year, the resilience of the atmosphere to absorb CO₂ has already been exceeded. Dr Meinshausen’s unchallenged views combined with Professor Heogh-Guldberg’s

⁴⁰ See particularly, *Telstra v Hornsby Shire Council* [2006] NSWLEC 133; (2006) 146 LGERA 10.

⁴¹ Hansen, J., M. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D. L. Royer and J. C. Zachos (2008). "Target Atmospheric CO₂: Where Should Humanity Aim?" *The Open Atmospheric Science Journal* 2: 217-231.

unchallenged views establish that 2°C and 450 ppm represent a critical threshold above which the damage to the environment, particularly the Great Barrier Reef, will be severe and highly detrimental.

Public interest

83. The submissions made and cases referred to earlier with regard to the concept of the public interest under paragraph 269(4)(k) of the MRA are relied upon in respect of paragraph (i) of the definition of “standard criteria”. However, as noted earlier, the MRA and the EPA are two very different Acts with two very different objects. This means there are different frameworks for considering the public interest under the two Acts.⁴² The MRA provides a system aimed at promoting the development of the mineral resources of the State while the EPA is very much focused on the protection of the environment. These objects overlap to some extent, but they are quite different and it would be wrong to assume that the consideration mining lease application under the MRA and the consideration of the application for the environmental authority under the EPA are the same.
84. The statutory context of “the public interest” under the EPA, both in a broad sense in the subject matter, scope and purpose of the EPA, as a whole and the more narrow context of the definition of “standard criteria” and the other paragraphs of s 223, give an even stronger basis for the already wide ambit of “public interest” to include the mitigation of the impacts of CO₂ and other greenhouse gases released by the use of coal from the mine than was the case with similar words used in paragraph 269(4)(k) of the MRA.

Is the Court obliged to recommend refusal of an unsustainable activity?

85. Having reviewed the relevant provisions of the EPA, an important issue arises in the context of this objections hearing, namely: is the Court obliged to recommend refusal of an unsustainable mining activity to meet the obligation imposed by s 5?
86. McHugh, Gummow, Kirby and Hayne JJ stated in *Project Blue Sky v Australian Broadcasting Authority* (1998) 194 CLR 355 at 390 [93]:

[The] test for determining the issue of validity [of an act done in breach of a statutory provision] is to ask whether it was a purpose of the legislation that an act done in breach of the provision should be invalid. ... In determining the question of purpose, regard must be had to “the language of the relevant provision and the scope and object of the whole statute”.

87. In that case their Honours also stated:

A legislative instrument must be construed on the prima facie basis that its provisions are intended to give effect to harmonious goals. Where conflict appears to arise from the language of particular provisions, the conflict must be alleviated, so far as possible, by adjusting the meaning of the competing provisions to achieve that result which will best give effect to the purpose and language of those provisions while maintaining the unity of all the statutory provisions. Reconciling conflicting provisions will often require the court “to determine which is the leading provision and which the subordinate provision, and which must give way to the other”. Only by determining the hierarchy of the provisions will it be possible in many cases to give

⁴² *McKinnon v Secretary, Department of Treasury* (2005) 145 FCR 70 at [8]-[12] per Tamberlin J; *McKinnon v Secretary, Department of Treasury* (2006) 228 CLR 423 at [55]-[56] per Hayne J.

each provision the meaning which best gives effect to its purpose and language while maintaining the unity of the statutory scheme.⁴³

88. On its face, s 5 of the EPA states a clear legislative intent that in exercising its functions under the Act of hearing the objections and making its recommendation to the Minister the Court “must perform the function or exercise the power in the way that best achieves the object of this Act” of ecologically sustainable development. In contrast, ss 222 and 223 provides a list of matters that the Court is only required to “consider” but leave it to the Court on the appropriate balance and weight to be given to each consideration. However, there appears to be a hierarchy in the Act in which the obligation in s 5, linked directly to the object of the Act stated in s 3, provides an over-riding duty when exercising any function under the Act, including the functions of the Court. This appears to be confirmed by the *Environmental Protection Bill 1994 Explanatory Notes*, set out above, particularly given that the reasons for the Bill stated, “Protection of the environment is ensured by requiring economic development to be ecologically sustainable.” (emphasis added).
89. If the Court concludes that a proposed mining activity is unsustainable, it is difficult to see how the Court could “best achieve the objects of the Act” in any way other than to recommend the activity be refused.
90. Consequently, having regard to the scope and object of the whole Act, including the explanatory notes, it would appear that if the Court concludes that an activity is unsustainable (in the sense defined in s3), it is submitted that the Court is obliged to recommend that the activity be refused.

INTERNATIONAL LEGAL OBLIGATIONS

91. FOE’s case is fundamentally based upon the statutory criteria that the Court must consider under the MRA and EPA. FOE submits that the statutes are clear and unambiguous in requiring the Court to consider the impacts of both the mining and burning of the coal, including burning the coal overseas. FOE submits that it is unnecessary to have recourse to international law to interpret the MRA and EPA. No treaty is mentioned in either the EPA or the MRA so as to make the treaty extrinsic material that may be considered under s 14B(3)(d) of the *Acts Interpretation Act 1954* (Qld).
92. The error of not focusing on the legislative criteria that the Court is required to consider is evident in the approach taken by Mr Stanford for Xstrata. Mr Stanford purported to review, *inter alia*, “the policies adopted by the Australian and Queensland Governments to date in respect of the future development of the coal industry” he failed completely to consider the MRA or EPA.⁴⁴ That is a fundamental error of analysis.
93. Xstrata submitted in its opening statement that:

... because of the fact that the coal will be burnt overseas, the emissions then will form part of the inventory of emissions and responsibility of the country where the coal is burnt, and in all probability, on the evidence, that’s going to be China or possibly India; not Australia.

⁴³ *Project Blue Sky v Australian Broadcasting Authority* (1998) 194 CLR 355 at 381-382 [70] (references omitted).

⁴⁴ Exhibit 77; transcript p 6-19, line 45 to p 6-20, line 5.

Those scope 3 emissions will not be taken into account in calculating Australia's compliance with emission targets, or compliance with any international obligations that Australia has about emissions. That's just how it is in relation to Australia's export of coal.⁴⁵

94. Xstrata's approach only confuses the issues for the Court to consider. While reporting of emissions under the UNFCCC⁴⁶ and the Kyoto Protocol⁴⁷ is primarily based on direct (scope 1) emissions from each country, there is no prohibition in these international agreements on countries regulating their own natural resources such as coal to take account of emissions occurring in other countries.
95. Xstrata itself reports its Scope 3 emissions from coal burnt by its customers⁴⁸ and has reported the Scope 3 emissions from burning the coal from the Wandoan Coal Mine in the EIS. Ms McCarthy agreed that "Xstrata recognises the need to report scope 3 emissions very clearly."⁴⁹
96. Moreover, the emissions reporting framework does not supplant the parties' obligation under Art 2 of the UNFCCC to prevent "dangerous anthropogenic interference with the climate system". A majority of the parties, including Australia, agreed in the 2009 Copenhagen Accord that this requires mean global temperatures to be less than 2°C above pre-industrial levels.⁵⁰ Dr Meinshausen was unchallenged on his opinion that the voluntary pledges by parties to the Copenhagen Accord are "still far above an emissions pathway that could realistically reach the 2°C target."⁵¹ The current international approach is clearly unsustainable and this international context has significance when the Court comes to apply the statutory criteria under the MRA and EPA to the applications. These issues will be addressed after considering the evidence.

EVIDENCE RELEVANT TO THE COURT'S RECOMMENDATION

Emeritus Professor Ian Lowe – Science of Climate Change

97. The first Witness for FOE was Emeritus Professor Ian Lowe. The brief biography of Professor Lowe establishes him as an internationally recognised expert whose summary of the basics of climate change science was unchallenged in these proceedings. Professor Lowe's evidence was challenged in relation to his expertise to address economic and policy issues; however, the Court accepted his expertise in sustainable energy policy and science due to his wealth of experience in this area, including advising numerous State and National government departments on these issues.⁵²

⁴⁵ Transcript page 5-67, lines 25-35.

⁴⁶ *United Nations Framework Convention on Climate Change 1992* [1994] ATS No 2 (Entry into force for Australia and generally, 21 March 1994).

⁴⁷ *Kyoto Protocol the United Nations Convention on Climate Change 1997* [2008] ATS No 2 (Entry into force for Australia 11 March 2008).

⁴⁸ Exhibit 47, pages 65-67 of the annexed Xstrata plc Sustainability Report 2010 and page 44 of the Xstrata Coal Sustainability Report 2010.

⁴⁹ Transcript, p 5-80, lines 45-55.

⁵⁰ See the Copenhagen Accord, agreed at the 15th Conference of the Parties in Copenhagen in December 2009.

⁵¹ Exhibit 103, para 57(b).

⁵² Transcript 30 August 2011, page 6-48.

98. No other expert is offered by Xstrata in relation to the climate science issues, nor does Xstrata challenge the scientific understanding of anthropogenic climate change. Xstrata states it, “supports the weight of scientific opinion in relation to climate change and believes actions is required to avoid negative climate change impacts.”⁵³
99. The evidence of Professor Lowe in relation to climate science should be accepted. He is an impressive witness whose evidence has been given clearly. He was articulate and completely credible. When criticised by counsel for Xstrata during cross-examination with claims that he was propounding a “policy statement”, Professor Lowe countered this criticism by noting that his statements and position are supported by accepted climate change science which demonstrates that “we need to rapidly reduce emissions of carbon dioxide and other greenhouse gases.” Professor Lowe stated that his position “[is] not driven by a policy position. The policy position arises from the science.” This science is accepted by Xstrata.⁵⁴
100. Professor Lowe’s report articulates:
- (a) the science of global warming;⁵⁵
 - (b) the seriousness of the problem;⁵⁶
 - (c) the contribution of the Wandoan mine to global warming;⁵⁷
 - (d) the viability of carbon capture and storage (CCS);⁵⁸ and
 - (e) the alternatives to fossil fuels for electricity generation.⁵⁹
101. The factual basis for his report is the statement made by Xstrata in the EIS that the thermal deposits for the mine are estimated to be in excess of 1.2 billion tonnes.⁶⁰ The EIS in the accompanying Technical Report on Greenhouse Gas Emissions, calculated that emissions from the mining and the use of coal from the mine would be over 41 million tonnes of carbon dioxide equivalents annually and 1.3 billion tonnes of carbon dioxide equivalents over the life of the mine.⁶¹
102. Professor Lowe explains that the greenhouse effect arises from the fact that the Earth is kept warmer than it would otherwise be by the presence of trace gases, greenhouse gases (GHGs), in the atmosphere which trap heat. He says that “*global warming is the common term for climate change due to anthropogenic emissions of greenhouse gases leading to increased global temperatures and*

⁵³ Exhibit 47, page 42 of the Xstrata Coal Sustainability Report 2010.

⁵⁴ Transcript 30 August 2011, page 6-61.

⁵⁵ Exhibit 102 paragraphs 8 to 13.

⁵⁶ Exhibit 102 paragraphs 14 to 30.

⁵⁷ Exhibit 102 paragraphs 31 to 39.

⁵⁸ Exhibit 102 paras 40 to 44.

⁵⁹ Exhibit 102 para 45.

⁶⁰ Exhibit 102, para 4.

⁶¹ Exhibit 102, para 5.

other climatic effects such as changes in rainfall patterns and the frequency of severe storms".⁶²

103. He further explains that "*greenhouse gases are gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds*".⁶³ He indicates that the primary greenhouse gases are water vapour, carbon dioxide (CO₂), nitrous oxide, methane and ozone.⁶⁴
104. Measurements over the last fifty years, supplemented by assessments of polar ice cores dating back 650,000 years, show that there have been natural variations of CO₂ levels in the atmosphere from about 180 to 280 parts per million (ppm) and that the global mean temperatures are directly and closely linked to the amount of CO₂ in the atmosphere. The present level of CO₂ in the atmosphere is about 390 ppm increasing annually by 2 ppm.⁶⁵
105. There is a growing concern in the climate science literature about the risk of exceeding a critical threshold and precipitating rapid and essentially irreversible changes to the climate.⁶⁶ Importantly he states, and it could scarcely be contested, that "the Earth is now warmer than at any time since human records began and it is clear that much of this increase is due to human activities releasing greenhouse gases into the atmosphere".⁶⁷
106. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concluded that mean global temperatures had increased by 0.74°C between 1906 and 2005 and that most of the observed increase over the 21st century is very likely (i.e. greater than 90per cent) due to anthropogenic emissions of greenhouse gases⁶⁸. He supports this statement by annexing the "Synthesis Report" produced by the IPCC as Appendix 2 to his report.
107. The report contains a number of statements which are relevant for the purposes of these proceedings:
- (a) Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, wide spread melting of snow and ice and rising global average sea level.⁶⁹
 - (b) Eleven of the last twelve years (1995-2006) rank among the twelve warmest years in instrumental record of global surface temperature.⁷⁰

⁶² Exhibit 102, para 10(c).

⁶³ Exhibit 102, para 10(a).

⁶⁴ Exhibit 102, para 10(a).

⁶⁵ Exhibit 102, para 11.

⁶⁶ Exhibit 102, para 13.

⁶⁷ Exhibit 102, para 14.

⁶⁸ Exhibit 102, para 15.

⁶⁹ Exhibit 102, page 29.

⁷⁰ Exhibit 102, page 29. Note also that the more recent report *Climate Change in Queensland – What the Science is Telling Us* (2010) identified that the land-ocean temperature record indicates that 14 of the past 15 years are the warmest since 1880 per pages 118, 130 and 133 of Exhibit 102.

- (c) The temperature increase is widespread over the globe and is greater at higher northern latitudes.⁷¹ Average arctic temperatures have increased at almost twice the global average rate in the past 100 years and land regions have warmed faster than the oceans.⁷² The temperature change is reflected in a figure which he produces showing abnormalities in the rate of temperature increase.⁷³
- (d) Global GHG emissions due to human activities have grown since pre-industrial times with an increase of 70 per cent between 1970 and 2004. Carbon dioxide (CO₂) is the most important anthropogenic GHG and its annual emissions have grown between 1970 and 2004 by about 80%, from 21 to 38 gigatonnes (Gt) (i.e. billion tonnes). The rate of growth of CO₂ equivalent (CO₂-eq) emissions was much higher between the recent 10 year period of 1995 – 2004 than during the previous period of between 1970 – 1994.⁷⁴
- (e) There is very high confidence that the global average net effect of human activities since 1950 has been one of warming, with a radiative forcing of +1.6 W/m².⁷⁵
- (f) The concentrations of CO₂ far exceed the natural range over the last 650,000 years. Global increases in CO₂ concentrations are due primarily to fossil fuel use, with land use changes providing another significant but smaller contribution.⁷⁶
- (g) It is very likely that there has been there has been significant anthropogenic warming over the last 50 years averaged over each continent (except Antarctica).⁷⁷
- (h) Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.⁷⁸
- (i) Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if GHG concentrations were to be stabilised. Model experiments showed that a further increase in global average temperature of about 0.5°C would still be expected by 2020 if CO₂ emissions were stabilised and radiative forcing was stabilised by 2100.⁷⁹
- (j) Additional thermal expansion alone would lead to 0.3 – 0.8 metres of sea level rise by 2300. Thermal expansion would continue for many centuries

⁷¹ Exhibit 102, page 29.

⁷² Exhibit 102, page 29.

⁷³ Exhibit 102, page 31 and see also page 219.

⁷⁴ Exhibit 102, page 35.

⁷⁵ Exhibit 102, page 36.

⁷⁶ Exhibit 102, page 36.

⁷⁷ Exhibit 102, page 38 and Figure 2.5 at page 39.

⁷⁸ Exhibit 102, page 44.

⁷⁹ Exhibit 102, page 45.

due to the time required to transport heat into the deep ocean.⁸⁰ The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (such as ocean acidification) and other global drivers.⁸¹ For increases in global average temperature exceeding 1.5 to 2.5°C and in concomitant atmospheric CO₂ concentrations, there are projected to be major changes in ecosystem structure and function, species ecological interactions and shifts in species geological ranges, with predominately negative consequences.⁸²

- (k) Coasts are projected to be exposed to increasing risks including coastal erosion due to climatic change and sea level rise. By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise.⁸³
 - (l) The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains whose economies are closely linked with climate sensitive resources. Poor communities are especially vulnerable, in particular those concentrated in high risk areas.⁸⁴
 - (m) The health status of millions of people expected to be affected through increases in malnutrition and deaths, disease and injury due to extreme weather events.⁸⁵
 - (n) The uptake of anthropogenic carbon since 1750 has led to the oceans becoming more acidic with an average decrease in pH of 0.1 units. Increasing atmospheric CO₂ concentrations lead to further acidification. Projections show an average global surface area pH of between 0.14 and 0.35 units over the 21st century and the progressive acidification of oceans is expected to have negative implications on marine shell-forming organisms (e.g. corals) and their dependent species.⁸⁶
108. Professor Lowe concludes that the level of reduction in GHG temperatures required to stabilise temperatures at less than a mean 2 – 3°C are uncertain. He says it would probably require stabilisation of equivalent GHG concentrations of 450 ppm or lower, with further reductions after 2100. He refers to a recent summary of the Australian Academy of Science which says that the world would need to be emitting less than half the amount of CO₂ by 2050 than it did in 2000. To do this on a smooth pathway, global emissions would need to peak over the next 10 years and then decline rapidly.⁸⁷
109. He further concludes that for Australia the consequences of anthropogenic global warming and climate change have been:⁸⁸
- (a) an increase in average temperature of 0.9°C since 1910;

⁸⁰ Exhibit 102, page 45.

⁸¹ Exhibit 102, page 47.

⁸² Exhibit 102, page 47.

⁸³ Exhibit 102, page 47.

⁸⁴ Exhibit 102, page 47.

⁸⁵ Exhibit 102, page 47.

⁸⁶ Exhibit 102, page 51.

⁸⁷ Exhibit 102, para 17 and see also Figure 1 at page 10 of Exhibit 103.

⁸⁸ Exhibit 102, para 19.

- (b) an increase in the frequency of very hot days;
 - (c) an decrease in the frequency of very cold nights;
 - (d) more frequent and persistent intense droughts;
 - (e) more frequent heavy rainfalls;
 - (f) decreased winter rainfalls, especially in southern Australian;
 - (g) sea levels increasing about 2cm per decade;
 - (h) increasing frequent extreme events such as category 5 tropical storms; and
 - (i) severe east coast low pressure systems and intense bush fires.
110. In support of these statements he exhibits Appendix 3 to the CSIRO Climate Change in Australia Technical Report, in respect of which it is only necessary to read the Executive Summary to see the dire consequences that the CSIRO predict for Australia as a consequence of Australia of global warming.⁸⁹
111. In paragraph 20 of his report, Professor Lowe identifies the four assessments carried out by the IPCC which he says was made up of hundreds of the worlds most distinguished atmospheric chemists, physicists and climatologists whose work is overseen by the United Nations and the World Meteorological Organisation. He says that the assessments show the steady strengthening of scientific confidence that we are seeing real changes in the earth's climate driven by human activity, principally with the release of CO₂ and other greenhouse gases as a consequence of energy use.⁹⁰
112. He then refers to specific consequences of climate change in Australia, of which the following are a summary:
- (a) The Australian Treasury Economic Roundup showing the effect of the 2002 – 2003 drought on the economy and the fact that it reduced farm output by 23per cent, cut agricultural income by 46per cent and reduced employment by about 100,000 jobs and almost 1per cent of GDP.⁹¹
 - (b) The more recent prolonged drought forced Australian mainland capitals to implement water restrictions, construct desalination plants and implement strategies because of the concerns about the reliability of water supply in the drought periods.⁹²
 - (c) The world's second largest insurer has warned that the global cost of natural disasters could double in the next 10 years as small changes in climate variables lead to proportioned increases in storm intensity, drought intensity, probability of flooding and risk of bush fires.⁹³

⁸⁹ Exhibit 102, Appendix 3, pages 81 – 87.

⁹⁰ Exhibit 102, para 20.

⁹¹ Exhibit 102, para 22.

⁹² Exhibit 102, para 23.

⁹³ Exhibit 102, para 24.

- (d) Health issues are likely to rise from more deaths from heat stress during intensified summer heat waves (which are estimated in 2009 to have caused twice as many deaths as the “Black Saturday” bushfires), rates of food poisoning and diarrhoeal diseases, usually in hotter conditions and especially in poorer rural communities and vector-borne diseases like dengue fever and Ross River virus.⁹⁴
- (e) Changes to Australia’s unique natural systems, such as decreasing the extent of mountain rainforests, causing coral bleaching, moving snow lines higher with impacts for alpine species and the increased frequency of severe fire events and being linked with “thickening” of woody vegetation in savannas and bushland.⁹⁵
113. Professor Lowe refers to the fact that climate change could exceed a critical threshold and cause abrupt changes. Abrupt changes which have occurred, such as the average rainfall in the Perth area being reduced by about 20 per cent and the average annual run-off into the water supply reservoirs being only one-third of the figure prior to 1975. Changes in the ocean circulation patterns and the stability of polar ice sheets are becoming evident. The deep ocean circulation of the north Atlantic appears to be slowing, and if this were to accelerate, it could affect both the regional climate of western Europe and the capacity of the oceans to support life. The increased gas being dissolved in the oceans could measurably change the average acidity with potential serious implications for shellfish and corals. Large ice sheets of Greenland and West Antarctica could be destabilised, leading to sea level increases of several metres. He says that *“the scale of these potential risks underlines the need for caution in the way we change the natural systems of the Earth”*.⁹⁶
114. Specifically with respect to Queensland, he refers to a recent report by the State Government which refers to increases in temperature of between 1.7 to 2.2°C for a high carbon emissions future, best estimates for decreasing stable rainfall and more severe rainfall events, rises in sea level by 0.8 metres by 2100 with potential for significantly greater levels, increasing hot days and frequency of severe tropical cyclones.⁹⁷ The above predictions are contained in a report prepared by DERM at Appendix 4. The key messages with respect to human settlements and infrastructure,⁹⁸ water supplies,⁹⁹ terrestrial biodiversity,¹⁰⁰ marine biodiversity,¹⁰¹ primary industries¹⁰² and emergency management.¹⁰³
115. Finally on this aspect of his report, he refers to the report of the Australian Business Leaders Roundtable on Climate Change which concluded that climate change is already having significant economic impacts and that these will worsen dramatically if the problem is not controlled. The more recent summary by the Australian Academy of Science demands more recent action than was

⁹⁴ Exhibit 102, para 25.

⁹⁵ Exhibit 102, para 26.

⁹⁶ Exhibit 102, para 27.

⁹⁷ Exhibit 102, para 28 and pages 116, 118, 142 and 146.

⁹⁸ Exhibit 102, Appendix 4, page 153.

⁹⁹ Exhibit 102, Appendix 4, page 159.

¹⁰⁰ Exhibit 102, Appendix 4, page 163.

¹⁰¹ Exhibit 102, Appendix 4, page 169.

¹⁰² Exhibit 102, Appendix 4, page 175.

¹⁰³ Exhibit 102, Appendix 4, page 186.

previously indicated by the IPCC reports, with the Australian Academy of Science report leading to the conclusion that global emissions must peak before 2020 and then decline rapidly to have a better than even chance of avoiding alarming consequences.¹⁰⁴

Lowe – Contribution of the mine to global warming and climate change

116. A critical fact identified by Professor Lowe is that the greenhouse gas emissions from the mine and the use of coal are cumulative in that they add to the amount of greenhouse gases that exist in the atmosphere. He says that while different greenhouse gases persist in the atmosphere for different lengths of time, CO₂ affects the atmosphere for very long periods, that significant amounts will still be affecting the atmosphere after 200 years and that most recent science finds that as much as 35% could still be affecting the atmosphere for thousands of years.¹⁰⁵ He says that it is not possible to link these emissions to any particular impact on the specific part of the environment of Queensland, Australia or globally other than to contribute to greenhouse gases in the atmosphere and thereby contribute to global warming and climate change. The impact of greenhouse gas emissions from this mine should therefore be understood as contributing to the cumulative impacts of global warming and climate change.¹⁰⁶
117. He points out that geological structures now trap the carbon contained in the coal so that the carbon is completely isolated from the atmosphere and will not contribute to global warming or climate change in its present form. He says that the argument advanced by Xstrata that the coal could just come from another mine somewhere in the world if this application is not approved ignores the growing recognition that reasonable and practical measures should be required to avoid, reduce or offset the greenhouse gas emissions of all human activities including the proposed mine. He says that climate change is a massive problem for society that must be addressed through action at the level of individual projects.¹⁰⁷ He says that the greenhouse gas emissions from the mine would need to be considered in the context of national and global emissions. His breakup from the National Greenhouse Gas Inventory from 2009 shows that Australia's net emissions are 564.5 million tonnes of CO₂-e. Global GHG emissions were estimated in the year 2000 at 34 gigatonnes and the IPCC estimated the figure at 49 gigatonnes. The current figure is likely to be higher.¹⁰⁸
118. He puts the potential CO₂ emissions from the proposed mine into the following context:
- (a) Annual average emissions from the proposed mine (41.7 million tonnes) would be about 7.4 per cent of the national figure for a year or about 0.085 per cent of the current annual global emissions.

¹⁰⁴ Exhibit 102, para 30.

¹⁰⁵ Exhibit 102, para 32.

¹⁰⁶ Exhibit 102, para 32.

¹⁰⁷ Exhibit 102, para 33.

¹⁰⁸ Exhibit 102, para 34-35.

- (b) The average annual emissions from the proposed mine would be greater than the annual emissions of New Zealand and, at peak production, greater than the annual emissions of Ireland.
- (c) The lifetime emissions from the proposed mine would be equivalent to 2 years and 4 months of national emissions and about 2.7 per cent of the current annual global emissions.¹⁰⁹
119. The relevance of this information is that the current state of annual emissions would remain the same if the mine were approved only if there were no emissions from New Zealand or there were no emissions from Ireland, or the existing annual emissions from Australia were reduced by 7.4%. That is the extent of the emissions from this mine on an annual basis. On the other hand, the lifetime emissions from this mine would force Australia to have no other emissions whatsoever for a period of 2 years and 4 months and that would simply produce a static Australia emissions basis. Clearly that is unrealistic. What it does show however is the extraordinary large impact this mine will have upon emissions generally from both an Australian and global context.
120. Professor Lowe provides the information that the IPCC data showed that 40% of carbon from fossil fuels come from coal, about 40% from oil and about 20% from gas. Since some of the oil is used to transport coal, the IPCC figure of about 10 billion tonnes of CO₂ released each year from the burning of coal would be seen as conservative and does not include the associated transport emissions. Coal contains more carbon and less hydrogen than oil or gas and produces proportionally more CO₂ per unit of energy. He says that burning coal to generate electricity is extremely inefficient so that coal-fired electricity produces about five times as much CO₂ per unit energy as directly burning gas.¹¹⁰
121. He refers to the consensus agreed at Kyoto that all countries would contribute to a global solution to the global problem. The more recent global conferences in Copenhagen and Cancun were again directed towards a legally binding global agreement to curb greenhouse gas emissions. In this respect they were unsuccessful in that there was no legally binding agreement, although there were non-binding pledges by a large number of countries, including USA and China, to greenhouse gas emissions reduction targets and with a view to hold the increase in global temperature below 2°C.¹¹¹ He refers to the conclusion by Australian Business Leaders that the most effective way to slow down greenhouse gases was to provide a clear price signal into our economic system. The present debate is about what Professor Lowe describes as “a very modest carbon tax” and shows the difficulty of its implementation. However the Coal Association of Australia, of which Xstrata is a member,¹¹² opposes this measure.¹¹³ The response to global emissions is a financial contribution to CO₂

¹⁰⁹ Exhibit 102, para 36 noting that because emissions are cumulative it is legitimate to compare the lifetime emissions of a single project with annual national or global emissions per para 29 on page 12 of Exhibit 103.

¹¹⁰ Exhibit 102, para 37.

¹¹¹ Exhibit 102, para 37. The Copenhagen Accord is provided in FOE's book of authorities at Tab 28.

¹¹² Transcript, p 5-77, lines 42-43.

¹¹³ Exhibit 141.

capture and storage,¹¹⁴ however on the evidence of Mr Stanford is clear that carbon capture and storage may never be technically or commercially viable.

122. This then raises the question, what contribution is being made by Xstrata towards the reduction of greenhouse gas emissions, global warming and climate change?
123. In response to cross-examination on behalf of Xstata that not approving this mine will have no effect on GHG emissions as the coal will be supplied from somewhere else, Professor Lowe demonstrated that this was an unfounded assumption because:
- (a) The coal at Wandoan will remain in the ground and will not be released;
 - (b) There will not be fugitive emissions from methane as the seam is mined;
 - (c) There will not be emissions incurred in mining and transporting the coal;
 - (d) There will not be scope 3 emissions of that coal being burnt.¹¹⁵
124. Professor Lowe made the valid point in response to Xstrata argument that the coal will come from somewhere else by saying, “We cannot influence what other jurisdictions do, but we can act responsibly ourselves.”¹¹⁶
125. Mr Stanford criticised the approach of addressing climate change methods at an individual project level, claiming that a global market based system that imposes a price on emissions is a more appropriate approach. Xstrata’s actions in opposing the proposed carbon tax through the Australian Coal Association¹¹⁷ is contrary to Mr Stanford’s market based approach. Further, Professor Lowe dismantled this argument by demonstrating that:
- “...in a hypothetical fantasy world, in which there was a global market, with a global cap, that required trading for permission to emit limited amounts of carbon within our global carbon budget, one might expect that market to achieve the goal of reducing carbon dioxide emissions and stabilising the climate. But that market does not exist; there doesn't seem any realistic prospect of it existing in the near future, and indeed the proponent is actively campaigning using advertising, and lobbying... to prevent the implementation of a market place...”¹¹⁸
126. Professor Lowe also made the point in relation to the global carbon scheme that Mr Stanford advocated:
- “...there is active opposition to the attempt to impose within Australia a very limited system which by the government's own figures would not go anywhere near meeting our obligations to the international community to reduce our emissions by 2020.”
127. In explaining the appropriateness of his comparison of the quantity of emissions that will be produced from the burning of this mine’s coal with the quantity of emissions produced from another country, Professor Lowe said:

¹¹⁴ Exhibit 102, para 40.

¹¹⁵ Transcript 30 August 2011, page 6-49.

¹¹⁶ Transcript 30 August 2011, page 6-50.

¹¹⁷ Exhibit 141.

¹¹⁸ Transcript 30 August 2011, page 6-50 and further re-stated in different terms on page 6-51.

“...if the global community accepts that even a small country like New Zealand has emissions which need to be curbed as part of the global effort to address climate change, and if the result of approving this mine is emissions which are greater than that of the nation of New Zealand, we should consider that this is a project of similar significance to that of the emissions of small countries.”¹¹⁹

“...if this Court allows this project to go ahead, it is saying that we are comfortable, not just for the scope 1 and scope 2 emissions within Queensland, but with the consequences of 1.3 billion tonnes of carbon dioxide being emitted when the coal is burnt.”¹²⁰

Lowe - Alternatives

128. Professor Lowe refers to the report “Beyond Zero Emissions”¹²¹ and an earlier report to indicate that Australia is able to move to a mix of renewable emissions by 2020 or 2030. Whereas the mix may be the subject of some debate as investment into technology improves and investment increases, the highly credentialed professionals identified in the report show that reduced greenhouse gases through the use of renewable energy is achievable and, in particular, the arguments raised by Mr Stanford that renewable energy can not meet electricity demands are not justified. Concentrated solar thermal power is both current technology and commercially realistic as the commercial project in Spain recognises. Alternatives are available. This mine is no more than a business-as-usual approach from a commercial perspective. It pays no regard to the environment, it is damaging to, if not destructive to our society as it exists today, and it ignores the reality of global warming.

Dr Malte Meinshausen

129. That Dr Meinshausen is an eminent scientist is reflected from his curriculum vitae.¹²² Apart from a PhD in climate science of the Swiss Federal Institute of Technology, his curriculum vitae indicates an extraordinary number of peer reviewed articles in journals, his contribution to three chapters of the IPCC Fourth Assessment Report, his consultancy work for government bodies and environmental NGO’s on climate policy issues, work associated with the Kyoto Protocol, that he has been a guest researcher for the National Centre for Atmospheric Research and that he is currently an Honorary Senior Visiting Researcher at the School of Earth Sciences at the University of Melbourne. His expertise can be unchallenged. The court is indeed fortunate to have the benefit of his evidence.
130. Dr Meinshausen addressed eleven questions which he identifies early in his report¹²³ to which reference will be made. Like all experienced scientists, he refers to his scientific methods, facts and assumptions. Particular reference is made to the fact that some of his references are ones where he has been one of the authors of the research. Some 27 references are identified in his report.¹²⁴ The articles which are given a date are ones where the paper has been reviewed and accepted for publication. His report which he described as Meinshausen et

¹¹⁹ Transcript 30 August 2011, page 6-60 to 6-61.

¹²⁰ Transcript 30 August 2011, page 6-61, lines 12-15.

¹²¹ Exhibit 102, Appendix 6.

¹²² Exhibit 103, Appendix A.

¹²³ Exhibit 103, para 7.

¹²⁴ Exhibit 103, pages 23 and 25.

al (Accepted) has now been published and stands among its reviewers as a research work worthy of publication.

131. His report is based on the reported value of scope 3 emissions based on the Xstrata Coal EIS estimate of 1.311 Gigatonnes CO₂ (GtCO₂) which is the annual emissions from end use for electricity production of 43,706,886 tCO₂ multiplied by 30 years of operation. Alternative estimates of up to 2.05 GtCO₂ are provided in the answer to Question 10 and Appendix C depending on various scenarios.¹²⁵ He says he has taken a conservative approach, doubting rather on the side of underestimating than overstating potential climate implications when attributing the illustrative number of annually flooded people to the mine.¹²⁶

Meinshausen - Resilience of the atmosphere

132. Dr Meinshausen adopts the work of Dr James Hansen and his colleagues, which is attached as Appendix E to his report,¹²⁷ that indicates the safe level of CO₂ in the atmosphere is less than 350 ppm. As CO₂ are already at 390 ppm and rising by 2 ppm per year, the resilience of the atmosphere to absorb CO₂ has already been exceeded.
133. He says that atmospheric CO₂ concentrations range from 190 ppm and 280 ppm and that today's CO₂ concentrations have reached 390 ppm which is unprecedented over the time frame of 650,000 years.¹²⁸
134. He says that today's concentrations have already moved the planetary balance out of the window of conditions that existed over the last 11,700 years, over which human civilisation developed. He says that today's ecosystems and its fauna and flora are adapted to the climatic zones which existed in the relatively stable climate over this period. He concludes that limiting warming to below today's levels of 0.8°C¹²⁹ will require reducing CO₂ concentrations to below 350ppm. It is worth repeating that today's concentrations have already reached 390ppm and increase by 2ppm per annum.¹³⁰
135. In Table 1 to his report he gives a range of estimates as to the likely temperature increase at various levels of CO₂-eq ppm. These are set out as "best guess", "very likely above" and "likely in the range". His best guess at 450ppm is an increase of 2.1°C, which is above the world objective. At 550ppm his best guess is 2.9°C increase. At 650ppm his best guess is 3.6°C increase.¹³¹ He says that recent observations show a decline in Arctic sea ice, more pronounced than the IPCC4 report. The stabilisation of Arctic sea ice at current levels would require restoring the earth's energy balance, requiring a return to 335 - 355ppm down from its current concentrations of 390ppm.¹³² He says that the recent retreat of

¹²⁵ Exhibit 103, para 10(a).

¹²⁶ Exhibit 103, para 10(b).

¹²⁷ Hansen, J., M. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D. L. Royer and J. C. Zachos (2008). "Target Atmospheric CO₂: Where Should Humanity Aim?" *The Open Atmospheric Science Journal* 2: 217-231.

¹²⁸ Exhibit 103, para 12.

¹²⁹ That is above pre-industrial levels.

¹³⁰ Exhibit 103, para 13.

¹³¹ Exhibit 103, page 8.

¹³² Exhibit 103, para 14.

mountain glaciers implies that the preservation of seasonal water supplies in downstream areas will only be guaranteed in the long-term if human-induced forcings are reduced to below current levels.¹³³

136. He concludes the answer to this question by saying that the observational evidence over the last five glacial cycles and a 25m sea level rise estimate from 3 million years ago, imply that equilibrium (millennium time-scale) sea level is closely related to global-mean temperatures. With current warming of about 0.8°C it is expected that the observed sea level rise of about 20cm only constitutes a very small fraction of the induced sea level rise in the long term. Returning to today's sea level would imply the world to return to below 350 ppm in the long-term.¹³⁴

Meinshausen – Carbon Budget

137. He was asked what are the cumulative human CO₂ emissions which can be released to the atmosphere prior to 2050 before reaching various probabilities of exceeding 2°C warming above pre-industrial levels.
138. He says that climate sensitivity is not known precisely but probabilities can be assigned to the expected rise in mean global temperatures at different levels of CO₂.
139. The amount of carbon that we can still afford to emit without causing dangerous climatic change, which has been implicitly defined in the Copenhagen/Cancun agreements as exceeding 2°C, has become known as the “Global Carbon Budget”. Under the climate budget, cumulative CO₂ emissions of between 2000 and 2050 is either 886, 1000 or 1437 GtCO₂ in order to limit the probability of exceeding that temperature range of 20%, 25% or 50% respectively. This is set out in Table 2 to his report.¹³⁵

Table 2: Carbon Budget to 2050 to achieve less than 2°C warming. (cf. Table 1 of Meinshausen et al. 2009)

Carbon budget 2000-2050 (GtCO ₂)	Carbon budget 2011-2050 (GtCO ₂)	Probability of exceeding 2°C (%)	Probability of remaining beneath 2°C (%)
886	529	20	80
1000	643	25	75
1437	1080	50	50

140. In order to understand this budget it is necessary to know that part of the carbon budget is already used due to the emissions since 2000. Therefore the actual carbon budget remaining until 2050 has already shrunk¹³⁶. The estimated

¹³³ Exhibit 103, para 15.

¹³⁴ Exhibit 103, para 16.

¹³⁵ Exhibit 103, para 19 and Table 2, page 10.

¹³⁶ If one takes the middle ground and assumes that a carbon budget of 1000 GtCO₂, the budget left from 2011-2050 is 643 GtCO₂, which affords only a probability of 75 per cent remaining below 2°C.

emissions since 2000 are 357 GtCO₂.¹³⁷ The emissions from the mine are estimated at 1.3 Gt. This is the estimate from one mine only. There are of course numerous mines throughout the world, the coal from which is being emitted at a continuous rate globally. It takes a lot of imagination to see how unlikely it is that the budget will not be exceeded. Dr Meinshausen sets out a figure which is reproduced below in these submissions.¹³⁸ The figure shows that emissions must peak before 2020 and quickly reduce to zero emissions by 2100. The figure below shows the future without climate policy in red and, in blue, shows the likely effect of the global budget of 1000 GtCO₂ until 2050 being achieved. The obvious observation is that strong mitigation action according to the blue route, shown in the lower figure, would limit the risk of exceeding 2°C to below 25 per cent.¹³⁹

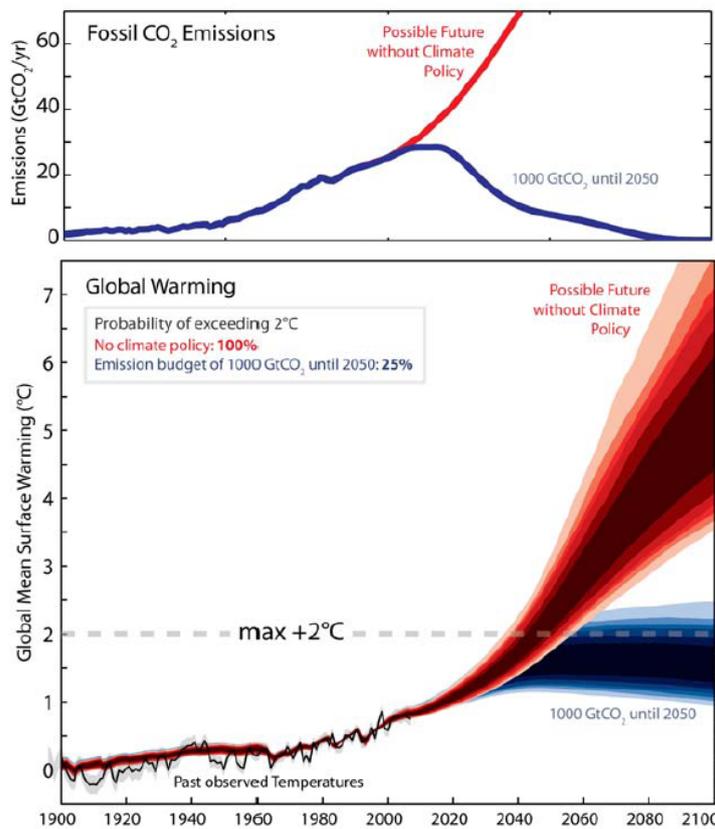


Figure 1. Two possible futures: One in which no climate policies are implemented (red), and one with strong action to mitigate emissions (blue). Shown are fossil CO₂ emissions (top panel) and corresponding global warming (bottom panel). The shown mitigation pathway limits fossil and land-use related CO₂ emissions to 1000 billion tonnes CO₂ over the first half of the 21st century with near-zero net emissions thereafter. Greenhouse gas emissions of this pathway in year 2050 are ~70% below 1990 levels. Without climate policies, global warming will cross 2°C by the middle of the century. Strong mitigation actions according to the blue route would limit the risk of exceeding 2°C to 25%. For more details, see Figure 2 in Meinshausen et al., *Nature*, (2009).

Meinshausen - Global temperature if global coal burnt

141. In answer to the question if the proven recoverable reserves of the world's coal continued to be produced and consumed, what would be the resulting atmospheric CO₂ concentration and likely degrees of global warming, Dr Meinshausen answers that the range of temperature increases would be between 2.5 and 4.4°C.¹⁴⁰ He says that the atmospheric CO₂ concentration would reach around 575ppm with the range being between 530 and 620ppm.¹⁴¹ In contrast

¹³⁷ Exhibit 103, para 20.

¹³⁸ Taken from Exhibit 103, page 10.

¹³⁹ Exhibit 103, page 10.

¹⁴⁰ Exhibit 103, para 23.

¹⁴¹ Exhibit 103, para 23.

he says that burning all the available resources, as distinct from reserves, would lead to a much higher climate effects over the centuries, possibly 8°C or higher warming.¹⁴²

Meinshausen – Is 350 ppm achievable by phasing out coal use?

142. He says that in the long-term, say by 2300, it is possible that atmospheric concentration of CO₂ could be returned to 350ppm or less. But only if emissions are substantially cut at the near peak and reduced to zero or negative emissions in the second half of the 21st century.¹⁴³ This answer highlights two issues. The first is the extraordinary long period for our atmospheric conditions to return to a safe level of 350ppm or less. The second aspect of the question is the very short time in which this must occur, being around 2015 or, as Dr Lowe suggests, peaking before 2020 and then quickly reducing to zero emissions. Reference is again made to the Figure 1 chart which sets out this scenario.¹⁴⁴
143. He says that in order to reduce the emissions would require a combination of a number of practices, such as agricultural forestry practices, biomass burning in combination with carbon sequestration and storage (CCS) and a phase-out of coal.¹⁴⁵ It has already been seen in Professor Lowe's report that CCS is commercially available only long term, if at all. Consequently this places greater attention to the remaining parts of the strategy, and in particular the phasing out of coal.

Meinshausen – Contribution of the mine to increased atmospheric CO₂ concentration

144. Dr Meinshausen makes the point that the concentrations of CO₂ will be proportional to the cumulative CO₂ emissions and therefore it is legitimate and illustrative to compare the CO₂ emissions associated from the mine with Australia or national emissions of other developed countries. He concludes that if Australia were to put in place policies to reduce national emissions by -35% below 2000 levels, then the cumulative effect of the mine would offset all Australian mitigation efforts up until 2020. He said it does not matter over what time frame the CO₂ emissions occur, the cumulative effect is decisive, in that the emissions associated with the project are estimated to be 39.2 years of current New Zealand fossil, industrial and agricultural CO₂ emissions. This can be seen from Figure 4¹⁴⁶ which shows a comparison of cumulative emissions arising from burning the produced coal in the mine with national CO₂ emissions of major developed countries. New Zealand would have to halt its fossil, industrial and agricultural CO₂ emissions over 39.2 years completely in order to offset emissions arising from the Wandoan Coal Project.
145. The comparison with the cumulative emissions is criticised by Mr Stanford, however as CO₂ emissions are cumulative, and climate change is a result of the cumulative effect, that is the only fair comparison of them. It is the total effect of emissions from the project to the cumulative effect of all other emissions

¹⁴² Exhibit 103, para 23.

¹⁴³ Exhibit 103, para 27.

¹⁴⁴ Exhibit 103, page 10.

¹⁴⁵ Exhibit 103, para 27.

¹⁴⁶ Exhibit 103, page 17.

which gives any indication of the extent of global change arising from the proposed mine.

146. Dr Meinshausen says that CO₂ emissions from the mine will have a lasting effect on the atmosphere for centuries to millennia in that, by 2300, there will still be approximately a third of the concentrations of CO₂ by the mid-21st century. He says that by using scientific methods as for the next generation of emissions to represent best-estimate projections, the projected increase of atmospheric CO₂ concentrations is 0.11 ppm by mid-century due to burning the produced coal from this mine. This implies a long lasting effect on both global warming and ocean acidification.¹⁴⁷
147. During cross-examination Dr Meinshausen was question on the comparison of cumulative effects of burning coal with the annual emissions of countries. Dr Meinshausen explained that “scientifically it is absolutely correct comparing the overall project emission to whatever other emission number you pick” due to the cumulative nature of emissions in the atmosphere. Dr Meinshausen explained, clearly and articulately, that:

...if I have here, a piece of coal ... for the climate system it doesn't matter whether I burn it instantly or ...whether I burn it slowly over 30 years ...it would the same climatic effect down the line. ...the scientific reason is the total amount - the cumulative amount of omissions the total amount of omissions is what counts and there you can do any sort of comparisons.¹⁴⁸

and

...what matters to the climate is an emission. It doesn't matter where the emission occurs, it doesn't matter when the emission occurs, it doesn't matter which time-frame the emission occurs, so what I did provide here was a comparison of the emissions that arise from the burning of the Wandoan coal to another set of emissions. And I think it's - fairly - probably useful comparison to compare it to the actual mitigation efforts that are under way in Australia.”¹⁴⁹

Meinshausen – Contribution of the mine to global warming

148. In answer to the question as to what extent will the emissions of the production, transport and use of coal from the proposed mine contribute to global warming, having regard to the likelihood of global warming, Dr Meinshausen says that emissions from the mine can be expected to increase the likelihood of exceeding 2°C by 0.05%. While this figure is small, considered in its global perspective it is very significant. If the emissions from the mine are not 1.3 gigatonnes over the 30 year life but are rather 2.05 GtCO₂, the probability of exceeding 2°C as climatologically mean temperature would increase by 0.08%, the a background scenario roughly implying a 50:50 probability of staying below 2°C. Taken at face value, and taking into account the uncertain nature of future climate change, attributing climate change to the Wandoan mine will nevertheless yield substantial attributable impacts.¹⁵⁰
149. When asked about the severity of global warming as a result of the mine, he said that “*best estimate additional warming due to the boom of the mine would*

¹⁴⁷ Exhibit 103, para 30.

¹⁴⁸ Transcript 30 August 2011, page 6-73 and further supported on pages 6-85.

¹⁴⁹ Transcript 30 August 2011, page 6-84.

¹⁵⁰ Exhibit 103, paras 32 – 34.

be about 0.006°C by 2050". Although small, he said this is probably unmatched when compared to the climatic impact associated with any other single human project, except perhaps for other large oil field and coal mine explorations.¹⁵¹ He said that the small temperature change will induce a small sea level change estimated to be 0.23 cm in equilibrium. Although the sea level rise is small, given that the overall expected impacts are large, the attributed proportion of the impacts to this mine are significant, and is likely to result in the extra annual flooding of the settlements and houses of 23,000 people worldwide by the 2080s. His analysis of these figures is set out in Appendix B.¹⁵²

150. Measured in real terms, an expected annual flooding of 23,000 people as a result of this mine is extraordinarily catastrophic as Brisbane residents would well appreciate. Obviously this will occur to people who live in low lying areas and those who are more vulnerable to flooding. They are likely to be poorer people. The effect on these people of this mine will be catastrophic.
151. When asked about the longevity of global warming as a result of emissions from the coal produced from the mine, he says that the increased emissions could be 0.035 ppm which will lead to an increase in CO₂ concentrations in several hundred to thousands of years.¹⁵³
152. When it was proposed to Dr Meinshausen during cross-examination that his expert scientific expressed opinion with regard to the potential number of houses that may be flooded annually, should this mine be approved, was somehow politically motivated, Dr Meinshausen responded:

“...if I wanted to make a political argument about how big the emissions of this mine, or how big the climate impacts could be, I would calculate worse case scenario. And the worst case scenario in the climate science is a fully legitimate thing to do. It's what could we expect from this amount of emissions? What would occur down the line? It's a worst case scenario. Then you would pick the upper range of the estimates, and then you would get to a number that is certainly higher than 100,000 people flooded being attributed to this coal mine. What I here provided was a conservative or best estimate of the numbers of people. So, I'm not sure if you want me to make - if you want to say that I overdramatised----- ...In a risk management sense, if you look at aviation, for example, you want to look at the worst case scenarios. You want to look at what is the safety that you have to do in order to prevent the worst case, which is the plane falling from the sky. So, worst case scenarios are fully appropriate.”¹⁵⁴

153. It is submitted that the Court can hold great confidence in Dr Meinshausen's opinions because, in addition to his eminence as a leading international climate scientist, he demonstrated repeatedly during cross-examination that he had taken a conservative approach in attributing impacts to the mine. For instance, except for a specific section where he considered alternative emission levels, he worked from the lowest plausible figure for the emissions from the mine – 1.311 Gt – which was even lower than the lowest estimate by the proponent (of 1.320 Gt).¹⁵⁵

¹⁵¹ Exhibit 103, para 32.

¹⁵² Exhibit 103, para 33 and Appendix B.

¹⁵³ Exhibit 103, para 35 and Appendix B.

¹⁵⁴ Transcript 30 August 2011, page 6-103

¹⁵⁵ Exhibit 81, para 4.7, p 7.

Meinshausen – Timeframe of impacts from emissions

154. Asked how long the emissions from the proposed mine will continue to increase atmospheric CO₂ concentrations, he said that CO₂ emissions from burning the coal from this mine would lead to increased CO₂ concentrations over millennia.¹⁵⁶ He said that the strongest increase in CO₂ emissions will be expected at the end of the project lifetime, by around 2050, decreasing to a long term millennia contribution of about 0.037ppm.

Meinshausen – Are the impacts of the mine irreversible?

155. When asked about whether the increases in CO₂ concentrations are reversible, he said that in principle the answer to that question is in the affirmative. This would depend upon a scheme being implemented by which 1.311 GtCO₂-eq would be drawn out of the atmosphere, then the atmospheric CO₂ concentration in the longer-term would approximate the levels as if the mine had not been in operation. This assumes that no amplifying feedbacks were started in the meantime, such as permafrost. Options for drawing CO₂ from the atmosphere include biomass burning, CCS, air capture and sequestration or mineral sequestration techniques. He thought that these techniques were likely to be more expensive than preventing the carbon from being emitted into the atmosphere in the first place.¹⁵⁷

Meinshausen – Are the emissions from the mine significant

156. In answer to the question whether the emissions from the production, transport and use of coal from the mine are significant with respect to global warming, he said that they were for three reasons. The first is that human induced global warming occurs because of the collective and cumulative emissions across all nations. He identifies that the reported estimate of cumulative emissions from this mine project will equate to more than three years of current annual fossil CO₂ Australian emissions, which he sets out in Figure 4 to his report¹⁵⁸, with higher-end alternative estimate of 2.05 GtCO₂ emissions which would equal more than 5 years of current annual 2009 fossil, industrial and agricultural CO₂ emissions of Australia. Compared to New Zealand's emissions, the project would be equivalent to 39.2 years of current New Zealand emissions, as indicated earlier.¹⁵⁹
157. His second reason is that the remaining carbon budget until 2050, which taking the mid-line is 643 GtCO₂, emissions due to the coal from the mine will constitute 0.20% of the remaining carbon that can be emitted to still have a likely change of staying below 2°C (that is, a 25% risk of exceeding it). For a single project, he says that a 0.20% share can be considered significant as it is larger than annual emissions of large developed countries, as referred to above.¹⁶⁰

¹⁵⁶ Exhibit 103, para 37.

¹⁵⁷ Exhibit 103, paras 39 and 40.

¹⁵⁸ Exhibit 103, page 17.

¹⁵⁹ Exhibit 103, para 43.

¹⁶⁰ Exhibit 103, para 44.

158. In Table 3 of his report, he identifies that a carbon budget of 643 GtCO₂ remaining, the contribution of 1.311 GtCO₂ is 1/490th part of that budget. In other words if there were 489 projects of similar size, then the budget would be exceeded before 2050.¹⁶¹

Table 3: The contribution of the Wandoan Coal Mine to the Carbon Budget up to 2050 to achieve less than 2°C warming.

Carbon budget 2011-2050 (GtCO ₂)	Probability of exceeding 2°C (%)	Probability of remaining below 2°C (%)	Percentage contribution of mine to remaining budget based on 1.311 GtCO ₂ of emissions (%)	Fraction mine contributes to budget based on 1.311 GtCO ₂ of emissions
529	20	80	0.25	1/403 rd part
643	25	75	0.20	1/490 th part
1080	50	50	0.12	1/824 th part

159. His third reason is that carbon in coal mines, gas and oil fields are already under operation and their cumulative effect may already be more than enough to prevent the international community from reaching their common goal of staying below 2°C increase.¹⁶²
160. The Wandoan mine will hence increase the already in operational stock of carbon being emitted from mines in operation, and that may already be at a level which will prevent the community from reaching its 2°C goal.
161. He says that his conclusion, although somewhat speculative, is supported by the following evidence:
- (a) From the total proven recoverable coal resources listed by the 100 top stock-traded companies, 85% of the coal sits in mines that are already in operation in the construction phase or suspended.
 - (b) Assuming a similar development ratio of 85%, the conclusion can be drawn that the Wandoan mine would be tapping reserves that we cannot afford to emit anyway, if the probability of exceeding 2°C can be kept between 20% or even up to 50%.
 - (c) Even on a 40% overall assumed development ratio would render the additional carbon from the Wandoan mine as being “too much”.¹⁶³

¹⁶¹ Exhibit 103, page 18.

¹⁶² Exhibit 103, para 45.

¹⁶³ Exhibit 103, para 46.

Meinshausen – Are the estimates of emissions in the EIS correct?

162. Dr Meinshausen found that the estimation in the EIS was not very transparent. He said that 98% of burning of the emissions resulting from the burning of the produced coal by the end-user, which were estimated to be 1.311 GtCO₂ over the 30 year operational lifetime of the project. He said that the two parameters necessary for the robust estimation of end-use-related CO₂ emissions were (a) the mass of the produced coal; and (b) its carbon content on an “as is” basis, i.e., taking into account the ash and moisture weight within the 23 Mt of the product coal.¹⁶⁴ He said that the carbon content of the coal varies regionally. Xstrata have provided an estimate of 77% for the carbon content of the product coal on an ash and moisture free basis. Using the figures provided by Xstrata, he produces in Appendix C an alternative emissions estimate, which could be as high as 2.05 GtCO₂.¹⁶⁵ He says that the ultimately induced emissions might be up to 56% higher than that stated in the 1.311 GtCO₂ estimate. Which of course acknowledge that Xstrata are unable to produce more than an estimate and that equally an estimate may be higher or lower. On the information available to Dr Meinshausen the estimate provided by Xstrata may be an underestimate. In those circumstances the climatic effects reported might be proportionately higher.¹⁶⁶

Meinshausen – Expected CO₂ and temperature rises based on current international and Australian policies

163. Dr Meinshausen was asked about the expected atmospheric CO₂ temperature rises based on current international and Australian policies. His response is that the only legally binding international commitments to reduce GHG emissions are contained in the Kyoto Protocol and those commitments end in 2012. The parties have been unable to agree on new commitments.¹⁶⁷ At the 2009 conference in Copenhagen, the majority of the parties, including Australia, agreed on non-binding pledges to reduce emissions. The agreement is known as the “Copenhagen Accord”. The agreement acknowledged the scientific view that increases in global temperature should remain below 2°C, on the basis of equity and in the context of sustainable development, agreed to enhance our long-term cooperative action to combat climate change. The parties to the accord agree that deep cuts in global emissions are required according to science and as documented by the IPCC4 with a view to reducing global emissions so as to hold the increase in global temperature below 2°C and agree to take action to meet this objective consistent with science and on the basis of equity.¹⁶⁸

164. Analysis of the Accord found that:

- (a) Global emissions in 2020 could be up to 20% higher than today;

¹⁶⁴ Exhibit 103, para 49.

¹⁶⁵ Exhibit 103, para 51 and Appendix C at page 32.

¹⁶⁶ Exhibit 103, para 53.

¹⁶⁷ Exhibit 103, para 55.

¹⁶⁸ Exhibit 103, para 56.

- (b) Assuming that nations meet the ambitious end of their stated pledges without using surplus allowances and land-use credits, this it is still far above an emissions pathway that could realistically reach the 2°C target;
 - (c) Current pledges mean a greater than 50% chance that warming will exceed a mean global temperature rise of 3°C by 2100.¹⁶⁹
165. Australia's own conditional commitment under the Copenhagen Accord of a 5% reduction in national emissions by 2020 is based on stabilising atmospheric CO₂ around 550ppm, thereby allowing a 3°C warming. The recent Clean Energy Future legislative package that was released by the Commonwealth Government is based on this scenario.¹⁷⁰

Meinshausen – Conclusions

166. The summary by Dr Meinshausen was that:
- (a) There are more proven fossil fuel reserves held by private companies, with the majority of them being coal, than can be emitted in order to keep global-mean temperature below 2°C with a likely (75%) chance.
 - (b) Emissions from burning coal from the Wandoan mine will constitute a very large source of CO₂ emissions, equivalent to 3.3 years of Australia's current CO₂ emissions, or 39.2 years of current fossil CO₂ emissions of New Zealand.
 - (c) Of the remaining carbon budget of 2050, coal from the Wandoan mine would constitute a fraction of approximately 0.2%.
 - (d) The peak increases of atmospheric CO₂ concentrations will continue for hundreds and thousands of years.
 - (e) The induced long term sea level increase from the mine is estimated to be 0.23cm based on paleoclimatic evidence. If just 5% of this induced additional seal level rise occurred in 2080s as part of a 1m total sea level rise, the flooding annually of 23,000 people's homes could be proportionally attributed to the mine.
 - (f) The climatic effects would be proportionally higher if the actual emissions from burning the coal of the mine exceeded 1.2 billion tonnes.

Professor Ove Hoegh-Guldberg

167. The climate change information referred to above presents the overwhelming evidence of CO₂ from the burning of fossil fuel as contributing to climate change. The "evil twin" of climate change is ocean acidification and the combined effect upon the world's ocean ecosystems. This evidence is presented by Professor Ove Hoegh-Guldberg whose report has been tendered.¹⁷¹ The outstanding qualifications of Professor Hoegh-Guldberg are set out in his

¹⁶⁹ Exhibit 103, para 57.

¹⁷⁰ Exhibit 103, para 59.

¹⁷¹ Exhibit 104.

curriculum vitae.¹⁷² His is currently a Professor of Marine Studies at the University of Queensland, the Director of the Global Change Institute at the University of Queensland and Deputy Director of the Australian Research Council Centre for Excellence for Reef Studies, Scientific advisor at the Centre for Ocean Solutions at Stanford University and Visiting Professor at Stanford University. He is the author of a number of papers dealing with the Great Barrier Reef. He is ranked among the top most cited authors on the research on global warming in 2006. He has produced and edited a book on the Great Barrier Reef and another 20 full time research reports and conference papers and brings to his evidence an extraordinary level of scientific knowledge with particular emphasis on the Great Barrier Reef.

168. His report sets out on the front page three photographs which are his scenarios (a), (b) and (c). The first illustrates 1°C increase at 375 ppm, the second illustrates 2°C at between 450-500 ppm and the third illustrates greater than 3°C increase above 500 ppm. Clearly the health of the Great Barrier Reef is dramatically depicted by these photographs.
169. The conclusions which he draws are that:
- (a) The Great Barrier Reef provides enormous benefits and income to the Australian people.
 - (b) It is highly valued by the world's people and has been World Heritage listed.
 - (c) It is widely recognised as one of the most pristine and valuable coral reefs in the world.
 - (d) It is threatened by both global warming and ocean acidification.
 - (e) The rate at which ocean temperature and pH are changing is unprecedented for thousands if not millions of years and it is having a direct impact on the health of the Great Barrier Reef.
 - (f) These factors are causing unprecedented mass coral bleaching and mortality events.
 - (g) These factors cause calcification rates to decline in response to declining carbonate ion concentrations.
 - (h) The Wandoan mine will directly damage the Great Barrier Reef and reduce its ecological services and hence the income and livelihoods of people both here in Australia and overseas.
 - (i) Conservative projections that climate change will cause the Great Barrier Reef to be fundamentally changed into non-coral dominated ecosystems if carbon dioxide continues to increase at the current rate.

¹⁷² Exhibit 104, Appendix 1.

- (j) The Wandoan mine will result in highly significant impacts on Australian people and industries such as fishing and tourism and these impacts will be felt on coral reefs, people and industries around the globe.¹⁷³
170. In support of these conclusions, Professor Hoegh-Guldberg identifies the Great Barrier Reef as one of the world's largest and most spectacular coral reef systems, lining almost 2,100 km of Australian Coastline. It is the largest continuous coral reef ecosystem in the world and home to an amazing variety of marine organisms, including 6 species of marine turtles, 24 species of seabirds, over 30 species of marine mammals, 350 coral species, 4,000 species of molluscs and 1,500 fish species. He suggests that new species are described each year, and some estimates suggest that we are familiar with less than 50% of the total number of species that live within this amazing ecosystem.¹⁷⁴ The extent of the Great Barrier Reef is graphically illustrated in Figure 1.¹⁷⁵
171. He refers to the threats to the Great Barrier Reef which he identifies as being both local and global. The local threats are from water quality, coastal degradation, pollution and fishing pressures. The global pressures are global warming and ocean acidification stressors. He says that local and global factors have already had major impacts on coral reefs, as evidenced by major decline in reef building corals on Caribbean reefs over the past 40 years.¹⁷⁶
172. Professor Hoegh-Guldberg explains that over 90 per cent of the extra heat trapped by the enhanced greenhouse effect has been absorbed by the oceans. These changes have resulted in rising ocean heat content and increases in the temperature of the upper layers of the ocean. Sea surface temperature of the global ocean has increased by about 0.5°C during the 20th century and the Great Barrier Reef waters are about 0.4°C warmer than they were 30 years ago. He says that the changes are greatest at the northern hemisphere and at high latitudes.¹⁷⁷
173. He identifies that increasing atmospheric CO₂ has also resulted in a 0.1 pH decrease, where the ocean has become more acidic. This has removed carbonate ions from ocean bodies like the Coral Sea that normally contain enough carbonate ions to form the substrate for calcification. The decrease in carbonate ions has impacted upon the ability of many marine organisms to form their skeletons which is ultimately crucial to the construction and maintenance of coral reefs. In addition to the size of the absolute change, global conditions have varied at unprecedented rates of change. Changes in atmospheric CO₂ (hence carbonate ion concentrations) and sea temperature have increased at rates that are 2-3 orders of magnitude faster than the majority of changes that have occurred over the past 420,000 years at least.¹⁷⁸ He says that these changes have had a major impact on the reef. The higher temperatures due to climate change have pushed corals and their symbionts above their thermal tolerance, which has resulted in mass coral bleaching. This has increased in frequency and intensity since first reported in the scientific literature in 1979. Coral bleaching occurs

¹⁷³ Exhibit 104, para 38.

¹⁷⁴ Exhibit 104, para 10.

¹⁷⁵ Exhibit 104, page 5.

¹⁷⁶ Exhibit 104, para 12.

¹⁷⁷ Exhibit 104, para 14.

¹⁷⁸ Exhibit 104, para 14

when the symbiosis occurs between corals in the critically important symbionts break down. These symbionts provide most of the energy needs of the coral host. The breakdown of the symbiosis can occur for a number of reasons, one of which is heat stress. The result of the breakdown of the symbiosis is that the symbionts leave the otherwise translucent coral tissue, leaving corals to remain as a stark white colour, hence the word 'bleached'. Without their energy source, bleached corals are susceptible to starvation, disease and death. He said in 1998, most coral reefs worldwide experience mass coral bleaching over a 12 month period. While many coral reefs recovered, many others such as those in the Western Indian Ocean and Northwest Australia were devastated by the mass mortality which followed these bleaching events. In these cases, coral bleaching was followed by mass mortalities that removed over 90 per cent of the resident coral on these reef systems.¹⁷⁹

174. He identifies the Great Barrier Reef has been affected by coral bleaching as a result of heat stress six times over the past 25 years. In most cases only 5-10 per cent of corals affected by coral bleaching died, which was far less than the mortalities seen in regions such as the Western Indian Ocean or Northwest Australia.¹⁸⁰
175. The changes to water chemistry arising from ocean acidification are adding additional pressure on coral reefs. Increasing concentrations of atmospheric CO₂ are entering the ocean. Once in the ocean, CO₂ combines with water to produce a weak acid, carbonic acid, which subsequently converts carbonate ions into bicarbonate ions. This leads to a decrease in the concentration of carbonate ions, which ultimately limits the rate of marine calcification.¹⁸¹
176. This is unprecedented in the 400 years of records examined and appears to be a direct effect of the changing conditions. These long calcification records are possible because corals lay down distinct annual layers of calcium carbonate, much like tree rings, which in the case of long-lived corals, can lead to precise measures of yearly calcification going back hundreds of years. He says that ocean acidification and elevated temperature can also act synergistically making the effect of each factor more significant when they occur together, with thermal tolerance of reef-building corals to temperature being reduced when they are also exposed to ocean acidification at the same time.¹⁸²
177. He says that the rate of increase in atmospheric CO₂ is largely unprecedented. Even during the highest rates of change seen during the rapid transition out of the last ice age, the same amount of change we are currently experiencing in a single year occurred over 100-200 years. This transition was accompanied by massive changes to the Earth's climate and biosphere.¹⁸³
178. In his opinion, impacts on coral reefs began when atmospheric CO₂ levels approached about 320 ppm. When CO₂ levels reached 340 ppm, sporadic but

¹⁷⁹ Exhibit 104, para 15.

¹⁸⁰ Exhibit 104, para 16.

¹⁸¹ Exhibit 104, para 17.

¹⁸² Exhibit 104, para 17.

¹⁸³ Exhibit 104, para 18.

highly destructive bleaching occurred in most reefs world-wide, often associated with El Nino events. Recovery was dependent on the vulnerability of individual reef areas and on the reef's previous history and resilience. At today's level of 390 ppm, allowing a lag-time of 10 years for sea temperatures to respond, most reefs world-wide are committed to an irreversible decline. The rate, extent and nature of this decline will become increasingly severe if atmospheric CO₂ concentrations continue to increase above current levels. In his opinion reducing atmospheric levels of CO₂ to below 350 ppm is critical for preserving a safe climate system.¹⁸⁴ Not pursuing this objective will escalate growing losses from a range of failing ecosystems and agriculture, increasing numbers of extreme events and other health and societal impacts.

179. He considers three different scenarios:

- (a) **CRS-A** where atmospheric CO₂ is stabilised close to current levels of 390ppm or up to approximately 420ppm and mean temperature rises above pre-Industrial levels of approximately 1-1.5°C occur.
- (b) **CRS-B** where atmospheric CO₂ is stabilised between 450 and 500 ppm and mean global temperature rises above pre-industrial values of approximately 2-2.5°C occur.
- (c) **CRS-C** where atmospheric CO₂ is either not stabilised or is stabilised above 500ppm at very long time horizons and mean global temperature is increased to above pre-Industrial levels by 2.5°C occur.

Hoegh-Guldberg - Future changes to the Great Barrier Reef as a result of climate change and ocean acidification

180. He concludes that climate change and ocean acidification are placing coral reefs in conditions that they have not experienced over the past 740,000 years, if not 20 million years. These changes are occurring at rates which dwarf even the most rapid changes seen over the past million years. There is a high degree of consensus within scientific circles that coral reefs, like a large number of other ecosystems, are set to change rapidly over the coming decades.¹⁸⁵
181. In his view, carbonate coral reefs such as the Great Barrier Reef are unlikely to maintain themselves beyond atmospheric CO₂ concentrations of 450ppm. This is because neither temperature nor ocean carbonate concentrations are suitable for coral growth and survival or the maintenance of calcium carbonate reef structures. Coral bleaching will occur and coral reefs will not accrete calcium carbonate or form limestone-like coral reefs in waters where there is less than appropriate carbonate ion concentrations.¹⁸⁶
182. In his view, the critical point for carbonate coral systems like the Great Barrier Reef arises when CO₂ concentrations exceed 450ppm. At this point, the majority of evidence points to tropical reef systems that do not have the dominant coral populations. As coral reefs are the results of vibrant coral

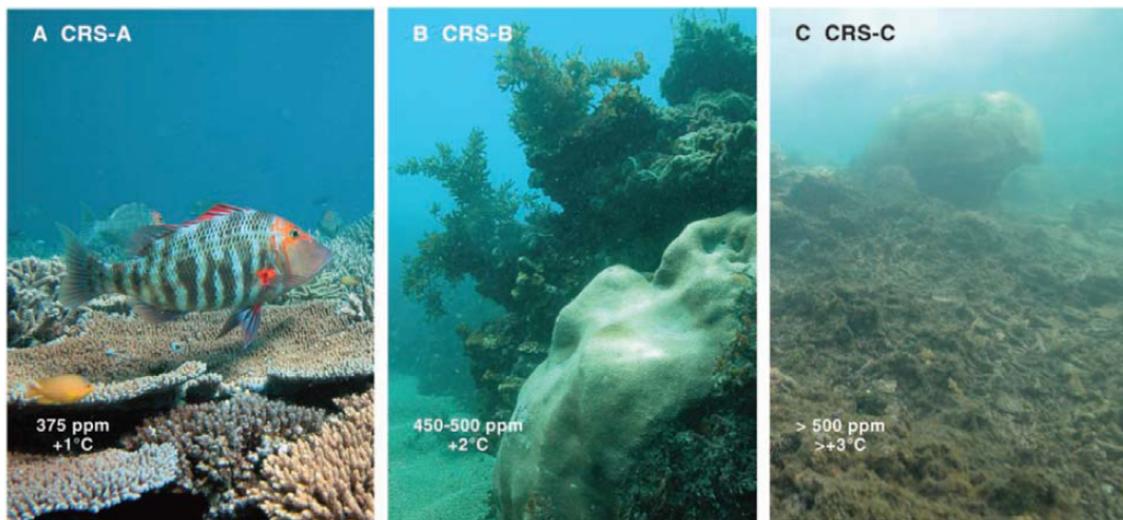
¹⁸⁴ Exhibit 104, para 19.

¹⁸⁵ Exhibit 104, para 23.

¹⁸⁶ Exhibit 104, para 24.

communities, many of the services (fisheries, tourist use) are severely degraded at this point.¹⁸⁷

Figure 5 **A.** If atmospheric carbon dioxide levels stabilise at current levels of 390 ppm up to around 420 ppm (scenario CRS-A), conditions will be similar to today except that mass bleaching events will be twice as common and will be more severe on reefs like the Great Barrier Reef. **B.** If atmospheric carbon dioxide concentrations that increase to around 450-500 ppm, together with a global temperature rise of 2°C above pre-Industrial levels, a major decline in reef-building corals is expected (reference scenario CRS-B). Because carbonate ion concentrations will fall below that required by corals to calcify and keep up with the erosion of calcium carbonate reef frameworks, reef frameworks will increasingly erode and fall apart. Seaweeds, soft corals and other benthic organisms will replace reef-building corals as the dominant organism on these much simpler reef systems. **C.** Levels of carbon dioxide in the atmosphere above 500 ppm, and associated temperature change (reference scenarios CRS-C) will be catastrophic for coral reefs which will no longer be dominated by corals or many of the organisms that we recognize today. Reef frameworks will actively deteriorate at this point, with ramifications for marine biodiversity, coastal protection and tourism (Reprinted courtesy of Science Magazine from Hoegh-Guldberg et al. 2007).



183. He presents the evidence in three scenarios assigned to Figure 5.¹⁸⁸ These scenarios represent a continuum and not a set of discreet thresholds or typing points. He points out that coral reefs regularly show non-linear behaviour which is a minimum of change for a period and then a sudden catastrophic decline in once dominant species as an environmental variable changes. Hence scientists do not know where these ‘breakpoints’ exist relative to particular concentrations of atmospheric CO₂.¹⁸⁹ In Figure 4 he sets out the carbonated values for aragonite saturation, which is a measure of the ease with which calcium carbonate crystals form as a function of geography. This figure is illustrated by the blue coloured areas which are coral reefs found today. It will be seen that the increase in temperature, as reflected in the red colour, and the level of aragonite saturation decreases with increasing concentrations of CO₂.¹⁹⁰ These are explained in the following paragraphs of the report.¹⁹¹ Initially there is coral bleaching, which is more frequent and intense relative to those that have occurred over the past 25 years. Then there is a shift towards reduced three-dimensional reef frameworks as concentrations of carbonate ions decrease. If

¹⁸⁷ Exhibit 104, para 25.

¹⁸⁸ Exhibit 104, page 12.

¹⁸⁹ Exhibit 104, para 27.

¹⁹⁰ Exhibit 104, page 12.

¹⁹¹ Exhibit 104, paras 29 – 35.

atmospheric CO₂ increases beyond 450ppm, large scale changes to coral reefs will inevitably occur and as a result, three-dimensional structures of coral reefs will begin to crumble and disappear. The loss of the three-dimensional structure has significant implications for other coral reef dwelling species such as fish populations, where at least 50% of the fish species are likely to disappear with the loss of the reef-building corals and the calcium carbonate framework of coral reefs.¹⁹²

184. He concludes that if the concentration of CO₂ in the atmosphere exceeds 500 ppm and conditions approach those of CRS-C, conditions will exceed those required for the majority of coral reefs across the planet. There will be a loss of coral reef ecosystems, a massive loss of biodiversity and a loss of ecological services and functions. This will result in scenarios where any semblance of reefs to the coral reefs of the Great Barrier Reef Marine Park today would vanish.
185. In dealing with the contribution of the Wandoan Coal Mine to the effects upon the Great Barrier Reef, Professor Hoegh-Guldberg considers that having regard to the fact that we are already above the thermal threshold for damaged reef-building corals. Any further additional CO₂ emitted into the atmosphere will directly damage the Great Barrier Reef, its natural ecosystems and the future opportunities of people and businesses that depend upon pristine and natural values. The thermal coal deposits that will generate 1.3 billion tonnes of CO₂-e over the life of the mine represent a very significant contribution to the impacts being felt by the Great Barrier Reef and a vast number of other ecosystems. He says that to ignore the impact of the mine, knowing that the emissions are not going to be sequestered, ignores the much greater costs of the mine to people and businesses worldwide.¹⁹³

Hans Hoegh-Guldberg

186. Mr Hoegh-Guldberg is an experienced economist. He worked as a consulting economist for three major management / economic consulting firms and ultimately founded his own firm in 1984. He has been involved in a number of papers dealing with the impact of climate change and ocean acidification on coral reefs, including both the Caribbean and the Coral Sea.
187. His report can be briefly summarised to include the following:
- (a) Between 2001 and 2009 the population in the Great Barrier Reef Catchment Area (GBRCA) increased from just under 1 million to 1.18 million. The growth rate was 2.45% per annum which was just under the national average of 1.5% per annum.
 - (b) The total tourism expenditure in the GBRCA in 2009-10 amounted to \$5.9 billion. The largest proportion of this was from domestic overnight visitors, followed by international visitors and domestic day visitors. Far North Queensland received a much higher proportion of international visitors spending than the other tourism regions – 67.7 per cent of total expenditure in the GBRCA.

¹⁹² Exhibit 104, para 32 – 33.

¹⁹³ Exhibit 104, para 37.

- (c) International holiday visitors where most prominent in the Whitsundays and Far North Queensland.
 - (d) The main experience sought by international visitors was the experience of nature as well as food and wine.
188. Reliable measures exist of the economic contribution of tourism in the GBRCA as a result of the works of Access Economics. At 2009-2010 values:¹⁹⁴
- (a) The contribution of the GBRCA itself totalled about \$3.7 billion.
 - (b) The contribution of GBRCA tourism to the whole of Queensland was \$4 billion.
 - (c) Contribution of GBRCA to Australia as a whole was 5.6 billion.
189. Mr Hoegh-Guldberg carried out research in 2004 which enabled him to make some assumptions as a result of the degradation of the Great Barrier Reef as a result of climate change. Updating those estimates to present values he derived the following estimates:
- (a) The worst case scenario would result economic losses of between 2001 and 2020 of \$11 billion. Even if the global environmental concerns took precedence over the economic growth there would be loss of between \$4.8 billion and \$6.2 billion.
 - (b) He indicates that these values indicate the economic impact on the Great Barrier Reef from climate change in the order of hundreds of millions of dollars per year.
 - (c) He says that the best hope for the ultimate future for coral in Queensland would be the development, as soon as possible, of more environmentally sensitive policies in the B1 / B2 scenarios to minimise pollution from the mainland and other sources of damage to the reef. Preserving and even building reef resilience will be critical to how reefs fare under increasing sea temperatures and carbonate alkalinities, especially over the coming quarter century or so.¹⁹⁵
190. By taking into account the Florida Keys study, he concludes that the indicative change in coral cover would be the most important indicator of the future of the Great Barrier Reef tourism. From a loss of cover, he deduces that, especially in the north, tourism would fall to a fraction of its previous level.¹⁹⁶ He concludes that it is reasonable to expect that a business-as-usual approach impact on climate change on reef-based tourism would be a reduction of approximately 65-75 per cent by 2100. Applying this reduction to the \$5 billion per annum value added by tourism estimated by Access Economics would yield a value of impacts from climate change on the GBR in the order of \$3.25 to \$3.75 billion per annum by 2100.

¹⁹⁴ Exhibit 105, para 13.

¹⁹⁵ Exhibit 102, para 22-23.

¹⁹⁶ Exhibit 105, para 29.

191. The upper end of the range of possible losses of tourism expenditure is consistent with the Oxford Economics estimate that the total economic value if the entire reef bleached would be 74 per cent of what it would be if the reef remained intact. The value of impacts on the Great Barrier Reef tourism alone are likely to expand from hundreds of millions of dollars per annum in the next decade to billions per annum as early as the second half of the century under a business-as-usual scenario.
192. When asked to place a total economic value on the Great Barrier Reef and the effect of climate change, he says that the impact of bleaching of roughly \$1 billion per annum over the next century must be regarded as an absolutely minimal estimate of the total impact from climate change on Great Barrier Reef tourism in a business-as-usual scenario.¹⁹⁷
193. The summary of Mr Hoegh-Guldberg's analysis is that a business-as-usual greenhouse gas emissions scenario would result in economic impacts on the Australian economy from lost Great Barrier Reef tourism in the order of hundreds of millions of dollars by the end of the decade, rising to billions of dollars as soon as the middle of the century. The economic loss from impacts on the Great Barrier Reef from coral bleaching due to climate change would be at the very least one billion dollars per annum over the next century. The total economic impact flowing from climate change impacts on the Great Barrier Reef is likely to be much higher than these estimates.¹⁹⁸
194. Various deductions can be made. It is not in issue that climate change will result in increased global temperatures and increased ocean acidification. These twin devils will result in continued degradation of the reef until it no longer exists as the pristine, healthy ecosystem which is attractive to tourism. The loss of tourism from the Australian economy will increase from millions to hundreds of millions to billions of dollars.
195. The contribution of this mine to ocean acidification and climate change is a significant piece in the matrix of carbon emitters which will produce devastating economic impacts to the Great Barrier Reef tourism economy.

Xstrata evidence of Ms Cassandra McCarthy

196. As has been stated above, Xstrata have not contested the wealth of climate change science which proves, irrefutably and alarmingly, the direct impact of human induced CO₂ emissions on our atmosphere, oceans and Great Barrier Reef in particular. The Affidavit of Cassandra McCarthy,¹⁹⁹ affirmed on 7 July 2011, demonstrates the importance that Xstrata Coal place on reducing GHG emissions, which she is familiar with through her role as Group Manager of Government Relations and Climate Change with Xstrata Coal.²⁰⁰ There remains some uncertainty as to the particular details of the Xstrata company that Ms McCarthy is employed by, however it is conceded that Ms McCarthy is

¹⁹⁷ Exhibit 105, para 39.

¹⁹⁸ Exhibit 105, para 48.

¹⁹⁹ Exhibit 47.

²⁰⁰ Exhibit 47.

employed by a company which is subsumed under the umbrella of the Xstrata Coal group.²⁰¹

197. The concern Xstrata Coal has with reducing its GHG emissions is understandable given that, as demonstrated in Ms McCarthy's affidavit, Xstrata is self-proclaimed as the "largest exporter of thermal coal in the world". Xstrata Coal's scope 1, 2 and 3 CO₂-e emissions totalled 211,711,987 tonnes in 2010 and Xstrata's total emissions internationally totalled 244,665,748 tonnes.²⁰²

198. Ms McCarthy detailed in her affidavit, and through cross-examination, many of the so-named "Sustainability Initiatives" which she understands Xstrata Coal has committed itself to with the aim of addressing the impact they acknowledge their coal production has on the environment through GHG emissions of CO₂ and methane.²⁰³ Indeed Ms McCarthy puts in evidence that Xstrata states:

"...we also fully recognise that the current and predicted level of GHG emissions associated with the burning of fossil fuels (of which coal is most polluting in terms of GHG emissions per btu produced) under a business-as-usual scenario are unsustainable and need to be addressed with considerable urgency and innovation."²⁰⁴

199. The "Sustainability Initiatives" detailed by Ms McCarthy are directed primarily at various CCS related research initiatives. It is conceded by Mr Stanford acting for Xstrata that "there is no indication as to when (or if) the technology will become a feasible commercial proposition."²⁰⁵

200. Ms McCarthy also demonstrated through her affidavit and during cross-examination that Xstrata Coal spends an approximate total of \$22 million of its profits on these "Sustainability Initiatives" which centre greatly on CCS research. This sum which they direct towards attempting to reduce their environmental impact is just 1% of the total annual profits of Xstrata Coal, which as at 2010 was reported at being approximately \$2 billion for the Xstrata Coal group alone.²⁰⁶

201. In conclusion, not only are Xstrata directing a nominal and insubstantial sum of their total profits towards so called "Sustainability Initiatives" in an effort to somewhat reduce the substantial environmental damage their company is profiting from, they are directing this small sum of money towards initiatives that are considered by their own experts to be highly commercially unfeasible and doubtful.

Xstrata evidence of Dr Christopher Taylor

202. Dr Chris Taylor gave evidence on behalf of Xstrata with respect to the estimated GHG emissions from the proposal.²⁰⁷

203. One of the questions Dr Taylor was asked to respond to was as follows:

²⁰¹ Transcript of proceedings, 29/08/11, pages 5-75 to 5-77.

²⁰² Exhibit 47, pages 66 and 67 of Exhibit 1, pages 10 to 11 of the affidavit.

²⁰³ Exhibit 47; Transcript of proceedings, 29/08/11, pages 5-78 to 5-80.

²⁰⁴ Exhibit 47, page 67 of Exhibit 1.

²⁰⁵ Exhibit 77, pages 11 - 13; Transcript of proceedings, 29/08/11, page 5-73.

²⁰⁶ Exhibit 132, page 62; Transcript of proceedings, 29/08/11, pages 5-82 to 5-83.

²⁰⁷ Exhibit 81, dated 8 July 2011.

- (a) *“With reference to the figures referred to in the EIS, SEIS and Objection of Friends of the Earth Brisbane Co-Op Ltd:*
- (i) *What will be the GHG emissions produced directly from the mining activities to be conducted at the Wandoan Coal Mine;*
 - (ii) *What will be the “downstream” or scope 3 GHG emissions likely to be produced from the export and ultimate use of the coal: and*
 - (iii) *In respect of (i) and (ii), can you please advise what the GHG emissions will be from the mining activities and from the downstream activities on both an annual basis and on a “life of mine” cycle basis?”*²⁰⁸
204. At section 3(a) of Dr Taylor’s report, filed on 8 July 2011, he stated that *“The data presented in the EIS have not been disputed in the Objection of the Friends of the Earth Brisbane Co-Op Ltd. I have therefore, assumed that the calculations were carried out correctly following the stated methodology and have not recalculated the emissions inventory”*.
205. The solicitors for FOE sought to clarify the basis for the calculations and this line of enquiry was objected to by the solicitors for Xstrata²⁰⁹ although, at the hearing of the Application in Proceeding Xstrata agreed to provide the figure for the product coal relied upon in the EIS GHG calculations.²¹⁰
206. In his report filed on 5 August 2011, Dr Malte Meinshausen on behalf of FOE found the estimation of overall emissions in the EIS not to be very transparent²¹¹ and based on alternate ROM coal figures from the EIS²¹² provided alternative calculations of the emissions which were up to 1.56 times higher than those provided by Xstrata.²¹³
207. Dr Taylor did not provide a reply to the evidence of Dr Meinshausen.
208. In cross examination Dr Taylor accepted the amount of product coal relied on in the calculation of the Scope 3 emissions from the project to be approximately 592 million tonnes²¹⁴ and accepted, at least in principle, that the calculation of the Scope 3 emissions presented in the EIS would be higher if the amount of product coal was higher, such as 846 millions tonnes, although he had seen no indication that the intention is to extract that much product coal.²¹⁵
209. Counsel for Xstrata objected to any evidence being led as to the accuracy of the calculations in the EIS and the Court reserved its judgment on this objection.
210. In our respectful submission the court should not proceed on the basis of key estimates about which there is some dispute without satisfying itself as to the reliability or otherwise of those estimates.

²⁰⁸ Exhibit 81, page 1, Section 2(a).

²⁰⁹ See the Application in Proceeding filed on 5 August 2011 and the affidavits of Sean Patrick Ryan affirmed on 5 August 2011 and 10 August 2011.

²¹⁰ Exhibit 133.

²¹¹ Exhibit 103 at a paragraph 48 on page 19.

²¹² Exhibit 103, Column A of Appendix C on page 32.

²¹³ Exhibit 103, Appendix C on page 32.

²¹⁴ Transcript for 29 August 2011, page 5-86.

²¹⁵ Transcript for 29 August 2011, page 5-91 line 55.

211. Dr Taylor also conceded to the court that the burning of coal increases the CO₂ concentration in the atmosphere for “hundreds to thousands of years” and therefore has a cumulative effect.²¹⁶ For this reason Dr Taylor agreed that it is reasonable to consider the life-of-mine emissions of the mine when considering the scope 3 emissions which the mine will be related to the coal burnt from Wandoan mine.²¹⁷ However Dr Taylor did not agree with the choice of Dr Meinshausen²¹⁸ and Professor Lowe²¹⁹ to compare life-of-mine emissions to an annual emissions figures.
212. In our submission, the Court should prefer the views of Professor Lowe and Dr Meinshausen to those of Dr Taylor as both are far more eminent scientists who backed their opinions with solid scientific reasoning.

Xstrata evidence of Mr William Simes

213. Mr William Simes, on behalf of Xstrata, expressed the view that there is demand from coal from Wandoan and if the coal from Wandoan is not produced, it is reasonable to expect that alternate coal will replace Wandoan coal.²²⁰
214. In cross examination Mr Simes accepted that in the shorter term that alternate coal may come from either operating mines, approved mines or mines that are yet to be defined and developed,²²¹ that is mines that don’t yet have legal approval.²²²
215. In respect of Australia, Mr Simes acknowledged that he raised similar arguments, that any refusal would be met by alternate supply in respect of the expansion of another coal mine, the Ulan Coal Mine, in New South Wales.²²³ That mine is presently subject of a reserved judgement in the Land and Environment Court. That argument, having already been raised twice in two different jurisdictions, can presumably be used by any coal producer in any future application for approval of a mine. It overlooks the fact that the argument is circular as the previous case would be able to supply the coal sought by the new applicant. It also overlooks the fact that mines that are already approved, whether in operation or not, could supply the coal.
216. In respect of other countries Mr Simes accepted that he is “not an expert in the controls of these other countries”.²²⁴

Xstrata evidence of Mr Jonathan Stanford

217. Mr Stanford gave evidence for Xstrata on policy and economic issues²²⁵ but, despite professing to be policy expert, failed to address in his report the criteria in

²¹⁶ Transcript 29 August 2011, page 5-93.

²¹⁷ Transcript 29 August 2011, page 5-94.

²¹⁸ Exhibit 103, pages 17-19.

²¹⁹ Exhibit 102, pages 12-15.

²²⁰ Exhibit 75 section 4.1(a).

²²¹ Transcript 30 August 2011 page 6-6, line 10.

²²² Transcript 30 August 2011 page 6-7, line 31.

²²³ Transcript 30 August 2011 page 6-2, Lines 50-50.

²²⁴ Transcript 29 August 2011, page 111 line 19.

²²⁵ Exhibit 77, page 24.

the MRA and EPA under which the Court must consider the applications. This was a fundamental and basic error that greatly diminishes the weight that the Court should give to his evidence and policy recommendations.

218. In cross examination he accepted the following propositions:
- (a) the Queensland Government prizes the Great Barrier Reef;²²⁶
 - (b) the Great Barrier Reef contributes very significantly to the total quality of life in Queensland;²²⁷
 - (c) the Great Barrier Reef is threatened by climate change;²²⁸
 - (d) losing the Great Barrier Reef would diminish, significantly, the quality of life of people in Queensland, Australia and internationally;²²⁹
 - (e) a development which if it does result - which would, if it does result - if it does result in the loss of the Great Barrier Reef, is not ecologically a sustainable development.²³⁰
219. The last of these concessions is a very significant one given the obligation imposed on the Court by s 5 of the EPA and the legislative criteria that the Court must consider under s 223 of that Act.

SUBMISSIONS ON THE MAIN FINDINGS OF FACT THAT THE COURT SHOULD MAKE

220. FOE submits that the Court should make the following main findings of fact based on the evidence set out above:
- (a) that the science of climate change and ocean acidification is well established and highly credible;
 - (b) the “safe” level of carbon dioxide (CO₂) in the atmosphere was less than 350 ppm but current levels have risen to 390 ppm and continue to rise by 2 ppm annually, thereby exceeding the resilience of the atmosphere to emissions from fossil fuels;
 - (c) the Great Barrier Reef is being damaged by climate change and ocean acidification at current levels;
 - (d) allowing atmospheric concentrations of CO₂ in the atmosphere to rise to 450 ppm will cause global temperatures to rise by around 2°C above pre-industrial levels and this level represents a critical threshold for temperature rises that Australia and most governments of the world have agreed not to exceed;

²²⁶ Transcript 30 August 2011, page 6-15, line 35.

²²⁷ Transcript 30 August 2011, page 6-18, line 44.

²²⁸ Transcript 30 August 2011, page 6-13, line 12.

²²⁹ Transcript 30 August 2011, page 6-18, line 50.

²³⁰ Transcript 30 August 2011, page 6-19, line 12.

- (e) there is a global Carbon Budget from the year 2000 to 2050 of around 1,000 gigatonnes (Gt) (billion tonnes) of CO₂ to provide a 75% probability of holding atmospheric CO₂ concentrations beneath 450 ppm and holding global temperature rises beneath 2°C warming, of which approximately 357 GtCO₂ has already been burnt and 643 GtCO₂ remains to be emitted by 2050;
- (f) approval of the Wandoan Coal Mine represents a significant step towards exceeding the critical thresholds of atmospheric CO₂ concentrations of 450 ppm and global temperature rises of 2°C warming due to the emissions from burning of the coal (of at least 1.3 Gt CO₂) representing around 1/490th part of the remaining global Carbon Budget;
- (g) the emissions of the Wandoan Coal Mine will cause significant harm to the Great Barrier Reef and, thereby, damage employment in the Queensland tourist industry by contributing to climate change and ocean acidification;
- (h) the CO₂ emitted from burning the coal will continue to affect the atmosphere for centuries to millennia making the impacts of the mine effectively irreversible;
- (i) carbon capture and storage (CCS) technology to avoid the emissions of CO₂ when the coal from the mine is burnt is: currently not technologically or commercially feasible; is not expected to be available for decades; and may never be available.

SUBMISSIONS ON THE APPLICATION OF THE STATUTORY CRITERIA

- 221. FOE submits that the different statutory regimes under the MRA and EPA require different outcomes in the facts of this case where Xstrata admits that the activity is unsustainable but say “if the mine is refused, the coal would simply come from somewhere else.” Such an approach may be acceptable under the MRA but it is clearly unacceptable under the EPA.
- 222. As noted earlier, the MRA provides a system aimed at promoting the development of the mineral resources of the State while the EPA is very much focused on the protection of the environment. These objects overlap to some extent, but they are quite different and it would be wrong to assume that the consideration of the mining lease application under the MRA and the consideration of the application for the environmental authority under the EPA are the same. A particular feature that distinguishes the two Acts is that the Court’s duty under s 5 of the EPA is to perform its function and exercise its powers “in the way that best achieved the object of the Act” of ecologically sustainable development. There is no such duty under the MRA.
- 223. Applying the main findings set out in the previous section to the criteria stated in s 269(4) of the MRA and s 223 of the EPA, FOE submits that the Court should hold that:
 - (a) scope 3 emissions from the mine must be considered when assessing its impact under the MRA and EPA;

- (b) the public right and interest is prejudiced due to the contribution the mine will make to climate change and ocean acidification;
- (c) the mine is not consistent with the principles of ecologically sustainable development set out in the *National Strategy for Ecologically Sustainable Development*;
- (d) whether the coal may be supplied from somewhere else in the world is relevant to consider but the Court is primarily concerned with assessing the impacts of *this individual mine*, not other mines that have not been applied for and are not subject to the jurisdiction of the Court;
- (e) when assessing the impacts of a mine in the context of coal production globally, the Court rightly assumes that other governments and courts around the world *will act responsibly* in approving mines subject to their control without considering their cumulative impacts to climate change and ocean acidification.

MEETING THE DUTY IMPOSED UNDER SECTION 5 OF THE EPA

224. An activity that is unsustainable does not become sustainable because others are doing similar things. It does not become sustainable simply because, if it did not proceed, someone else would do it in another place.
225. Xstrata and DERM have failed to understand the legislative context under which the environmental authority must be assessed and, in particular, the duty imposed on the Court by s 5 of the EPA and the principles of ecologically sustainable development.
226. Xstrata admits that “current and predicted levels of GHG emissions associated with the burning of fossil fuels ... under a business-as-usual scenario are unsustainable”.²³¹ It does not challenge the evidence of Dr Meinshausen in relation to the remaining Carbon Budget to 2050 to exceed the critical threshold of 2°C²³² or that the current international framework for reducing global emissions is “still far above an emissions pathway that could realistically reach the 2°C target.”²³³ It does not challenge the evidence of Professor Hoegh-Guldberg that the Great Barrier Reef will be severely damaged if atmospheric carbon dioxide levels increase beyond 450 ppm.²³⁴ Nor does it challenge his evidence and that increases above 500 ppm “would result in scenarios where any semblance of reefs to the coral reefs of the Great Barrier Reef Marine Park today would vanish.”²³⁵
227. In response, Xstrata says, two things. The second is that “mining and burning the coal from the project will have negligible or no separate impact on climate change.”²³⁶ That proposition cannot stand in the face of the uncontradicted evidence of Dr Meinshausen as to the large contribution that the emissions will

²³¹ Exhibit 47, page 67 of the extract of the Xstrata plc Sustainability Report 2010 attached to the affidavit of Ms McCarthy.

²³² Exhibit 103, pages 9-10 [18]-[21].

²³³ Exhibit 103, page 21 [57].

²³⁴ Exhibit 104, page 13 [32].

²³⁵ Exhibit 104, page 14 [35].

²³⁶ Transcript, page 5-66, lines 29-31.

make to exceeding the Carbon Budget necessary to have a reasonable chance of not exceeding the critical threshold of 2°C²³⁷ and the uncontradicted evidence of Professor Hoegh-Guldberg regarding the severe damage to the Great Barrier Reef of allowing such increases.²³⁸

228. The principal proposition by Xstrata, however, is that, “stopping ... this mine will not reduce the amount of greenhouse gas emissions which will occur [because] the coal that this mine would have produced will be replaced by coal produced elsewhere.”²³⁹ In effect: if we don’t do it, someone else will.
229. Xstrata makes no pretence that the emissions that will result from the mine are consistent with ecologically sustainable development. To the contrary, Xstrata admits that the “current and predicted levels of GHG emissions associated with the burning of fossil fuels ... under a business-as-usual scenario are unsustainable”.²⁴⁰ The mine represents no more than a business-as-usual scenario.
230. The Court’s duty under s 5 of the EPA is to perform its function and exercise its powers “in the way that best achieved the object of the Act” of ecologically sustainable development. This mine does not represent ecologically sustainable development and seeking to point to other, equally unsustainable development, in other jurisdictions does not change that fact. In such circumstances, the Court must recommend refusal of the application for the environmental authority under the EPA.

CONCLUSION

231. The Court has a discretion whether to recommend the mining lease be granted under the MRA as this Act primarily promotes the development of the mineral resources of the State.
232. The Court must recommend that the environmental authority not be granted to comply with its duty under s 5 of the EPA. As a matter of discretion, the Court should in any event not be minded to recommend approval of the environmental authority after weighing up the considerations in s 223 of the EPA because the proposal does not conform with the principles of ecologically sustainable development.

Brian Cronin and Dr Chris McGrath
Counsel for the Friends of the Earth
31 August 2011

²³⁷ Exhibit 103, pages 9-10 [18]-[21].

²³⁸ Exhibit 104, page 13 [32].

²³⁹ Transcript, page 5-66, lines 24-29.

²⁴⁰ Exhibit 47, page 67 of extract attached as exhibit 1 to the affidavit of Ms McCarthy.