

# Chapter 2

## Issues

2.1 This chapter discusses a number of concerns raised in relation to proposed coal and gas exploration and mining/drilling on the Liverpool Plains area of NSW, in particular by BHP Billiton Ltd (BHP), Shenhua Watermark Coal Pty Ltd (Shenhua) and Santos Ltd (Santos). Particular concerns were raised at the potential for these developments to adversely impact on agricultural activities in the area.

### Background

2.2 The Liverpool Plains covers an area of 12 000 square kilometres located in the north-west of New South Wales some 400 kilometres from Sydney. It is bounded by the Great Dividing Range to the east, the Liverpool Range to the south and the Warrumbungles to the west. The area is a sedimentary flood plain that has been laid down over several million years to provide a very rich, fertile farming area.<sup>1</sup>

### *Importance of the Liverpool Plains to food production*

2.3 The area's fertile black soils have a high water holding capacity with reliable summer and winter rainfall. The crops in the area consistently produce 40 per cent above the national average. The area grows a diverse range of crops such as wheat, sorghum, oats, soybeans, barley, corn, sunflowers and cotton. It also produces chickpeas, mungbeans, canola, olives, turkeys, chickens, pigs, lambs and wool. In addition it has a significant beef industry. The area is unique in that it produces two crops per year, unlike the majority of farming areas. The Liverpool Plains contributes an estimated \$332 million to GDP annually.<sup>2</sup>

2.4 The area produces 28 per cent of the state's sorghum, 33 per cent of sunflowers and 16 per cent of the state's maize. The cereals grown in the region contribute approximately 4.4 per cent of the wheat and barley grown in NSW. The average yield for wheat and barley is 36 and 20 percent higher respectively in the Liverpool Plains than the state average.<sup>3</sup>

2.5 Mr Tim Duddy, Spokesman of the Carroona Coal Action Group (CCAG), graphically illustrated the importance of the Liverpool Plains to food production in Australia when he stated that:

Annually, our plain produces 233,000 tonnes of sorghum for cattle and chicken feed, 29 million kilograms of beef, 77 million kilograms of chicken

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1 Mr Tim Duddy, *Committee Hansard*, 5 March 2009, p. 64.

2 *Submission* 85, Mrs Rosemary Nankivell, p. 1.

3 Mr Bob Hunter, Tabled Document, 19 May 2009.

and 77,000 tonnes of pork... We have grown 183,488 tonnes of wheat over a 16-year average, which equates to 365 million loaves of bread; 63,709 tonnes of barley, which equates to 144 million bottles of beer; 19,829 tonnes of sunflowers, which is eight million litres of oil; and 29,018 tonnes of corn, which is 68 million boxes of cornflakes. That area has produced 36 crops in the last 40 crop-producing periods. In the last 20 years, that area... has had only four of what can be labelled as 'complete failures', taking out of the equation any irrigated country in the area.<sup>4</sup>

### ***The projects***

2.6 As noted above, mining and gas proposals by BHP, Shenhua and Santos have raised concerns within the community. In April 2006, the NSW Government issued BHP Billiton, via its shelf company Coal Mines Australia Pty Ltd, a five-year coal exploration licence in the Caroonna area.

2.7 BHP explained that the company is in the assessment stage of the Caroonna project and 'in reality we are probably another three years away from submitting a mine plan to the New South Wales government for assessment'. The company's exploration work has focused on mine development that will be generally located on the ridge country of Doona Point, Nicholas Ridge and Georges Island.<sup>5</sup>

2.8 BHP explained that:

The current exploration area is some 350 square kilometres, of which we have already said we are not interested in two-thirds, from a mining point of view. It is a no-go zone. So our application for a mining lease will be a lot smaller. The ridge area that is defined on the maps... is about 126 square kilometres. The mining lease is likely to be something smaller again, but we do not know exactly where. Once we apply for a mining lease and it is granted... the exploration licence just expires. So it will no longer be an exploration lease; we will hold a mining lease.<sup>6</sup>

2.9 In October 2008, the NSW Government issued an exploration licence over neighbouring land at Watermark to Shenhua.

2.10 Shenhua, the operator of the Project, is a subsidiary of Shenhua Australia Holdings Pty Limited which is a subsidiary of the China Shenhua Energy Company Limited (China Shenhua) which is 68 per cent owned by the Chinese government. Shenhua was granted the Watermark Exploration Licence (Watermark EL 7223) in October 2008 over an area of 195 square km area near Gunnedah and within which

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4 Mr Tim Duddy, *Committee Hansard*, 5 March 2009, p. 64.

5 Mr Martin Grant, *Committee Hansard*, 18 September 2009, pp 2-3. See also BHP, Tabled Document, 18 September 2009.

6 Mr Stephen David, *Committee Hansard*, 18 September 2009, p. 4.

there are 197 individual privately owned lots with 65 private owners; areas of Breeza State Forest; and public lands.<sup>7</sup>

2.11 Shenhua explained that should a viable mine be identified and subject to the issue of all necessary environmental planning and mining approvals the company anticipates construction of the mine to commence in 2012 with mine production commencing in 2013.<sup>8</sup>

2.12 Santos has interests in a number of Petroleum Exploration Licences in the Gunnedah Basin and is undertaking an 18-month exploration program for coal seam gas. The company is drilling approximately 30 coreholes and have undertaken seismic testing in parts of its exploration leases. As the Liverpool Plains and surrounding ridges make up a part of these leases the company has some coreholes and seismic testing on both areas.

2.13 The area under exploration is approximately 63 000 square km (Santos and Eastern Star Gas Ltd combined), with exploration and initial testing limited to specific sites.<sup>9</sup> The area includes the districts around Gunnedah, Coonabarabran, Scone, Quirindi and Boggabri. The exploration program commenced in May 2008 and when the program is complete the company will consider whether it is viable to continue exploration. If this is the case more detailed testing will be done over a period of 2-3 years commencing in 2010. Before coal seam gas could be commercially extracted in the Gunnedah Basin Santos advised that 'several more years' of testing, analysis and planning would be required.<sup>10</sup>

2.14 The major issues of concern raised during the inquiry are discussed below.

### **Regulatory arrangements**

2.15 The adequacy of regulatory arrangements related to the exploration and mining/drilling of coal and gas on the Liverpool Plains were raised during the inquiry. The majority of mineral resources in NSW are owned by the Crown. State ownership of minerals confers on the State exclusive rights to allocate resources and collect royalties resulting from their exploitation.

2.16 The NSW regulatory framework comprises a range of legislation, regulations, environmental planning instruments, policies, and guidelines. Exploration licences are granted under the *Mining Act 1992*. However, during the exploration stage, companies are required to comply with the *Water Act 1912*, which regulates rights to surface and groundwater sources, and the *Protection of the Environment Operations Act 1997*

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7 *Submission 146, Shenhua, p. 2.*

8 *Submission 146, Shenhua, p. 2.*

9 In July 2009 Santos acquired a 20 per cent interest in Eastern Star Gas Ltd.

10 Santos, Tabled Document, 18 September 2009. See also Santos, Correspondence, dated 7 November 2009.

(PEOA Act), which regulates pollution generated by mining activities. Exploration activities are also subject to the environmental assessment process set out in Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which is discussed below. Mining approvals are granted under the Environmental Planning and Assessment Act.

2.17 The government's development assessment process is provided for under a number of Acts. The legislation of primary importance for mining and exploration is the *Environmental Planning and Assessment Act 1979*. The *Mining Act 1992*, the *Petroleum (Onshore) Act 1991*, the *Protection of the Environment Operations Act 1997*, the *Water Management Act 2000* and the *Water Act 1912* are also significant instruments. A number of these Acts interact with each other. Industry and Investment NSW summarised the situation in the following terms:

It is important to recognise that an exploration licence is not an approval to develop a new mine; rather, an exploration licence allows a company to undertake exploration and environmental feasibility studies only and is subject to stringent environmental conditions. In New South Wales any new mining proposal is subject to an environment assessment process under the Environmental Planning and Assessment Act. That addresses all potential impacts of the proposal, including cumulative impacts. Coal projects, for example, require a major project approval from the Minister for Planning under part 3A of the EP&A Act. As part of that process a comprehensive environmental assessment must be prepared by the proponent, which is subject to public exhibition and agency consultation requirements. The EP&A Act uses merit based assessment processes that weigh up the competing values of land and requires all relevant values to be assessed in order to achieve an appropriate balance between mineral development and agricultural and environmental values.<sup>11</sup>

### ***Environmental Planning and Assessment Act***

2.18 The EP&A Act requires environmental assessment of exploration and mining proposals, and may impose conditions on approvals to minimise potential environmental impacts. The assessment process under the EP&A Act considers a broad range of environmental issues including water, aquifers, alternative uses of the land and whether the proposed development is in the best interests of the State.

2.19 The assessment process also considers ecologically sustainable development, including inter-generational equity and environmental, social and economic factors. The process also includes community and agency consultation, depending on the nature and scope of the proposal.<sup>12</sup>

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11 Mr Nick Milham, *Committee Hansard*, 18 September 2009, p. 35.

12 NSW State Government Submission to Senate Environment Committee inquiry into the impacts of mining in the Murray Darling Basin, p. 6.

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***Mining Act and Petroleum (Onshore) Act***

2.20 These Acts regulate access to land for exploration and mining of minerals and petroleum in New South Wales. They set out the requirements to be met in order to enter land to undertake exploration and mining and petroleum activities, including requirements to obtain a mining or petroleum authority (exploration licence, assessment lease, mining lease, or mineral claim) and to pay royalties to the Crown on recovered minerals and petroleum.

2.21 The Mining Act deals with the approval of mining titles, technical and safety aspects of mining and the day-to-day environmental monitoring of mining projects.

***Protection of the Environment Operations Act (PEOA Act)***

2.22 The PEOA, administered by the NSW Department of Environment, Climate Change and Water (DECCW) regulates pollution generated by mining activities through a licensing scheme. The DECCW imposes conditions on the licence which limit or prohibit pollution and establish management obligations.

***Water Management Act (WMA) and the Water Act (NSW Water Act)***

2.23 The WMA and the NSW Water Act, administered by DECCW, regulate rights to surface and groundwater sources via a licensing and approvals regime which is integrated with the EP&A Act. This regime limits the volume and nature of water that can be extracted from a water source and imposes conditions to protect the water source. The WMA applies in areas where water sharing plans have commenced. Otherwise the NSW Water Act still operates.

2.24 Water extracted for mining is licensed under NSW water legislation and accounted for within water extraction limits.<sup>13</sup>

2.25 As noted above, the NSW Minister for Planning is the approval authority for all coal mining and other major mining proposals under Part 3A of the EP&A Act.

***Reference to water in the Mining Act***

2.26 Submissions drew attention to the fact that the NSW Mining Act does not recognise the impact of water resources in the granting of exploration or mining licenses and, in fact, does not even mention the word 'water' in the legislation. The CCAG stated that:

The grant of exploration or mining licenses in the Caroonna area without proper regard for these same water resources is wholly inconsistent and irresponsible consequent management, allowing mining companies to

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13 NSW State Government Submission to Senate Environment Committee inquiry into the impacts of mining in the Murray Darling Basin, pp 7-8.

explore the resources of the region without a proper understanding of the spatial relationship between coal and water resources.<sup>14</sup>

2.27 The CCAG stated that access to a reliable source of water is an essential requirement for coal mining, used variously to drill for the coal, to wash the product, to manage dust, and so on. The CCAG stated that reports indicate that at least 200 litres of water can be consumed for every tonne of coal produced, however this may vary according to operation practice and circumstance, and may be as high as 1000 litres. This represents a huge volume of water that is removed from the Murray Darling Basin, while remaining water may be irretrievably damaged through salinity, subsidence and cross-contamination.<sup>15</sup>

2.28 The committee raised this issue with the NSW department. The department noted that:

The Mining Act is not there to govern water. We have different acts that govern water, including the EP Act and the Water Act. So the mining act is not the instrument for management of water issues.<sup>16</sup>

2.29 During the exploration stage, companies are required to comply with the Water Act, which regulates rights to surface and groundwater sources, and the PEOA Act, which regulates pollution generated by mining activities. Exploration activities are also subject to the environmental assessment process set out in Part 5 of the EP&A Act. As noted above, Part 5 of the EP&A Act requires the determining authority (the Minister for Planning) to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment. Conditions to protect the environment are imposed on the exploration title on approval of exploration activities.<sup>17</sup> Part 5 of the EP&A Act is at Appendix 3.

### **Role of the Planning Minister**

2.30 New projects require a mining lease to be granted by the NSW Government before mining can commence.

2.31 As noted above, the NSW Minister for Planning is the approval authority for all coal mining and other major mining proposals under Part 3A of the EP&A Act.

2.32 Part 3A of the Act sets out the criteria to be to be complied with when submitting an application for a mining proposal:

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14 *Submission* 119, CCAG, p. 4.

15 *Submission* 119, CCAG, p. 4.

16 Mr Brad Mullard, *Committee Hansard*, 18 September 2009, p. 37.

17 Advice from Industry and Investment NSW, 24 November 2009. See also NSW State Government submission into the Environment Committee's inquiry into the impacts of mining in the Murray Darling Basin, p.6.

- Approval by the Minister for Planning is required for commencement of a project (section 75); and
- An environmental assessment is required under section 75H. The Director-General of the Department of Planning must prepare environmental assessment requirements having regard to relevant guidelines. Consultation is also required to take place with relevant public authorities to identify issues. The Director-General has a broad discretion over the requirements to be addressed in the assessment (Section 75F).

2.33 The NSW Government has also introduced a number of complementary regulatory measures within the planning framework of the EP&A Act to ensure the integrity of agricultural land is not diminished through the development of incompatible industries. These measures include the Rural Lands State Environmental Planning Policy (SEPP) and the SEPP (Mining, Petroleum Production and Extractive Industries) 2007, both of which are environmental planning instruments created under the EP&A Act.

2.34 The Rural Lands SEPP provides for protection of rural lands in NSW while at the same time allowing flexibility to respond to the changing nature of agriculture. The SEPP contains a framework whereby agricultural land of State significance can be identified for special protection (clauses 12 and 13).

2.35 The Mining SEPP requires an assessment of land-use compatibility as part of an application for a new mine, quarry or petroleum production facility. It also applies to developments on adjacent land identified as containing minerals, extractive materials or petroleum resources. The assessment is used to determine the potential for land-use conflict and land-use constraint in respect to adjacent land uses.<sup>18</sup>

2.36 Industry and Investment explained the process in the following terms:

It is actually a very broad assessment of a whole range of issues. Clearly mining has quite a significant local impact...Basically the assessment takes into account a whole range of factors such as water, subsidence impacts, dust, noise, lighting and the economic impact on the community. It is a very broad and comprehensive assessment.

The requirements of the assessment process are set out in those planning instruments...They are very comprehensive. They allow the concerns of different community interest groups to be expressed and to be taken into account. So if, for example, as Senator Heffernan has already outlined, there is a concern about the long-term impacts of longwall mining then that would be heard as part of that process.<sup>19</sup>

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18 NSW State Government submission into the Environment Committee's inquiry into the impacts of mining in the Murray Darling Basin, p. 7.

19 Mr Brad Mullard/Mr Nick Milham, *Committee Hansard*, 18 September 2009, p. 41. See also Minerals Council of Australia, Tabled Document, 9 October 2009.

2.37 The committee questioned the NSW department if it is solely a ministerial decision to grant a mining lease or is the process based on certain facts or criteria. The committee raised the possible situation of a mining company that wishes to mine an area despite adverse impacts on agriculture or firm community opposition. The department noted that:

Mr Milham—There are no concrete rules. It is not a case of ticking a box or moving down the decision tree.

Senator NASH—And that is the difficulty, isn't it?

Mr Milham—... it becomes—

Senator NASH—Subjective.

Mr Milham—A case of weighing up different views and opinions and it becomes a matter of judgement.<sup>20</sup>

2.38 While it is possible that the Minister could decide to go ahead with a project that may produce adverse consequences, the committee notes that the likelihood of this occurring is minimised somewhat by requirements under section 75J of the EP&A Act and the operation of the State Environmental Planning Policies. Section 75J of the EP&A Act requires the Minister to consider the Director-General's report on the project and reports and advice and recommendations as well as the statement of compliance with environmental assessment requirements which accompanies the application by the proponent.

2.39 The department noted that the Minister has the option of convening an expert advisory panel to provide advice. Decisions of the Minister for Planning are also subject to appeal.

Mr Milham—The judgement is made by the Minister for Planning on those major developments, and those judgements are subject to appeal.

Mr Mullard—I should point out too that quite often for major complex projects the minister will actually convene an expert advisory panel to hear evidence and call for submissions so he can take advice very broadly from experts in the field....any decision of the minister can be subject to appeal through the Land and Environment Court New South Wales.<sup>21</sup>

2.40 The committee noted that a future minister may permit mining under the Gunnedah flood plains. The department conceded that there was no way of guaranteeing that this would not occur.

...there is a case-by-case assessment of each project as it comes forward. So if you are asking if there is a blanket ban on mining then there is not,

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20 Mr Nick Milham, *Committee Hansard*, 18 September 2009, p. 42.

21 Mr Nick Milham/Mr Brad Mullard, *Committee Hansard*, 18 September 2009, p. 42.



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because it is based on an assessment of the exact type of mining and the mining impacts.<sup>22</sup>

2.41 One submission stated that no application for coal mining in NSW has been rejected in the last 10 years by a Planning Minister.<sup>23</sup>

2.42 The committee notes that the Minister under the Act has the discretion to approve or not approve a project. The Minister is required to consider a number of issues stipulated in the Act. These are the Director-General's report on the project, including a statement relating to compliance with environmental requirements; and any findings of the Planning Assessment Commission, which was established to determine applications for approval of projects if those matters are delegated by the Minister and review any environmental aspects of the proposed development. The Minister can weigh up various considerations and take into account competing issues. Ultimately, however it is the Minister's decision to approve a project or not.

### **Mining on the ridges**

2.43 In September 2009, BHP reached an agreement with the NSW Government to amend the special conditions of its exploration licence. The NSW government will include a new condition in the Exploration Licence under the Mining Act that will quarantine the floodplains from long wall and open-cut mining by BHP.

2.44 This condition requires that any development approval sought by BHP within the initial terms of the licence, or during any extensions or renewals of the licence, will not include any of the following conditions:

- long wall mining underneath the deep alluvial irrigation aquifers;
- long wall mining underneath the floodplain; or
- open-cut mining underneath the floodplain.<sup>24</sup>

2.45 BHP reiterated that:

BHP has itself declared two-thirds of the exploration licence a no-go area for mining of any description. The remaining one-third, consisting mostly of elevated ridge country, is the focus of our ongoing exploration work. Secondly, longwall mining will be restricted to under the ridge country within the targeted area. Just to be clear, within the targeted area there is still a minor amount of flood plain land. Whilst there will be no longwall mining under the flood plains within the targeted area, there is the

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22 Mr Brad Mullard, *Committee Hansard*, 18 September 2009, p. 42.

23 *Submission* 149, Mr Chris Russell, p. 2.

24 The Hon Ian Macdonald, NSW Minister for Primary Industries and Minister for Mineral Resources, 'Landmark agreement to protect floodplains', *Press Release*, 1 September 2009.

possibility of access roadways being constructed on the flanking areas. Lastly, there will be no open-cut mining anywhere in the Caroonna project.<sup>25</sup>

2.46 The CCAG questioned whether alternative types of mining other than long wall or open-cut are, or may be, available in the future to mine these areas, and queried to what extent these amendments will restrain future mining activities.<sup>26</sup>

2.47 The committee also questioned why a blanket prohibition on mining in general was not a condition of the revised exploration licence.

2.48 BHP responded that:

It is a difficult one and it is a good question. The reason is that we are worried about the fact that development of the access ways will be construed as being mining, which in some ways it is. But we want to make sure that there is a differentiation between the large economic extraction of a coal resource and the access development.<sup>27</sup>

2.49 BHP conceded that on a 'strict interpretation' other types of mining could be used on the floodplain. BHP added however that:

What we have decided, and we have communicated this quite clearly to key stakeholders, is that we will not be taking any mining outside our targeted area. That targeted area very much follows the ridge land areas, except for minor amounts of flood plain.<sup>28</sup>

2.50 Shenhua stated that any mining at the Shenhua Watermark Project 'will be located in the "ridge" country" and 'will not be on the black soils'.<sup>29</sup>

2.51 Concerns were however raised that mining activity on the ridges may adversely affect the rich alluvial floodplain and affect future agriculture. Mr Duddy explained that:

If there is a mountain here and a mountain here, the side of which they are mining, and there is the plain filling in that area—so the plain is across here—and you have a big sandwich of aquifers, when they start digging in here the hill then starts to slide back and all those aquifers and contaminated waters that we have complained about start cracking and things start moving, just like with earthquakes. Then all that water becomes intermingled and the coal all becomes intermingled with the aquifers. The

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25 Mr Martin Grant, *Committee Hansard*, 18 September 2009, p. 3.

26 *Submission* 119, CCAG, p. 3.

27 Mr Martin Grant, *Committee Hansard*, 18 September 2009, p. 6.

28 Mr Martin Grant, *Committee Hansard*, 18 September 2009, p. 6.

29 *Submission* 146, Shenhua, p. 1. See also Mr Joe Clayton, *Committee Hansard*, 24 November 2009, p. 2.

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coal has sulphur and heavy metals in it, and that water then is no longer suitable for the purpose of agriculture.<sup>30</sup>

2.52 The CCAG noted the importance of the ridge formations around the flood plain and their contribution to the recharge of the underground aquifer and surficial aquifer.<sup>31</sup>

2.53 The committee questioned BHP concerning the ridge country and its role as recharge zones. BHP conceded that it was difficult to assess the impact at this stage.

Senator NASH—With all the work you have so far done...do you consider the ridges above the flood plain are actually recharge zones or potential recharge zones?

Mr Grant—Again, it is a difficult question to answer, given where we are in our study process. These will be questions we will need to clearly answer ahead of our development application.<sup>32</sup>

2.54 The committee also questioned BHP on the possible impact of mining the ridges on the aquifer. BHP stated that:

Senator NASH—How do you know that mining on the ridges is not going to have an impact on the aquifer?

Mr David—Today I would not say that we know that.

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Mr David—...what we are doing is collecting the data to build the model that will allow us to answer that question. A key part of the data comes from this recharge. We currently have installed a number of monitoring points in the regolith. If there is recharge from the ridges it will be coming off the small regolith zone that sits on the top couple of metres of the ridges—the unconsolidated material that will be running down. What we are doing is monitoring how much water, basically, is in that zone, where it is coming from and where it is going to. That will be an input into the hydrogeological model that will allow us to answer the question: what is the role of the ridge in recharging?<sup>33</sup>

2.55 Shenhua expressed a similar view noting that the company was at the early exploration stage and possible effects were difficult to determine at this stage.<sup>34</sup>

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30 Mr Tim Duddy, *Committee Hansard*, 5 March 2009, p. 70. See also Mr Robert Hunter, *Committee Hansard*, 19 May 2009, p. 7.

31 CCAG, *Submission 119*, p. 4. Surficial aquifers occur in alluvial sediments in river valleys, deltas and basins and in lake sediments. They are a major source of potable groundwater.

32 Mr Martin Grant, *Committee Hansard*, 18 September 2009, p. 11.

33 Mr Stephen David, *Committee Hansard*, 18 September 2009, p.12.

34 Mr Joe Clayton, *Committee Hansard*, 24 November 2009, p. 3.

## **Water security**

2.56 Community concerns were expressed in relation to the potential damage to the region's natural waterways, particularly to the significant and complex underground alluvial aquifers that lie beneath the flood plain.

2.57 The Liverpool Plains is part of the Namoi Catchment which feeds into the Murray Darling Basin. It is underlaid by high output aquifers which contribute to the ability of the soils to retain moisture. One submission noted that the 'preservation of these aquifers is the overriding concern of those who have farmed successfully and innovatively for decades'.<sup>35</sup>

2.58 Witnesses commented on the possible impact on the aquifers during exploration:

The potential for damage during exploration is thus: the shallow aquifers become extremely polluted and sometimes up to 30 and 40 times the salt and mineral levels of seawater can go into the aquifers that are only some 20 or 30 metres below them, which are hugely viable and productive in crop production.<sup>36</sup>

## **Water study**

2.59 Since it was announced that exploratory drilling was to commence in the area, in 2006, the CCAG has argued that an independent and comprehensive water study of the area should be undertaken to assess the impact of mining on the water resources of the region.<sup>37</sup>

2.60 On 2 December 2008, Senator the Hon Penny Wong, Commonwealth Minister for Climate Change and Water announced funding of up to \$1.5 million as a one-third contribution towards a joint study into the surface and groundwater resources of the Namoi Catchment in NSW. The study is intended to provide high quality information to help identify risks associated with mining on water resources in the region, and to inform the NSW Government's decision-making processes.<sup>38</sup>

2.61 Industry and Investment NSW informed the committee that the Hon Ian Macdonald, the NSW Minister for Primary Industries and Mineral Resources, given community concerns, initiated discussions with both agricultural and coal exploration and mining interests on the Liverpool Plains. Agreement was reached to conduct a water study in the Namoi catchment. The objectives of the study are to:

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35 Mrs Rosemary Nankivell, *Submission* 85, p. 2.

36 Mr Tim Duddy, *Committee Hansard*, 5 March 2009, p. 66.

37 *Submission* 119, CCAG, p. 3.

38 Senator the Hon Penny Wong, Minister for Climate Change and Water, 'Rudd Government provides up to \$1.5 million for Namoi water study', *Media Release*, 2 December 2008.

- provide scientific information on water resources in the Namoi catchment;
- advance knowledge and understanding of the quantity and quality of surface and groundwater resources; and
- provide scientific information to benefit both community awareness and decision-making processes in government and among key stakeholders.<sup>39</sup>

2.62 It is envisaged that the study will commence in 2010.<sup>40</sup> Reports from the study will be made publicly available when completed. As previously noted, BHP is about three years away from submitting a mine plan to the NSW Government, and Shenhua indicated that it has 'several more years' of testing before coal seam gas could be commercially extracted.

2.63 The Minister has established a ministerial oversight committee to facilitate the full commissioning of the water study. This is a small, high-level representative group comprising an independent chair and representatives from key stakeholders. The Minister has appointed Mr Mal Peters, former President of the New South Wales Farmers Association, to be the independent chair of this committee. That committee had its inaugural meeting on Monday, 24 August 2009.

The ministerial oversight committee will liaise regularly with the stakeholder advisory group, who will keep the local community informed on the progress of the study. This group will have wide representations to ensure transparency and inclusiveness.<sup>41</sup>

2.64 All three companies have committed to fund part of the study, and BHP has undertaken to incorporate the findings of the study as part of any environmental assessment undertaken in the future.<sup>42</sup>

2.65 Santos advised that:

With regard to the water work, we have also been involved in the working group around the Namoi catchment-wide water study. We have also made a commitment to contribute funds to the study. Along the lines of your conversation with BHP, a lot of clarity is not there yet, about amounts and budgets et cetera but we are working with that process.<sup>43</sup>

2.66 The CCAG, while welcoming the study, argued that an independent water study should be an essential prerequisite before exploratory drilling commenced in the area. The CCAG noted that extensive exploratory drilling has already been undertaken

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39 Senator the Hon Penny Wong, Minister for Climate Change and Water, 'Rudd Government provides up to \$1.5 million for Namoi water study', *Media Release*, 2 December 2008.

40 *Submission 119*, CCAG, p. 3.

41 Mr Nick Milham, *Committee Hansard*, 18 September 2009, p. 36.

42 Mr Martin Grant, BHP, p. 16, *Committee Hansard*, 18 September 2009, pp 16-17; Mr Samuel Crafter, Santos, *Committee Hansard*, 18 September 2009, p. 45; *Submission 146*, Shenhua, p. 5.

43 Mr Samuel Crafter, *Committee Hansard*, 18 September 2009, p. 45.

– and continues – 'posing an unacceptable and ongoing potential risk to the water resources of the region'.<sup>44</sup>

2.67 The National Water Commission has also funded a \$2 million multi-jurisdictional study on 'the potential local and cumulative impacts of mining on groundwater resources'. The study will develop national tools and methodologies to understand and manage the potential impacts of mining on water resources. The project commenced in September 2008 and is expected to be finalised in 2010.<sup>45</sup>

### **Water users**

2.68 As previously noted, the CCAG stated that access to a reliable source of water is an essential requirement for coal mining, used in drilling for the coal, washing the product, and in managing dust.<sup>46</sup>

2.69 Towns in the Liverpool Plains also rely on their water sources from the aquifer. BHP advised the committee that some 12 towns in the Liverpool Plains area rely on the aquifer for their water supplies.<sup>47</sup>

### **Other environmental and health impacts**

2.70 A number of other environmental and health concerns were raised during the inquiry. The Australian Conservation Foundation expressed concerns for the environmental impacts of coal mining in the area, specifically, water quality, air quality and biodiversity.<sup>48</sup>

2.71 One witness noted the particular environmental impact in the Hunter Valley (NSW):

All you have to do is fly over it and look at the 500 square kilometres that look much like a moonscape. There are ridges of rock rubble that are now in place from where they blew up the ground to get the coal. That has brought all the toxic rocks up onto the surface: the rock ledges between the coal mines have the same heavy metals as the coal itself...Every time it rains it leeches those heavy metals out and they go down eventually into the gullies, into the creeks and into our rivers. There is very little really fresh water left in the Hunter now. It was one of the richest and most diverse valleys...from growing various grains; from dairying, which was a very big thing in those days but they have nearly all gone because of mining; and

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44 *Submission 119, CCAG, p. 3.*

45 Submission by the Department of the Environment, Water, Heritage and the Arts into the Senate Environment Committee's inquiry into the impacts of mining in the Murray Darling Basin, p. 3.

46 *Submission 119, CCAG, p. 4.*

47 BHP, Correspondence, dated 28 October 2009.

48 *Submission 151, ACF, p. 1.*

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from vegetable growing...now the Hunter is just like an industrial area; there is very little left except on the east side of Singleton.<sup>49</sup>

2.72 Submissions pointed to the potential for mining on the Liverpool Plains to lead to the release of a range of harmful compounds that may be deleterious to human health.

Exhuming such strata to the surface in food-producing areas by long-wall or open-cut coalmining ensures the air, the water, the soil and the people here and the food grown here will be contaminated with heavy radioactive and excessive metals. This contamination is already verified in the Hunter Valley.<sup>50</sup>

### **Impact of mining in other areas**

2.73 Submissions pointed to the adverse impact of mining on agricultural land in other areas of Australia.

2.74 Submissions noted the deleterious impact that mining has had on the Hunter Valley. One submission noted that:

The diverse and rich Hunter Valley is already under strain from contaminated water, land use is no longer predominately agricultural, 600 square kilometres of mining has been taken from agricultural use.

Communities and families have been uprooted and dispersed by the forced sale of properties and villages.<sup>51</sup>

2.75 Mr Duddy also stated that in relation to the Hunter:

Initially, the mining company said that they would never touch those [productive areas]. Now they have all been dug up and turned over and all the underground water that is there, as limited as it was, has been completely destroyed. A lot of the dairy projects that were left to be used as examples of mining co-existing with dairy industry lasted less than 18 months; they ran out of water.<sup>52</sup>

2.76 Another witness also commented:

In approximately 1998-97 this [Hunter] mine started to operate and with no buffer zone the blasting, being open-cut mining, started. On some days the men living on the property could not see their front gate from their front door due to the thickness of the dust that fell from the blasting and from the draglines that worked within 200 metres of the property.

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49 Mrs Wendy Bowman, *Committee Hansard*, 19 May 2009, p. 27.

50 Dr Pauline Roberts, *Committee Hansard*, 19 May 2009, p. 14. See also *Submission 89*, Dr Pauline Roberts, pp 2-6 ; Ms Marilyn Carter, *Submission 65*, p.1.

51 *Submission 97*, Ms Wendy Bowman, p. 5. See also Ms Wendy Bowman, *Committee Hansard*, 19 May 2009, pp 25-29.

52 Mr Tim Duddy, *Committee Hansard*, 5 March 2009, p. 71.

...We then discovered that the dairy herd cattle at one stage would not eat the green irrigated feed.....We discovered that it was the dust.

The next thing we found was that the lucerne in the Bowman's Creek country was dying...When we realised it was the water, I discovered that upstream of Bowman's Creek a number of years earlier Coal and Allied had been allowed to mine under Bowman's Creek. One of the landholders up there told me that the bottom of the creek had broken and gone down into the longwall. These were not like the longwalls now. They were the ones that left piers. The water was coursing through those, picking up all the heavy metals. It came up again two kilometres downstream in a spring and continued to flow on down to the river through our place, which meant that I lost the use of four irrigation pumps and probably a kilometre of alluvial soil where we grew all our feed. That contaminated water flowed into the Hunter River.<sup>53</sup>

2.77 Similar concerns were expressed in relation to the threat of mining on prime agricultural land on the Haystack Plains (Qld) and the Gloucester region of NSW.<sup>54</sup>

### **Gas exploration and drilling**

2.78 As previously noted, Santos is undertaking an exploration program for coal seam gas in the Gunnedah Basin. Santos stated that 'the smaller footprint of gas exploration, pilot testing and production comparative to other resource exploration means that it can co-exist with other primary industries such as agriculture'.<sup>55</sup>

2.79 However, some concerns were raised during the inquiry about aspects of these operations.

### ***Impact of drilling***

2.80 Santos explained the drilling process in the following terms:

....essentially when we drill a well we drill through the surface aquifers, we case off and cement behind that to about 200 metres deep and then we drill down through the next lot of strata. Before we get to the coal seams, which are between 400 metres to 1,000 metres deep—so we are quite deep—we have another casing and cement that off. And when we cement the casings off—both the surface casing and the intermediate casing—we pressure test the cement behind the pipe and also get returns to surface to ensure there is integrity in the cement and there is no communication between the various strata. Then when we are down at the intermediate casing we are at the

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53 Mrs Wendy Bowman, *Committee Hansard*, 19 May 2009, pp 25-26.

54 *Submission* 44, Mr Jeff Bidstrup, pp 1-4; *Submission* 45, Ms Janet Cox pp 1-3; *Submission* 154, The Gloucester Project, pp 2-3.

55 *Submission* 155, Santos, p. 5.



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coal—the deep coal, which is well away from the aquifers or the alluvial-aquifers—then we core ahead to do our exploration program.<sup>56</sup>

2.81 Santos explained that the aquifers of importance to pastoralists – the fluvial aquifers – are the shallow aquifers – the aquifers in the first 100-odd metres of drilling.<sup>57</sup>

2.82 Submissions raised the issue of the impact of drilling on the aquifer. One submission stated that:

Methane gas, drilling fluids and the highly-toxic saline water extracted from the coal seam beds have been shown to migrate throughout aquifers and poison water supplies. Given the interconnective nature and vastness of aquifers under the Liverpool Plains, this contamination would be widespread, ultimately destroying our rivers and creeks and contaminating our town water supplies.

With gas extraction, comes the lowering of water tables. Extraction requires the aquifers under the coal seam to be dewatered to allow the gas to escape. This of course results in the creation of voids. These voids lead to subsidence causing cracking and draining of rivers, waterways and aquifers long after extraction has finished. Our farming country will be damaged irreparably.<sup>58</sup>

2.83 The committee raised these concerns with Santos. Santos commented that it continuously measures water loss during the drilling operations.

Mr Kelemen—In the surface aquifers, we would drill through the first, say, 100 metres with a water based drilling mud containing potassium KCL, potassium chloride, and some other non-toxic polymers for lubrication and to stop swelling. We measure any water loss. We look at returns, and we do not get any water loss. If you get water loss you have a problem and you have to address it. Then we case off.

....

Senator O'BRIEN—So that is at the points where you enter and exit the aquifer?

Mr Kelemen—We continuously measure fluid loss during the drilling process so, if we do lose fluid, we see it, and we address the problem. Our drilling records—we have only drilled about 15 wells so far—show that we have not lost any fluid over the aquifer areas. It is in balance. The reason for that is that, as we drill, cuttings in the well bore—very fine bits of rock, shale and sandstone—build up around the circumference of the hole, which

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56 Mr Stephen Kelemen, *Committee Hansard*, 18 September 2009, p. 46. See also Santos, Tabled Document, 18 September 2009.

57 Mr Stephen Kelemen, *Committee Hansard*, 18 September 2009, p. 47.

58 *Submission* 85, Mrs Rosemary Nankivell, p. 2. See also, Mrs Rosemary Nankivell, *Committee Hansard*, 19 May 2009, pp 18-20.

is about 8½ inches, and plug up the intersection between the aquifer and the well bore. That forms a sort of a barrier. The hole is only open for a couple of days and then you cement it off and make that barrier permanent.<sup>59</sup>

2.84 The committee questioned Santos if there is the possibility of leakage in relation to the shallower aquifers. Santos stated that at the production phase:

Mr Kelemen—...if we get to a test or production phase, the well bore designs are essentially very similar to the core holes. So you are again drilling well bores, and that is all you are doing, and they are not too different from a water well bore. We have certain criteria to maintain integrity. Again, you drill through your aquifers, you cement off, you measure any fluid losses, you do intermediate casing and you cement off. During the life of those wells, you would, historically, measure the pressure in the production casing and the intermediate casing. You would monitor that pressure for changes and for integrity problems—

CHAIR—So there is a scientific indicator that you can rely on that, because you are creating a vacuum, as it were, in the lower aquifer, if there is connectivity with the shallower aquifer it will show up—

Mr Kelemen—It will show up in a couple of things: pressure monitoring and also your production fluids.

CHAIR—Has that happened?

Mr Kelemen—We have not drilled any production bores in this area, but are you asking whether it has happened historically in the industry?

CHAIR—Anywhere, yes.

Mr Kelemen—Occasionally you get some casing which fails, yes. It might not be aquifer; it might be other sandstone.<sup>60</sup>

### ***Connectivity***

2.85 The committee raised the issue of the possible impact on the aquifer due to the connectivity of the Namoi aquifer and the Great Artesian Basin. Santos stated that:

Typically, coal seam gas will be present because that aquifer is under pressure. So, by definition, it has to be largely isolated from other aquifers. I will not say it has to be 100 per cent isolated, because, if you look at the environmental impact statement for our work in Queensland, you will find there is a portion of one of our fields, the Fairview field, where there is an intersection between the sandstone aquifer that is drawn on by the agricultural community and the coal seam. Over a prolonged period of depressurisation of that coal seam we will potentially see some impact in bores in that vicinity— we are looking at four bores, in fact.<sup>61</sup>

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59 Mr Stephen Kelemen, *Committee Hansard*, 18 September 2009, pp 46-47. See also *Submission 155*, Santos, pp 4-5.

60 Mr Stephen Kelemen, *Committee Hansard*, 18 September 2009, p. 48.

61 Mr James Purtill, *Committee Hansard*, 18 September 2009, p. 48.

2.86 Santos noted that it is important to understand the regional hydrogeology of the various layers.

The fact that there are over 300 metres between the two is a very positive step, but it is early days. We have only drilled 15 core holes in this area. Ultimately, before any type of production scenario...a hydrogeological model will be developed—we have had three models for our work in Queensland—to start to predict the relationship between potable aquifers and the saline aquifers that we draw upon. I suppose the key thing for the committee to know is that, typically, coal seams are not exploited for any agricultural purpose because of their salinity, which poses other challenges for us when we go into production, of course, but I am sure we will get onto that. But it does mean that the aquifers are not directly competing with any alternative source of groundwater use. We will monitor that. It requires a comprehensive groundwater monitoring program that starts with a baseline. Before you start that activity you model and predict those relationships and ensure you understand the geology. Then you monitor through the life of the production. That is our modus operandi.<sup>62</sup>

2.87 The committee also questioned Santos regarding the volume of water that would be extracted from its operations. Santos conceded that it could not provide a definitive indication at this stage.

Mr Keleman—There is a big uncertainty range. Until we do our pilot testing the range could be from negligible to very large. We do not know at this point in time.

.....

Mr Kelemen—In some of the fields we are producing there is actually no water, so there is no water in the coal; in other areas there is a lot of water. There could be—

CHAIR—I suspect there will be water up here.

Mr Kelemen—I suspect there will be too.<sup>63</sup>

2.88 Santos advised that the water is managed in a variety of ways depending on its quality. If it has low salinity it is used for irrigation purposes. Water with high salinity is put through a reverse osmosis plant to produce good quality water, although other processes are still required to enable the water to be used for agricultural purposes.<sup>64</sup>

### ***Access to properties***

2.89 The committee raised the issue of access arrangements to properties for drilling sites. Santos explained that they approach individual landowners. Santos uses

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62 Mr James Purtill, *Committee Hansard*, 18 September 2009, p. 49.

63 Mr Stephen Kelemen, *Committee Hansard*, 18 September 2009, p. 49.

64 Mr James Purtill, *Committee Hansard*, 18 September 2009, pp 49,51. See also *Submission 155*, Santos, pp 7-9.

a standard land access agreement and assists with landowners' legal costs, up to a certain limit, to enable the landowner to obtain legal advice on the contract.

2.90 If the landowner declines access to the site that the company wishes to drill there is an arbitration process in place. Santos explained the process in the following terms:

Mr Kelemen—There is a step 2. In the exploration phase we are doing now we have alternative sites to go to. We have preferred drilling sites but, if we cannot get access because we cannot get agreement there, we have got a plan B and a plan C. Our preference is to get agreement with the landowner and prove our worth and the benign impact we will have. Under the legislation there is an arbitration process through the various courts to get access. We have not pursued that at this stage, but if at sometime in the future we have a development plan blocked and we find it difficult, that option is open to us.

Mr Crafter—But if you look at our Queensland operations as an example—

Mr Kelemen—We have never had to do that in Queensland.<sup>65</sup>

2.91 The arbitration system was explained thus:

It is a formal legal process under the [Petroleum] Act...we issue a notice outlining our desire to enter the property for the purposes of exploration. They have a period of time to come back to us...Then there is another point where the formal selection of an arbitrator kicks off. After that, you enter the arbitration process.<sup>66</sup>

### **Committee view**

2.92 The committee believes that prime agricultural land needs to be protected from mining developments. Protecting the most productive agricultural land is an important step in maintaining efficient and quality food production systems and ensuring the nation's 'food security'.

2.93 As the driest inhabited continent on earth, with only an estimated 6 per cent of arable land across Australia, the preservation of these productive lands and finite water systems is clearly of national significance.

2.94 The committee believes that the floodplains of the Liverpool Plains should not be subject to mining activities. The Liverpool Plains with its climate, soils and unique groundwater make it one of the most fertile and drought-resistant agricultural areas in Australia. The committee also recognises that many families have been farming in the area for generations and have a very close affinity with the land.

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65 Mr Stephen Kelemen/Mr Samuel Crafter, *Committee Hansard*, 18 September 2009, p. 51.

66 Mr Samuel Crafter, *Committee Hansard*, 18 September 2009, p. 51.

2.95 The committee welcomes the commitment of BHP to exclude longwall mining underneath the deep alluvial irrigation aquifers; longwall mining underneath the flood plains; and open-cut mining on the flood plains of the Liverpool Plains. The committee also welcomes the commitment by Shenhua that any mining at the company's Watermark Project 'will be located in the "ridge country" and 'will not be on the black soils'. The committee notes that the comments by BHP are limited to excluding certain forms of mining and in the case of Shenhua are general in nature.

2.96 The committee believes that the companies should make a clear commitment that mining of any form or type should not take place on the floodplains. The committee notes that BHP conceded that on a 'strict interpretation' other types of mining, that is, other than those excluded under its recent agreement with the NSW Government, could be used on the Liverpool Plains floodplain.

2.97 The committee considers that the NSW Government should take steps to enforce companies' commitments to exclude mining from certain areas, in a similar way to its recent agreement with BHP.

### **Recommendation 1**

**2.98 The committee recommends that the NSW Government investigate the total prohibition of mining under the floodplains of the Liverpool Plains and other areas of the state where similar conditions prevail, especially where evidence indicates that there will be damage to the floodplain or aquifers and the agricultural productive capacity of the floodplain in question.**

2.99 The committee considers that other jurisdictions should consider similar measures to protect their vital agricultural resources from mining and other activities in their respective jurisdictions.

2.100 The committee has some concerns about proposed mining on the ridge country of the Liverpool Plains. The committee notes the importance of the ridge formations around the flood plain and their contribution to the recharge of the underground aquifer and surficial aquifer. The committee notes that BHP and Shenhua were unable to give an unequivocal assurance about the possible impact of mining the ridges on the aquifer.

2.101 The importance of water security was emphasised during the inquiry. The committee notes that the NSW Mining Act does not explicitly recognise the impact of water resources in the granting of exploration licenses. The committee notes however that during the exploration stage, companies are required to comply with the Water Act and the PEOA Act. Exploration activities are also subject to the environmental assessment process set out in Part 5 of the EP&A Act. As noted above, Part 5 of the EP&A Act requires the determining authority to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment.

2.102 The committee also notes that mining approvals are subject to the EP&A Act which requires environmental assessment of these proposals, and may impose

conditions on approvals to minimise potential environmental impacts. As noted previously, the assessment process under the EP&A Act considers a broad range of environmental issues including water, aquifers and alternative uses of the land.

2.103 The committee welcomes the Namoi water study, announced in 2008, into the surface and groundwater resources of the Namoi Catchment in NSW. The committee trusts that this study will provide comprehensive information to help identify risks associated with mining on water resources in the region. The committee, in view of the concerns expressed by stakeholders, believes that the study should be expedited as a matter of priority. The committee also notes that the National Water Commission has been funded to conduct a multi-jurisdictional study on 'the potential local and cumulative impacts of mining on groundwater resources'. The project commenced in September 2008 and is expected to be finalised in 2010.

2.104 The committee considers that an independent water study should be an essential prerequisite before exploratory drilling commences in an area where mining exploration is to be undertaken. As the CCAG noted, extensive exploratory drilling has already been undertaken in the Liverpool Plains – and continues – which poses an ongoing potential risk to the water resources of that region.

2.105 In addition to concerns in relation to mining developments as noted above, the committee also has some concerns regarding the exploration and drilling activities of Santos in the Gunnedah Basin. The major concerns relate to the impact of drilling on the aquifer; the possibility of leakage in relation to the shallower aquifers; and the possible impact on the aquifer due to the connectivity of the Namoi aquifer and the Great Artesian Basin.

2.106 The committee believes that these concerns should be addressed as part of the project approvals process.

**Senator the Hon Bill Heffernan**  
**Chair**