

# 13

## 13 Mining

Prolonged rainfall over Queensland's mining regions during the 2010/2011 wet season severely affected the industry. Huge volumes of water poured into pits and leaked into underground areas. Following years of drought, some mines had been designed to catch as much runoff as possible.<sup>1</sup> Storage facilities and dams became so full that operators were forced to pump excess water into pits.<sup>2</sup> Access to equipment, storage facilities and monitoring sites was cut.<sup>3</sup> Gigantic mining equipment was swamped by floodwaters.

Eighty-five per cent of Queensland coal mines had to either restrict production or close entirely.<sup>4</sup> In May 2011, Queensland's coal mining sector had recovered to only 75 per cent of its pre-flood output.<sup>5</sup> The economic repercussions of these events were a loss of \$5.7 billion<sup>6</sup> (2.2 per cent)<sup>7</sup> in Queensland's gross state product for the financial year ending June 2011, and a reduction in royalties received by the Queensland Government.

In early 2011, the Premier indicated to the peak mining industry body, the Queensland Resources Council, that her government was committed to the successful recovery of the coal industry. The Premier said that all agencies had been instructed to facilitate a return to full production capacity at the earliest opportunity.<sup>8</sup> Inherent in this commitment was a tension between environmental and economic objectives, the resolution of which fell to the Department of Environment and Resource Management (DERM) in its administration of the *Environmental Protection Act 1994*. The Act has, as its object, the protection of the environment while allowing development.<sup>9</sup> By the time of the Premier's letter, DERM had, in fact, already been authorising (by dispensing with normal restrictions) the discharge of water from mines into flooded rivers and creeks.



Baralaba Coal Mine (photo courtesy Cockatoo Coal)



*Baralaba Mine during 2010/2011 floods (Newspix, Lyndon Mechielson)*

The processes by which DERM put the Premier's commitment into effect, both before and after it was publicised, were the subject of many submissions to the Commission. Mining companies and the Resources Council complained of delays, impossible conditions and an agency hesitant to take an expansive view of its powers to assist their recovery.<sup>10</sup> Environmental groups expressed concern that DERM's actions resulted in harm to ecosystems.<sup>11</sup> DERM, for its part, contended that it had struck an appropriate balance between the competing interests by allowing the release of water from mines under strict conditions.<sup>12</sup>

Those submissions were the impetus for a confined examination of DERM's response to flooding at mine sites and the use of its legislative powers under the *Environmental Protection Act*. The Commission has not conducted a comprehensive investigation into the mining industry in Queensland. The fact that only a limited number of recommendations are directed at mining companies should not, therefore, be interpreted as an endorsement of existing flood preparedness and response activities within that industry.

In order to examine DERM's response, the Commission selected seven case examples:

- Hail Creek mine, operated by Rio Tinto Australia, an open cut coal mine situated near Mackay<sup>13</sup>
- Rolleston mine, operated by Xstrata Coal Queensland, an open cut thermal coal mine located 275 kilometres due west of Gladstone, approximately 16 kilometres from the town of Rolleston<sup>14</sup>
- the Ensham mine, an open cut coal mine approximately 40 kilometres east of Emerald in Central Queensland<sup>15</sup>
- the Moranbah North mine, operated by Anglo American Metallurgical Coal Pty Ltd, an underground coal mine 15 kilometres north of Moranbah<sup>16</sup>

- the Dawson mining project, also operated by Anglo American Metallurgical Coal Pty Ltd, a collection of three open cut coal mines (Dawson South, Dawson Central and Dawson North) located near Moura<sup>17</sup>
- the Moranbah Gas Project, operated by Arrow Energy, a site used for the extraction and processing of coal seam gas, situated on the Isaac River 2.5 kilometres from Moranbah<sup>18</sup>
- the Century mine, operated by MMG Century, 250 kilometres north-west of Mt Isa, which produces lead and zinc concentrates.<sup>19</sup>

Water is required to undertake most mining activities. Coal miners use it to process and wash coal and suppress dust.<sup>20</sup> At coal seam gas projects, saline water is extracted from coal seams in the process of obtaining the gas.<sup>21</sup> If the gas is not exiting the coal seam quickly enough, water is used in ‘fracking’, a process in which water is inserted into coal seams at high pressure to fracture the rock, allowing the gas to escape.<sup>22</sup> Other types of operations, such as the Century lead and zinc mine, use water to separate minerals from a slurry of mined ore.<sup>23</sup> Whatever role it plays, water used in, or resulting from, mining operations is likely to come into contact with contaminants, such as salts and metals.<sup>24</sup> As a result, it will often be of lower quality than fresh water in rivers and creeks. In light of water’s status as a tool used in mining operations and a product of such activities, most mines have facilities to store both fresh water and contaminated, or mine-affected,<sup>25</sup> water. During times of flood, storage facilities of this type may be overwhelmed by the influx of water.

The *Environmental Protection Act* sets up the regulatory framework for mining companies in Queensland. A miner must have an environmental authority, the terms of which are set by DERM. Environmental authorities deal with, among other things, water management, including the circumstances in which an operator may discharge mine-affected water into natural watercourses. Mining companies are voluntary participants in the industry. It is their responsibility to ensure that they are able to comply with the environmental authority conditions and any other requirements set by DERM. Generally speaking, they have the technical and financial ability to do so. DERM, as the regulator, has responsibility for setting and enforcing the conditions under which mining may take place. In accordance with the Act’s object of allowing ecologically sustainable development,<sup>26</sup> DERM must set reasonable and effective conditions that allow mining to occur in an environmentally sustainable manner. As part of this, DERM has a responsibility to address requests for the relaxation of environmental authority conditions in a predictable and consistent manner. This responsibility, and the way it was discharged by DERM during flooding, was the focus of the Commission’s investigation.

In addition to its investigation into DERM’s response to flooding at active mine sites, the Commission considered the effect of flooding on one abandoned mine, Mt Oxide mine: see section 13.8.3.

## 13.1 Preparation for the 2010/2011 wet season

Preparation for flooding at a mine site begins well before the wet season. Mine operators are required to produce water management plans for DERM’s approval. Mines are able to deal with excess water in a range of ways, including building infrastructure such as water storage and tailings dams, desalination and treatment plants and diversion channels. Emergency action plans and flood procedures may be developed. A mine operator’s preparation for flood may include audits of the operator’s capacity to respond quickly to flood and checks to ensure equipment is functional. There has been no attempt to consider whether all such measures were appropriately adopted at each mine site – that would be a formidable task. The Commission has focussed on the two aspects of preparation that were squarely raised on the material before it: the response to the Bureau of Meteorology’s forecast in October 2010 that above median rainfall was expected for much of Queensland, and DERM’s pre-wet season inspections.

### 13.1.1 Response to Bureau of Meteorology seasonal forecast

Surprisingly, not all of the operators of case study mines were aware that the Bureau of Meteorology had forecast that the 2010/2011 wet season was likely to involve above median rainfall. None was provided with the seasonal forecast by DERM, or the Bureau itself.<sup>27</sup> The forecast was available on the Bureau’s website. It is not DERM policy to provide forecast information to operators.<sup>28</sup> It was not until December 2010 that Rio Tinto, for example, realised that a significant wet season might be approaching.<sup>29</sup> The operators of Century mine were aware of the general thrust of the Bureau’s forecast in the second half of 2010, but had no specific advice about the Gulf region in which that mine is located.<sup>30</sup> Others did obtain and use forecast information: from March 2010, Xstrata had a staff member reviewing and distributing to employees publicly available weather forecast information for the Rolleston coal mine, including seasonal, weekly and daily forecasts.<sup>31</sup>

Very few specific actions were taken by the operators of the case study mines in response to the Bureau forecast. One operator which did react was Anglo American; it undertook a pre-wet season review at its Capcoal mine which identified risks and recommended infrastructure upgrades,<sup>32</sup> in consequence of which Anglo purchased additional pumping equipment.<sup>33</sup>

Most companies took at least some action to implement their water management plans and deal with issues arising from previous wet seasons. Ensham, which had experienced significant inundation in 2008, constructed levees to protect it from a flood with an average recurrence interval of 1000 years in the Nogoia River.<sup>34</sup> It had also installed additional pipe infrastructure.<sup>35</sup> Arrow Energy was building additional dams and planned to build a water treatment plant.<sup>36</sup> Xstrata implemented a system of levees and diversion channels to move water away from mine pits,<sup>37</sup> and responded to short-term forecasts of rainfall of over 50 millimetres by checking diversion channels and pumps and blocking off ramps that might allow water to enter operational pits.<sup>38</sup>

Representatives from MMG Century and Anglo American indicated that seasonal forecasts did not provide enough lead time to build infrastructure to cope with flooding.<sup>39</sup> That is true for long term solutions to the threat of flood. Other measures, such as checking pumps and drainage channels or auditing response capability, do not require such lead times. Knowledge of forecasts can help operators to prepare for the wet season ahead, for example by preparing applications for transitional environmental programs and opening lines of communication with DERM.

Mine operators should take primary responsibility for obtaining and reviewing the best forecast information available. It would be sensible for operators of sites at high risk of flood to obtain region specific forecast information (both seasonal and short-term) directly from the Bureau of Meteorology. The Bureau does provide such a service for some mines currently.<sup>40</sup>

That said, it should not be difficult for the Queensland Government, through DERM or another agency, to provide all operators with any seasonal forecast information it obtains from the Bureau of Meteorology. This would be particularly appropriate if, as was the case prior to the 2010/2011 wet season, the information held by the Queensland Government extended beyond that made available to the public on the Bureau's website.

## Recommendations

- 13.1 Mine operators should obtain all public seasonal forecasts issued by the Bureau of Meteorology relevant to the regions in which their operations are located.
- 13.2 Any mine operator of a site at high risk of flood should obtain the best forecast information available (seasonal and short term) for the region in which the mine is located.

### 13.1.2 Pre-wet season inspections

Prior to each wet season, DERM pursues a system of inspections for those mines it considers at risk of experiencing difficulty coping with excess water.

Site inspections are planned to occur as close as possible to, but in advance of, the start of the wet season, which DERM puts at 1 November.<sup>41</sup> Of the seven case examples considered by the Commission, DERM inspected five sites. The Moranbah North coal mine was inspected on 6 October;<sup>42</sup> Hail Creek mine on 16 November;<sup>43</sup> Ensham mine on 17 November;<sup>44</sup> and Dawson Central, North and South mines on 9 November.<sup>45</sup> The Century mine was not physically inspected until 23 and 24 November, and disputes about the water management at the site were not settled between the operator and DERM until 19 January 2011.<sup>46</sup> The Commission's seven case studies do not permit generalisations to be made about whether DERM's inspection system is comprehensive or effective, but plainly enough indicate that in some cases the 1 November date was not met.

The Commission acknowledges that physical inspections are only one part of DERM's preparation for wet seasons. The process, however, could be improved in a number of ways.

The first concerns the process by which DERM determines which sites to inspect. DERM assesses risk by reference to its regional officers' knowledge of the site, history of compliance and known water management issues.<sup>47</sup> Given the reliance on officers' knowledge, it is impossible to list exhaustively factors that are taken into account. However,

DERM did, properly, take account of meteorological observations and forecasts in its allocation of resources to site inspections.<sup>48</sup> Some matters relevant to risk assessment, such as blocked drainage channels or low access roads, may only be discernible from a physical inspection.

The risk assessment process would benefit from the development of a list of relevant considerations, thereby ensuring consistency between DERM regional officers. Forecasts, particularly seasonal forecasts for specific regions of Queensland, should be one of those considerations.

The second opportunity for improvement lies in timing. DERM should ensure its risk assessment process, undertaken in preparation for a wet season, is conducted in time for it to be able to inspect the sites it identifies as requiring inspection, and for operators to implement solutions to any problems identified, by 1 November. Inspections in late November are too late to have any useful effect for the wet season. And while DERM considers the wet season to begin on 1 November, heavy rain and flooding can occur before that date. DERM's inspection program should not be confined to the period immediately preceding each wet season. Risk assessment and site inspection should be a continuous undertaking by DERM. The assessment of the risks posed by a particular site should be reviewed if circumstances change (for example a seasonal forecast is released, a non-compliance event occurs or environmental harm is caused). The factual basis upon which risk assessments are made should be reviewed on a regular basis.

## Recommendations

- 13.3 The Department of Environment and Resource Management should prepare a list of relevant considerations to be taken into account in performing a risk assessment to decide which sites to inspect. Bureau of Meteorology forecasts should be one consideration.
- 13.4 The Department of Environment and Resource Management should conduct risk assessments in time for site inspections, and the implementation of solutions to problems identified at inspections, to take place before 1 November of each year.

## 13.2 Flooding at mine sites

Substantial rainfall was experienced during the 2010/2011 wet season at all the case study mines.

At the end of December 2010 at Hail Creek mine, water storages were calculated to be approximately 98 per cent full; by the end of January 2011, the storage facilities were at 105 per cent capacity.<sup>49</sup> The mine was storing approximately seven gegalitres of water on-site in dams and pits.<sup>50</sup> Water was continually pumped from high priority areas into low priority areas around the site in an effort to maintain some operations.<sup>51</sup> Rio Tinto sought, and was granted, authorisation by DERM to release water into surrounding watercourses in January 2011.<sup>52</sup> All sale contracts were suspended by reason of the wet weather from 24 December 2010.<sup>53</sup> Pits used for the purpose of storing water were unable to be mined until dewatering activities had begun; supplies of explosives were delayed; and resources were being deployed to address the water located in the pits.<sup>54</sup> The sales suspension was lifted on 12 May 2011.<sup>55</sup> As at September 2011, the mine was still not operating at full production on a sustained basis.<sup>56</sup>

The Rolleston mine experienced record rainfall: 250 millimetres fell in September 2010, with a further 366 millimetres falling in December 2010.<sup>57</sup> Production was also affected by flooding of the Dawson highway and rail lines.<sup>58</sup> The site was able to discharge excess water regularly during the wet season under its environmental authority,<sup>59</sup> but did require two relaxations of it to prevent uncontrolled discharges from water storages.<sup>60</sup> Xstrata Coal estimated a reduction in production forecast for 2011 by approximately 1.1 million tonnes as a result of the 2010/2011 wet season.<sup>61</sup>



*Rolleston Coal Mine, 2010/2011 floods (photo supplied)*

Thanks to its levee banks, the Ensham mine did not suffer any flooding of its mine pits from the nearby Nogoa River or its tributaries during the 2010/2011 wet season.<sup>62</sup> Heavy rainfall over the site itself increased the amount of surface water at the site.<sup>63</sup> From 2 to 5 December 2010, the site received approximately 200 millimetres of rainfall. This flooded active mine pits and resulted in the cessation of mining activities.<sup>64</sup> An authorisation to release water into the Nogoa River was sought and granted by DERM. The mine was, at November 2011, still holding water from the 2007/2008 and 2010/2011 wet seasons.<sup>65</sup>

At Moranbah North, heavy rainfall occurred at Anglo American's site in December 2010, with 80 millimetres falling the night before 20 December.<sup>66</sup> The excess water being retained led to concerns about the safety of a dam on site; as a result, emergency authorisations were sought on 19 and 20 December to release water to prevent the dam from collapsing. DERM granted those authorisations.<sup>67</sup> A longer term authorisation was granted on 24 December 2010, allowing continued releases from the water storage facilities.<sup>68</sup>

By 28 December 2010, Anglo American advised DERM that heavy rainfall meant that it was no longer able to comply with the conditions of its environmental authority at Dawson mine relating to the management of mine-affected water.<sup>69</sup> Authorisations to release water were given in December, January and February. Following the 2010/2011 wet season, 4.5 gigalitres of water remained in a pit at Dawson North.<sup>70</sup> The pit was to be mined in May 2011, but because of the large volume of water still inside it, mining had not commenced by November 2011.<sup>71</sup>

By 13 December 2010, the water storage facilities at Arrow Energy's Moranbah coal seam gas project were reaching capacity. Arrow Energy was concerned about the structural integrity of one of its dams.<sup>72</sup> Between 13 and 14 December 2010, 2.6 megalitres of coal seam gas water was released in breach of Arrow's environmental authority to prevent any failure of the dam.<sup>73</sup> Further rainfall over the site necessitated the release of more water between 20 December 2010 and 6 January 2011: in total, another 34 megalitres of coal seam gas water was released in breach of the applicable environmental authority.<sup>74</sup>

At Century mine, the rainfall received during the 2010/2011 wet season was estimated to represent an event with an average recurrence interval of 150 years.<sup>75</sup> Between 1 November 2010 and 1 April 2011, 1114.8 millimetres of rain fell in the area around the mine site.<sup>76</sup> This figure represents more than double the annual average rainfall for the area.<sup>77</sup> The heavy rainfall overwhelmed the water management system in place at the site.<sup>78</sup> To maintain compliance with the terms of the site's environmental authority, 1850 megalitres of mine-affected water was transferred to the open pit for interim storage.<sup>79</sup> Storage of the excess water in an open pit resulted in significant operational and business risks for the operators of Century mine.<sup>80</sup> Despite efforts to avoid it, including transferring

water to pits and impairing production,<sup>81</sup> one non-compliant discharge of contaminated water occurred on 15 March 2011.<sup>82</sup>

### 13.3 Effects of mine discharges

The Commission received three submissions from environmental groups concerned that the release of water from mines had caused environmental harm.<sup>83</sup>

The main contaminant of concern for freshwater environments in releases from coal mines and coal seam gas projects during the 2010/2011 wet season was salt. DERM's monitoring indicates that the Fitzroy basin, where many coal mines are located, has experienced high salinity in the aftermath of the 2010/2011 wet season. DERM officers gave evidence that they believe that discharges from mines were not a significant contributor to the high salinity. Rather, the elevated salinity was caused by flows of groundwater into the river system during the flood.<sup>84</sup> That belief was based on the observation of the high levels of groundwater affecting the system, and the fact that despite mine discharges' ceasing in mid 2011, the high salinity continued.<sup>85</sup> DERM has found no evidence of harm to plant or animal species or the environment as a result of mine discharges during the 2010/2011 wet season,<sup>86</sup> or any concerning levels of contaminants other than salt released from mines.<sup>87</sup>

In the marine environment, there were concerns about the effect of mine discharges on native animals such as dugongs, dolphins and turtles. Those species have experienced a much higher mortality rate since the 2010/2011 floods than in previous years.<sup>88</sup> Damage to the ecosystem by way of coral bleaching and mortality of fringing reefs<sup>89</sup> (coral reefs close to shorelines) and degradation of seagrass beds has also been observed.<sup>90</sup>

DERM's investigations indicate that the loss of the seagrass meadows was a significant contributor to the death of dugongs and turtles which need them for food.<sup>91</sup> The seagrass was affected by the low salinity (relative to the ocean) and high sediment levels of the flood waters entering the marine ecosystem. Those waters appear as a noticeable flood plume of brown water entering blue: see photo below.



*Flood plume near Keppel Islands, January 2011 (CQG Consulting)*

DERM is unable to come to a definitive conclusion as to the causes of the ecological damage observed in the marine environments after the floods or the relative contribution of releases from mines.<sup>92</sup>

Both the state and federal governments and some mining companies undertake water quality monitoring in freshwater and marine environments.<sup>93</sup> DERM considers that it is the responsibility of the Great Barrier Reef Marine Park Authority to monitor the marine environment of the Great Barrier Reef.<sup>94</sup> That authority's monitoring program is aimed at detecting agricultural chemicals and fertilisers, not possible toxins from mines or coal seam gas projects.<sup>95</sup> DERM undertakes monitoring<sup>96</sup> upstream and downstream of mines, and requires mine operators to conduct monitoring and report results to DERM.<sup>97</sup> But it appears that DERM's water quality testing program undertaken in the Great Barrier Reef area in response to the 2010/2011 floods was restricted to testing for pesticides.<sup>98</sup> This omission in monitoring is concerning; it may make it impossible to determine the cumulative impacts of mine discharges on the marine environment.

DERM estimates it would take two to five years and significant work to come to a definitive conclusion as to the causes of the ecological damage.<sup>99</sup> The Commission considers that DERM should determine, as far as possible, the contribution, if any, that mine discharges made to the environmental harm observed. Such a conclusion is vital to inform DERM's response to future flooding at mines in Queensland.

## Recommendations

- 13.5 The Queensland Government should work collaboratively with the Commonwealth Government and mine operators to ensure co-ordinated and effective monitoring of salts, metals and other contaminants in marine environments that may be affected by mine discharges.
- 13.6 The Queensland Government should determine, as far as possible, the impact of mine discharges during the 2010/2011 wet season on freshwater and marine water quality and fauna and flora.

## 13.4 Environmental authorities

The *Environmental Protection Act* creates the two primary instruments which were used by DERM to deal with excess water caused by flooding at mine sites: environmental authorities and transitional environmental programs.<sup>100</sup> The environmental authorities of the five coal mines considered by the Commission are based on what are known as the Fitzroy model conditions,<sup>101</sup> a set of standard conditions created for coal mines in the Fitzroy basin. These conditions, and their interaction with transitional environmental programs, were the source of most complaints in submissions to the Commission from the mining industry. The remaining two case studies, the Century mine and the Moranbah coal seam gas project, are not operated within the Fitzroy model conditions regime.<sup>102</sup> This and the next part of the report, which discuss DERM's use of environmental authorities and transitional environmental programs to deal with flood, are concerned only with the coal mines covered by the Fitzroy model conditions.

### 13.4.1 The legislative regime

Mining is an 'environmentally relevant activity' under the *Environmental Protection Act*.<sup>103</sup> Consequently, an environmental authority is required to engage in it.<sup>104</sup> The authority allows the holder to carry out the mining activity subject to certain conditions.<sup>105</sup> It is an offence to breach any condition of an environmental authority.<sup>106</sup> Often, to apply for an environmental authority, the applicant must prepare an environmental impact statement,<sup>107</sup> and an environmental management plan<sup>108</sup> which proposes conditions and mechanisms to manage the potential environmental impact of the project.<sup>109</sup>

### 13.4.2 The Fitzroy model conditions

The Fitzroy model conditions were developed for inclusion in environmental authorities following severe flooding at the Ensham mine in 2008, and the consequent release of mine-affected water. In January 2008, the floodwaters at Ensham mine overtopped the then existing levee banks in a number of places. As a result of the flooding an estimated 150 000 megalitres of water collected in four open cut coal mining pits.<sup>110</sup> Ensham's production was substantially curtailed, and it appealed to the Queensland Government for assistance. The state agency responsible



for the environment issued two emergency directives and approved a transitional environmental program which allowed Ensham to discharge 138 000 megalitres of the water between February and September 2008.<sup>111</sup> Ensham voluntarily ceased discharging water from the mine on 9 September 2008, after water quality monitoring found the salinity of domestic water supplies for some townships downstream was at unacceptable levels.<sup>112</sup> These problems led to considerable and continuing community concern about the impacts of mining, and in particular, the effects of water discharges.<sup>113</sup>

The Queensland Government commissioned Professor Hart, an expert in water quality management and environmental chemistry, to perform a review of water quality issues, which led to the Review of the Fitzroy River Water Quality Issues report. DERM then initiated a water quality monitoring program to address community concerns regarding water quality<sup>114</sup> and produced A Study of the Cumulative Impacts on Water Quality of Mining Activities in the Fitzroy River Basin. This report recommended standardised conditions be imposed on the quantity and quality of water that could be discharged from mines across the region.<sup>115</sup>

In May 2009, the Queensland Government decided to implement that recommendation. It was determined that the standardised conditions should be included in environmental authorities by the end of that year. DERM was required to provide draft conditions to the responsible Ministers by 30 June 2009.<sup>116</sup> Throughout 2009, DERM consulted the mining industry about the conditions: at workshops and by providing drafts to the Resources Council and individual companies.<sup>117</sup> Despite this, the mining industry was not pleased with the process DERM adopted for the introduction of the Fitzroy model conditions. The Queensland Resources Council considered the consultation process in 2009 was too hasty, did not take into account many of the industry's concerns and forced it into acceding quickly to unsatisfactory provisions.<sup>118</sup>

After the model conditions were set, individual mines were required to make applications to DERM to include the conditions in new environmental authorities by December 2009.<sup>119</sup> (The Queensland Government indicated it would give the conditions legislative effect if operators did not adopt them voluntarily.<sup>120</sup>) That process meant that little site-specific amendment was possible, although it was open to mining companies to apply for non-standard conditions.<sup>121</sup> The environmental authorities of all five case study coal mines contain the full suite of the Fitzroy model conditions.<sup>122</sup>

The mining industry regarded the conditions as a 'blunt instrument' that did not take account of the differences between mines.<sup>123</sup> The industry was concerned also by the effect of the new conditions, which significantly reduced the ability of coal mine operators to discharge mine-affected water into watercourses. Salinity and volume limits had been lowered, while the flow required in watercourses before releases could be made was set higher.<sup>124</sup> There was no transitional period;<sup>125</sup> the conditions took effect immediately.

DERM knew that the new conditions decreased release opportunities; it considered that the conditions needed to be conservative to protect the environment. The conditions were intended to apply across the whole of the Fitzroy basin. There was insufficient scientific monitoring data available in 2009 to justify larger releases.<sup>126</sup> New monitoring requirements were also a feature of the model conditions. These were designed to ensure that data was collected for future consideration of release limits. A review of the conditions, using data gathered under them since 2009, was planned for the second half of 2011.<sup>127</sup>

### 13.4.3 The effect of the model conditions on water storage on site

The environmental authorities based on the Fitzroy model conditions meant that many mines were prevented from reducing their water storages in advance of the 2010/2011 wet season and held much more water on site than would otherwise have been the case.<sup>128</sup> Some mines were using pits as makeshift storage dams; others planned to do that if heavy rain fell.<sup>129</sup> Ensham mine, as an example, had water in its pits that had been there since 2008.<sup>130</sup>

Storage of water in pits at coal mines involves a vicious cycle: the longer water is stored in pits, the higher its salinity level, which may in turn preclude the water's release.<sup>131</sup>

The Fitzroy model conditions were not the only reason mines were dealing with more water than usual entering the 2010/2011 wet season. A lack of infrastructure, and the early onset of the wet season, no doubt affected the ability of some mines to cope. The rain that fell in mining regions of Queensland in 2010/2011 compounded an existing problem.

### 13.4.4 The industry pushes for amendments

The mining industry was concerned by the effect the model conditions were having on water management following the 2009/2010 wet season. Throughout 2010, the Queensland Resources Council pressed DERM and the Environment Minister to conduct a full review of the Fitzroy model conditions. Although the Minister for the Environment, Ms Kate Jones, indicated in March 2010 that a review of the conditions would occur before the next wet season,<sup>132</sup> DERM was not responsive to the Resource Council's proposal for a broad review, citing the fact that the conditions had been completed only recently. DERM indicated that individual mine operators could advise it, and apply for amendments to their authorities, if there were any difficulties with compliance.<sup>133</sup> In contrast to DERM's position, Ms Jones indicated in September 2010 that she was surprised that no review had gone ahead.<sup>134</sup> Finally, in October 2010, DERM agreed to hold a workshop later that year, which would address mine operator concerns about the conditions.<sup>135</sup> The chief executive of the Resources Council, Mr Michael Roche, by then held concerns for the situation at mines in the Bowen Basin; the wet season had started in August and large parts of the coalfields had experienced heavy rainfalls.<sup>136</sup>

On 3 November 2010, the workshop was held with representatives of DERM and mine operators. The workshop discussed the issues raised by the mining industry but made no major changes to release rates or quality limits. The review was limited because of the full review planned to occur in 2011. The amendments to the model conditions in November 2010 were so minor that they would not, even if implemented, have made a significant difference to water management for the 2010/2011 wet season.<sup>137</sup> In any case, the amendments were so late that no mining company was able to incorporate them into its environmental authority in time for the 2010/2011 wet season.<sup>138</sup>

DERM made it clear, in a letter to the Resources Council dated 24 November 2010, that it did not intend to make the widespread amendments to the Fitzroy model conditions sought by the mining industry.<sup>139</sup>

The Resources Council's hope that problems which had already arisen might be dealt with in advance of the next wet season was reasonable. DERM's arguments, which included the fact that the conditions were barely 12 months old, were also valid. DERM's preference was clearly that problems be dealt with by amendments to individual environmental authorities. The possibility of convincing mining companies to embrace that approach was diminished by the Minister's suggestion that the model conditions would be reviewed. It was unfortunate that DERM and the Minister did not present a consistent position.

In the result, it was not until December 2010 that there was any serious discussion between the Resources Council and DERM about ways for mines to deal with flood outside of their environmental authority conditions. The intervening months could have been usefully spent considering what emergency measures mining companies might need to employ if the predicted above average rainfall in the wet season eventuated. It is true, as DERM says, that companies could have applied for individual amendments to their environmental authorities. However, knowing that many mines had not so applied, and that many would not be able to comply with their environmental authorities if high rainfall occurred, it was incumbent on DERM to engage with the industry on how that threat could be met.

### 13.4.5 Performance of environmental authorities in the 2010/2011 wet season

The environmental authorities were not sufficient for mines to deal with the water entering their sites during the 2010/2011 wet season. From 1 December 2010, DERM received over 100 applications for transitional environmental programs to allow mines to release water in a way that would otherwise contravene their environmental authorities. That is not necessarily a reflection of deficiencies in the environmental authorities; DERM clearly indicated its intention to deal with floodwaters through transitional environmental programs.

### 13.4.6 Changes in the wake of the flood

After the difficulties experienced by the mining industry in the 2010/2011 wet season, the review of the Fitzroy model conditions planned for the second half of 2011 was brought forward.<sup>140</sup> DERM conducted workshops in May and June 2011 with representatives of the Resources Council and mining companies.<sup>141</sup> The thrust of the evidence from the mining industry was that the process of engagement with it in respect of these amendments was much improved from 2009.<sup>142</sup> The new version of the Fitzroy model conditions was approved within DERM on 3 August 2011.<sup>143</sup>

The new model conditions for dealing with flooding at mines contain these advantages for the mining industry:

- a greater ability for operators to obtain site specific amendments to the conditions<sup>144</sup>
- a relaxation of monitoring requirements during wet weather events if monitoring points are either unsafe or inaccessible<sup>145</sup>
- a narrower definition of mine-affected water which excludes some discharges from the conditions altogether<sup>146</sup>
- a stepped approach to discharge of mine-affected water into watercourses depending on the flow. Table 4 in the model conditions<sup>147</sup> creates different discharge conditions in low, medium and high rainfall events as indicated in the table below.<sup>148</sup>

Figure 13(a)

Receiving waters/ stream	Receiving Water Flow Recording Frequency	Receiving Water Flow Criteria for discharge (m <sup>3</sup> /s)	Maximum release rate (for all combined RP flows)	Electrical Conductivity and Sulphate Release Limits
e.g. Wet Creek	Continuous (minimum daily)	<b>Low Flow</b> <XX m3/s for a period of <insert number of days> after natural flow events that exceed XX m3/s (where XX is a specified event flow trigger)	Insert < xx ML/day or < xx m3/s Volume/rate to be determined on case by case basis	Electrical conductivity (uS/cm): <insert water quality objective or 75th percentile of long term background reference data> Sulphate (SO <sub>4</sub> <sup>2-</sup> ): 250 mg/L
		<b>Medium Flow</b> > XX m3/s (where XX is specified event flow trigger)	< XX m3/s (where XX is the maximum release rate determined on case by case basis )	Electrical conductivity (uS/cm) <insert value determined on case specific basis but typically <1500 Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum) >
		<b>High Flow</b> > ZZ m3/s (where ZZ is a specified high flow event trigger)	< ZZ m3/s (where ZZ is the maximum release rate determined on case by case basis)	Electrical conductivity (uS/cm) <insert value determined on case specific basis but typically <3500 Sulphate (SO <sub>4</sub> <sup>2-</sup> ) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>

Extract from Table 4, Final Model Water Conditions for Coal Mines in the Fitzroy Basin, 2011, page 7.

That table is a promising step in the management of the problem of excess water at mine sites during heavy rainfall events. However, it will only be of benefit to the individual mining operators who are able to agree with DERM on values to be inserted in it.

DERM will need to take a whole of catchment approach to the question of the quality and volumes that can be discharged by each mine under low, medium and high flows, similar to its approach to the grant of transitional environmental programs in 2010/2011.<sup>149</sup> DERM (as opposed to the mining companies) is in the best position to establish what can be discharged by each mine during low, medium and high flow events without causing environmental damage. It will need to take an active role in determining the values to be inserted into Table 4. It cannot expect mining companies to make the complex calculations required to determine the interplay between discharges from different mines; indeed, it already has a system in place to make those calculations.

The 2011 amendments to the Fitzroy model conditions have substantially addressed the Resources Council's concerns.<sup>150</sup> However, they are not a panacea for all problems experienced during the 2010/2011 wet season. DERM has estimated that with the new conditions in place, just under half of those granted transitional environmental programs in 2010/2011 would have to apply again if a wet season of a similar magnitude occurred.<sup>151</sup> For example, the new conditions will not enable Ensham mine to discharge the 20 000 megalitres of water left over from the 2008 and 2010/2011 flooding events it was still holding as at November 2011.<sup>152</sup>

The transition to new environmental authority conditions should be carefully managed. DERM should work with mining companies to aid a transition to the new conditions where they differ markedly from the status quo. Mine operators are voluntary participants in the industry, and by engaging in it subject themselves to the regulatory scheme under the *Environmental Protection Act*. But, particularly given the substantial capital expenditure involved in starting a mining project, they are entitled to some foreknowledge of conditions and should not face the imposition of conditions without transitional periods.

## Recommendations

- 13.7 The Department of Environment and Resource Management should assist mine operators in their applications for amended environmental authorities to ensure, as far as possible, that each environmental authority contains a tailored version of Table 4 of the model conditions. The Department of Environment and Resource Management should provide to mining companies its monitoring data and its suggested values for Table 4 on the basis of an assessment of the catchment which takes into account the cumulative effect of different operators' releases.
- 13.8 Unless the Department of Environment and Resource Management has decided not to permit discharges, it should assist each mine operator in its application for an environmental authority to ensure, as far as possible, that each authority includes provisions for discharges during times of heavy rainfall and flood.

## 13.5 Transitional environmental programs

As is clear from section 13.4, environmental authorities were not a complete solution to dealing with flooding at mines during the 2010/2011 wet season. They may never be. Transitional environmental programs were DERM's mechanism of choice in the 2010/2011 wet season for dealing with the discharge of excess water from mines caused by flooding.<sup>153</sup>

A transitional environmental program is one of the regulatory tools in the *Environmental Protection Act* available for use by DERM. The program must either reduce environmental harm caused by an activity, or move an activity through the transition from non-compliance to compliance with an environmental authority or other instrument.<sup>154</sup> A person can apply for a transitional environmental program or DERM can require the submission of a draft program.<sup>155</sup> DERM has 20 business days to consider whether or not to grant an application for a transitional environmental program.<sup>156</sup> The program, once approved by DERM, authorises any action done in compliance with it, despite anything in a regulation or environmental authority.<sup>157</sup>

The application of the Fitzroy model conditions and the lack of water management infrastructure at mine sites were both partly responsible for a greater build up of water than would otherwise have been the case and, in turn, an increase in the need for transitional environmental programs during the 2010/2011 wet season. In total, over 100 transitional environmental programs were approved by DERM after 1 December 2010. The Commission acknowledges that, given the severity of the wet season experienced in many parts of Queensland, it is likely that some transitional environmental programs would have been needed even if the Fitzroy model conditions had not been introduced.

### 13.5.1 DERM's approach to granting transitional environmental programs in the 2010/2011 wet season

DERM's approach to assessing applications for transitional environmental programs was to balance the environmental harm to be caused by allowing the discharge against the economic benefits to be gained from production increasing as a result of the discharge,<sup>158</sup> with the proviso that unacceptable levels of environmental harm could not be permitted.<sup>159</sup>

The dominant consideration governing the grant of applications for transitional environmental programs was the cumulative environmental impact of releases from different mines.<sup>160</sup> That required a catchment-wide consideration of releases, and environmental impacts, for each application. Conditions on discharge were set to give each mine a window of opportunity to discharge water.<sup>161</sup> DERM maintained control of the process by monitoring waterways downstream and directing discharges at particular mines to stop, if necessary, in order to keep downstream water quality measurements within appropriate bounds.<sup>162</sup>

That approach appears to provide a sound basis for making decisions across a range of mines. It requires significant co-operation between officers of DERM and is likely to require one person to take overall responsibility for all mines in a particular catchment. It is a credit to DERM officers that they were able to manage the process despite the inadequacies of the legislative scheme and guidance material provided. However, see section 13.5.3 *Consistency of decision-making*.

DERM suggested to some mine operators at pre-wet season inspections that they should apply for transitional environmental programs in advance if they anticipated having problems dealing with heavy rainfall.<sup>163</sup> It is hard to see how a transitional program could be used in that way, given that DERM considered the cumulative impact of discharges from many mines within a catchment.<sup>164</sup> If pre-emptive programs were to be granted, they would need to be drafted conservatively in anticipation of applications from other mine operators, and amended as such applications were received.

### 13.5.2 The need for timely approvals

In its letter of 24 November 2010, DERM indicated to the Queensland Resources Council that transitional environmental programs were its mechanism of choice to deal with excess water at mines. DERM was active in promoting transitional environmental programs to mining companies. It provided information about applying for programs and a template application, and encouraged mine operators to start a dialogue with DERM as early as possible.<sup>165</sup>

Mr Roche gave evidence that the process of approving transitional environmental programs in December 2010 was excellent; DERM had delivered on promises to increase staffing over the holiday period and applications were processed promptly.<sup>166</sup> But, by January 2011, the rains had stopped in many mining areas. The programs that had been approved in December 2010 were of little use to mine operators with storages and pits full of water when flows in nearby waterways were too low to permit discharge.<sup>167</sup> The Resources Council contacted DERM numerous times over the first weeks of January 2011 to try to hasten the processing of transitional environmental program applications.<sup>168</sup> Mr Roche considered that DERM 'gave it their best shot', but could not meet the council's expectations for a response to the flooding at mines around Queensland within the transitional environmental program regime.<sup>169</sup>

Mines wishing to release into ephemeral (inconsistently flowing) watercourses were in particular need of timely approvals. Rio Tinto's Hail Creek mine is one such mine. Its representative gave evidence that an approval time of hours, as opposed to days, was needed, if the opportunity to discharge under a transitional environmental program were not to be lost.<sup>170</sup> While Rio Tinto's applications for transitional environmental approvals were approved

quickly (in 11, 8 and 14 days respectively), such timeframes are insufficient to make use of a flood flow which can move through a river system in a matter of hours.

DERM indicated that it did prioritise applications, according to their urgency, on the basis of the information provided by mine operators.<sup>171</sup> It did not, and could not, process applications within hours because of the rigour with which it assessed them. The process of prioritisation grew organically from the situation DERM found itself in during the 2010/2011 wet season and was not an established procedure.<sup>172</sup> That procedure should now be formalised. It should contain a short list of factors that indicate urgency. That may involve some policy decisions; for example, threats to human safety or health are likely to outweigh potential economic harm.

The Commission has identified two possible mechanisms to avoid delay: providing pre-emptive relaxations in advance of rainfall or flooding events, and providing a general relaxation to mines in an entire catchment immediately following a rainfall event.

Pre-emptive approvals could apply to those mines in the headwaters of a catchment or near ephemeral streams when rainfall of high volume is forecast. They could also apply to mines downstream in a catchment towards which floodwaters are travelling. In both scenarios, such an approval could allow greater volumes of water to be discharged. Quick approvals would be required, some in less than 24 hours, to respond to a particular rainfall forecast.

Given their nature, catchment-wide relaxations would have to be conservative to ensure that no environmental harm resulted. However, even a conservative exemption would assist mines to remove excess water from their sites quickly without the need for a drawn out application process. DERM is in the best position to determine accurately the quality and volumes of water that can be discharged from each mine without causing environmental harm. It can provide each mine within a catchment with volume and quality limits, conditioned on flow in the nearby waterway, for discharges when heavy rain falls or flooding occurs. If particular mines consider they need to make further discharges, a further application can be lodged. Such a blanket approach would not be appropriate in all circumstances, but where large regions of the state are flooding at once, it would allow the process of discharge to start quickly and ensure the opportunity to discharge into high flowing rivers was not lost in the struggle with paperwork in Brisbane.

Any approval could be conditioned by DERM in the same way as transitional environmental programs during the 2010/2011 wet season, and could include a requirement that a particular rainfall level or waterway flow rate is actually observed before any discharges are made.

### 13.5.3 Consistency of decision-making

For transitional environmental programs to operate consistently with the *Environmental Protection Act* and environmental authorities granted, there must be some degree of predictability about the type of programs that DERM is willing to grant. Decisions will, of course, be made by reference to the object of the Act to support ecologically sustainable development, but the legislative scheme for granting transitional environmental program applications does not ensure consistency. There are numerous criteria in the legislation. The procedural guide, too, does not assist DERM decision makers to make consistent decisions. This makes it difficult for mine operators to plan their response to environmental authority conditions in terms of building further infrastructure or changing operational plans. It should be possible for operators to determine, in advance, how DERM will make decisions during flood.

#### Relevant considerations

In making a decision about whether or not to grant a transitional environmental program, DERM must consider the 'standard criteria',<sup>173</sup> regulatory requirements,<sup>174</sup> additional information provided by the applicant,<sup>175</sup> and any views expressed in a conference held about a draft program.<sup>176</sup>

The 'standard criteria' are defined in the *Environmental Protection Act 1994* as:

- (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) a transitional environmental 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.<sup>177</sup>

The regulatory requirements under the *Environmental Protection Regulation 2008* are wide ranging. The general considerations include environmental protection policies,<sup>178</sup> environmental values as declared under the regulation,<sup>179</sup> and characteristics specific to the site: its nature, persons likely to be affected<sup>180</sup> and potential contaminants.<sup>181</sup> Specific environmental impact considerations include the impact of the activity itself,<sup>182</sup> the direct and cumulative effect of introducing the contaminant to the area,<sup>183</sup> greenhouse gas emissions and the environment's remaining capacity to survive future contamination as a result of the proposed release.<sup>184</sup> The regulation also requires consideration of whether and what conditions should be imposed about a large range of matters,<sup>185</sup> including monitoring requirements.<sup>186</sup> If the discharge under the transitional program is onto land<sup>187</sup> or into a watercourse,<sup>188</sup> there are still more considerations including the flow of the water, the mixing of the contaminant and clean water, and storage of water on land.

The Assistant Director-General of DERM described the process of considering all the criteria as a challenge, but considered it a normal part of administrative decision-making by government officers.<sup>189</sup>

## Procedural guide

DERM publishes a procedural guide to assist its officers in deciding whether or not to approve an application.<sup>190</sup> The guide was revised following the flood;<sup>191</sup> the versions provided to the Commission are dated 24 January 2011<sup>192</sup> and 2 June 2011.<sup>193</sup> A version of it was available to officers during the 2010/2011 wet season.<sup>194</sup> The procedural guide is a checklist designed to assist the officers in considering all relevant matters and coming to a conclusion.<sup>195</sup> The record of the officer's decision is contained in an assessment report, in which considerations and conclusions must be set out.<sup>196</sup>

The 24 January 2011 version of the procedural guide for DERM officers is not particularly helpful: it lists criteria and their source but does not give any guidance about what they might mean.<sup>197</sup> The part of the guide that refers to the standard criteria contains an empty table for the insertion of relevant considerations next to headings which correspond to each criterion.<sup>198</sup> No further guidance is given. This document does nothing more than ensure the scores of considerations applicable are brought to the attention of the decision maker.

The 6 June 2011 version of the procedural guide attempts to give more guidance but, in a number of respects, is likely to add to the difficulty likely to be experienced by DERM officers in dealing with the criteria. It contains more detail about the process that the decision maker should go through in order to comply with the Act, and explains what the applicable criteria mean and includes examples.<sup>199</sup> The part of the guide that relates to the

standard criteria might cause problems. It lists a series of questions that should be answered for each of the criteria. Some of these questions are helpful and succinct, for example: ‘Does the decision/action allow for broad community involvement on issues that affect them?’ Others, on the other hand, are long, seemingly impossible to answer and appear beyond DERM’s expertise. Some examples are:

- Has the decision effectively integrated long- and short-term economic, environmental, social and equity considerations?
- Does the decision have due regard to the global dimensions of environmental impacts and policies?
- Has the need to maintain and enhance international competitiveness in an environmentally sound manner been considered when making the decision?<sup>200</sup>

The questions must be answered, and determinations made by relatively senior public service officers on the recommendation of junior professional officers. These junior officers are unlikely to be equipped to answer the questions posed; it is difficult to imagine a person who could answer all of them.

The procedural guide should assist in understanding the relevant considerations, how they should be applied and the priority, if any, that should be accorded to particular criterion. The guide should be public so as to increase mine operators’ ability to understand the way in which DERM makes decisions.

### Rationalisation of criteria

For any particular application, these instruments – the standard criteria, the regulatory requirements and the documents referenced in them – set out well over 100 criteria to be taken into account. The legislative scheme is convoluted and not conducive to consistent decision-making. The procedural guide does not assist. The criteria should be rationalised, and if possible prioritised, to assist both DERM officers and mine operators regulated by them.

The Commission recognises that the gamut of considerations relevant to the grant of a transitional environmental program is so wide because of the range of activities to which a program could relate; the programs are not specifically tailored as a flood response. Rationalisation of criteria could be achieved in a number of ways. Specific criteria for granting transitional environmental programs in response to flood could be identified as a subset of the criteria for granting programs generally. Alternatively, a new mechanism to relax other environmental conditions for discharge of water during floods could be created with its own set of criteria. The policy choice as to how the rationalisation of criteria should occur is one for the Queensland Government.

### 13.5.4 A proper use of transitional environmental programs?

Section 330 of the *Environmental Protection Act* reads:

A transitional environmental program is a specific program that, when complied with, achieves compliance with this Act for the activity to which it relates by doing 1 or more of the following—

- (a) reducing environmental harm caused by the activity;
- (b) detailing the transition of the activity to an environmental standard;
- (c) detailing the transition of the activity to comply with—
  - (i) a condition, including a standard environmental condition, of an environmental authority or code of environmental compliance; or
  - (ii) a development condition.

It should also be noted that a transitional program may only be granted if it assists to achieve compliance with an environmental authority in the manner set out in paragraph (a), (b) or (c). For current purposes, (a) is the only basis upon which a program might be granted for removal of flood waters from a mine site.

However, it might be queried whether paragraph (a) does in fact authorise the granting of such programs. The word ‘activity’ must maintain its meaning throughout the section. The program must reduce the harm caused by that ‘activity’. It cannot really be said that a program which authorises the release of mine-affected water reduces the environmental harm caused by releasing that water. The discharge will cause the same amount of environmental harm whether or not it was done in accordance with a transitional environmental program.



The Assistant Director-General of DERM, pointed out that the program would reduce the harm in comparison to the greater environmental harm that might occur if the activity were unregulated.<sup>201</sup> That may be an accurate representation of how the system works in practice. On one view, however, it is not authorised by the Gilbertian form of section 330(a) which requires that the program must, itself, reduce the environmental harm caused by the very thing it allows.

More than one interpretation of this section may be open. To avoid any suggestion that transitional environmental programs granted by DERM are not authorised by section 330(a), this part of the legislation should be clarified.

### 13.5.5 Adequacy of DERM's response to flooding

The evidence was mixed as to whether the transitional environmental program was an effective response measure to the flooding suffered during the 2010/2011 wet season.

The measure by which mining companies judged DERM's response was its ability to return them to full production. Rio Tinto considered that the programs were simply ineffective in addressing the volume of water received by its Hail Creek mine.<sup>202</sup> The Ensham coal mine was satisfied with the terms of its programs, which resulted in 7000 megalitres of water being released,<sup>203</sup> even though, moving into the 2011/2012 wet season, it retained some water in its pits. A representative of DERM who oversaw the consideration of many transitional environmental program applications disagreed that a failure to empty all mines of water meant that the process was ineffective. Rather, he asserted it simply indicated that the possible environmental impacts of releases were too large to allow all water to be discharged.<sup>204</sup> It is clear to the Commission that the grant of transitional environmental programs to mine operators during floods at least allowed them to restart production more quickly than would otherwise be the case.

There are, however, concerns about the time taken to process applications, whether the use to which the mechanism was put is consistent with its purpose as stated in the Act, and the lack of predictability of application outcomes. Those concerns should be resolved before transitional environmental programs are considered an effective response to flooding.

## Recommendations

- 13.9 The Queensland Government should legislate to clarify the purposes for which a transitional environmental program can be granted. In particular, if the government considers the transitional environmental program the appropriate regulatory mechanism to deal with the discharge of water from mines during flood, section 330 of the *Environmental Protection Act 1994* should be clarified to make it clear that it extends to that use.
- 13.10 The Queensland Government should refine the criteria which must be considered in assessment of applications for relaxation of environmental authority conditions, by transitional environmental program or otherwise, in response to flood.
- 13.11 The Queensland Government should consider amending the *Environmental Protection Act 1994* so that it allows for the relaxation of environmental authority conditions, by transitional environmental program or otherwise, as to discharge of water:
- pre-emptively, in advance of rainfall or flooding events, or
  - for all mines in a catchment that is flooding.
- 13.12 The Queensland Government should prepare a procedural guide for officers deciding whether to grant a relaxation of environmental authority conditions, by transitional environmental program or otherwise, with guidance as to:
- the meaning of each criterion
  - examples of the types of things that may be relevant to each criterion
  - the priority, if any, to be afforded to different criteria.
- 13.13 The Queensland Government should make public the procedural guide used by Department of Environment and Resource Management officers to decide whether to grant a transitional environmental program.

## 13.6 A third way – emergency directions?

By late January 2011, the Queensland Resources Council considered that the usefulness of transitional environmental programs had been exhausted. It began pushing for DERM to issue emergency directions allowing mines to discharge water before further rainfall occurred.<sup>205</sup> The Queensland Government rejected the push,<sup>206</sup> possibly under a misapprehension as to the breadth of what the Resources Council was seeking.<sup>207</sup> Mr Roche indicated by letter to the Premier, dated 28 January 2011, that the council envisaged the ‘release of larger quantities of water from mines, irrespective of flows in the receiving streams, provided that water does not exceed some agreed level of salinity...’.<sup>208</sup> In evidence before the Commission, he said that either of two alternatives - a direction across the board or directions granted mine-by-mine - would have sufficed.<sup>209</sup> The mining companies’ reception to the proposal for emergency directions was mixed, but, for the most part, they supported further release opportunities.<sup>210</sup>

The emergency directions power is set out in section 468 of the *Environmental Protection Act*. The power allows DERM to direct the release of a contaminant (with or without reasonable conditions) when:

- it is necessary and reasonable to release the contaminant because of an emergency
- there is no other practicable alternative to the release.

Actions that might otherwise be subject to enforcement action, including depositing contaminants and causing environmental harm or nuisance, will not be unlawful when undertaken pursuant to an emergency direction.<sup>211</sup> The Act requires that the person to whom an emergency direction is given comply with the direction and take all reasonable and practicable precautions to prevent or minimise environmental harm, the risk of death or injury to humans and animals, and loss or damage to property.<sup>212</sup>

The Queensland Resources Council has submitted that, in light of the delays associated with the transitional environmental program mechanism, the use of emergency directions should have been expanded to allow mine operators to make releases when the water held was of better quality and flow conditions were such as to allow releases to be made with lower environmental impact.<sup>213</sup>

The Commission does not consider that this would have been an appropriate use of the emergency directions power. Emergency directions, by their nature, will often be made in circumstances where the likely impact of the release is not fully understood. They are an appropriate mechanism for dealing with unforeseen emergencies where the available information suggests that the emergency is, if action is not taken, likely to result in harm to environmental or other values that outweighs the potential impact of the contaminant release.<sup>214</sup> On the other hand, pre-emptive releases made to reduce the likelihood of an emergency arising as a result of foreseeable events, such as elevated rainfall during a wet season, can be properly managed through the environmental authorities or a short-term relaxation that allows for a consideration of the effects of the release, such as a transitional environmental program.

### 13.6.1 The Moranbah North emergency direction

The emergency direction process was employed only twice during the 2010/2011 wet season, both times in relation to the Moranbah North coal mine owned by Anglo American Metallurgical Coal.

On Sunday 19 December 2010, Anglo American advised DERM that, following significant rainfall in the area, one of the dams at the Moranbah North coal mine was at risk of overtopping.<sup>215</sup> Potentially, the dam could have collapsed, with the consequence that a large uncontrolled quantity of mine-affected water would be released.<sup>216</sup> Anglo American requested that an emergency direction be issued to allow water to be released from the dam.<sup>217</sup> Approximately 90 minutes later, DERM authorised Anglo American to discharge water from the dam into the Isaac River. The emergency direction applied until 5.00 pm on Friday 24 December 2010 or until a transitional environmental program authorising the release could be approved.<sup>218</sup>

A further request for an emergency direction was made the following day in respect of another dam that had exceeded its safe storage capacity. That request was also granted on the day it was made.<sup>219</sup>

Given that the emergency directions power was only employed in relation to one mine during the 2010/2011 wet season, it is difficult to draw any firm, broadly applicable conclusions as to its effectiveness. The evidence before the Commission suggests that the emergency directions process in relation to Moranbah North coal mine worked well. The risk of the storages overtopping was the type of emergency contemplated by DERM’s internal guidance

material.<sup>220</sup> Both requests for emergency directions were approved on the day they were made. The emergency directions allowed Anglo American to prevent overtopping of its dams on the site by discharging 13.36 megalitres of mine-affected water into the Isaac River between 21 and 23 December 2010.<sup>221</sup>

### 13.6.2 Definition of emergency

The *Environmental Protection Act* does not define the term ‘emergency’. DERM considers that emergency directions can only be granted in circumstances where there is an imminent risk to the environment, property, human health or safety.<sup>222</sup> It propounds that view in its procedural guide, which guides the decision-making of DERM’s officers.<sup>223</sup> The Queensland Resources Council has expressed a view that the emergency directions power should be construed more broadly. It submits that, when the emergency directions power is read in the context of the Act’s definition of environment as including economic and social conditions,<sup>224</sup> it is wide enough to be used in the case of economic emergencies.<sup>225</sup> In DERM’s view, a decision to release a contaminant into the environment to relieve economic hardship requires a more involved balancing process than that possible for an emergency direction, so releases are more appropriately authorised following an application for a transitional environmental program.<sup>226</sup>

There is no obvious textual reason why an economic emergency might not serve as the basis for use of the emergency directions power. That does not mean that it should. It is open to the executive, acting through the responsible Minister, to decide the bases upon which such a power should be used. The relevant Ministers and DERM did as much in January 2011 when they decided, and told the Resources Council, that the grant of a direction under section 468 would not be used to relieve mines of water that was causing only a loss of production and not posing a pressing environmental or human safety risk.<sup>227</sup> Whether that course of action was in the public interest is a policy question to be answered by government.

### 13.6.3 Procedural guide

In deciding whether to issue an emergency direction, DERM requires its officers to have reference to a procedural guide.<sup>228</sup> The guide directs DERM officers to the factors they should consider to determine whether the direction will satisfy the requirements of section 468 of the *Environmental Protection Act*. Evidence before the Commission indicated that the procedural guide is a public document,<sup>229</sup> but it is marked for internal use and does not appear to be available on DERM’s website. It would be appropriate for the guide to be made public; its list of the factors to be considered when making a decision on the issue of an emergency direction would assist mine operators in understanding how DERM intends to use the tool.

## Recommendations

- 13.14 The Queensland Government should consider amending the *Environmental Protection Act 1994* to provide a definition of the term ‘emergency’ for the purposes of section 468 of that Act.
- 13.15 The Queensland Government should make public the procedural guide used by Department of Environment and Resource Management officers to decide whether to grant an emergency direction.

### 13.6.4 Verbal approvals

The *Environmental Protection Act* requires that an emergency direction be given in writing. That requirement is understandable, as it ensures that both parties have a record of the direction’s precise terms. It seems odd, however, that written notice is required for emergency directions but not for the approval of transitional environmental programs. For the latter, the *Environmental Protection Act* leaves open the possibility of verbal approvals being given, requiring that written notice of a decision be provided to the operator within eight business days.<sup>230</sup> In fact, a verbal approval for a transitional environmental program was given to Anglo American in respect of the Dawson Mine during the 2010/2011 wet season.<sup>231</sup> DERM contended that this was done to provide an expedited approval of a low risk release, thereby avoiding the need for possibly more damaging non-compliant releases.<sup>232</sup> A representative of DERM said that verbal approvals might be given where there is urgency, although that is not the usual approach.<sup>233</sup>

It is clear, though, that emergency directions are more likely to need urgent communication than the grant of transitional environmental programs. The Queensland Resources Council has submitted that the requirement should be relaxed so that a direction can be made orally and subsequently confirmed in writing.<sup>234</sup> Situations may arise where, for example, a failure of communication systems leaves a mine operator unable to receive an emergency direction by email. It seems appropriate that the position on verbal approvals under the *Environmental Protection Act* be made consistent, and that verbal emergency directions be permitted.

### Recommendation

- 13.16 The Queensland Government should amend the *Environmental Protection Act 1994* so as to permit an emergency direction to be given orally where it is not practicable to provide the direction in writing, with provision for its subsequent confirmation in writing.

## 13.7 Maintaining the experience gained in 2010/2011

A representative of DERM said that the wet season had been an education for both DERM and mining companies about how the transitional environmental program would work in practice. He said that since the flood, DERM had taken steps to refine communication and assessment processes.<sup>235</sup> The question now is how DERM can ensure the valuable experience gained during the event is not lost. DERM should include in internal guidance documents information about problems encountered during the 2010/2011 wet season and effective solutions that were implemented.

However the government decides to amend the regulatory scheme, workshops and training for both mining industry staff and DERM officers regarding the new approval process would assist in a common understanding of the new scheme.

## 13.8 Abandoned mines

The term 'abandoned mines' is used in this section to describe mine sites which have not been fully rehabilitated and for which there is no person identifiable as being the owner or as being responsible for the rehabilitation of the site.

### 13.8.1 Effect of flooding on abandoned mines

In addition to the obvious risks which may be present on site, abandoned mines pose the following risks during floods:

- acid mine drainage, which can result in low water quality and damage to aquatic animals and plants<sup>236</sup>
- discharge of contaminated water from tailings dams overtopping, or seepage through dam or pit walls<sup>237</sup>
- health and environmental risks from the release into watercourses of contaminants such as cyanide, chemicals or fuels that have been kept on the mine site<sup>238</sup>
- sediment issues caused by the lack of vegetation at open cut and surface strip mines.<sup>239</sup>

There are ways in which abandoned mines can be rehabilitated so as to minimise the environmental impacts of flooding. Options include:

- controlling the source of the contamination, for example by sealing underground mines, storing wastes away from rain water or solidifying or encapsulating wastes<sup>240</sup>
- controlling the movement of the contamination away from the mine, for example by using biological measures such as wetlands<sup>241</sup>
- controlling the amount of rainfall that flows from the abandoned mine into creeks, for example by revegetating
- diverting rainwater away from areas in which it will become contaminated.<sup>242</sup>

## The 2010/2011 wet season

The Commission selected the Mt Oxide mine site (abandoned) as a case study for its investigation into flooding at mine sites. The mine is located on Chidna station, north-west of Mt Isa.<sup>243</sup> A number of different operators mined copper there from the 1920s until the 1990s;<sup>244</sup> the last mining leases were surrendered in 1999.<sup>245</sup>

Tributaries of Cave Creek drain runoff from the Mt Oxide site. Cave Creek is part of the catchment of the Leichardt River, which flows into the Gulf of Carpentaria.<sup>246</sup> The tributaries to Cave Creek, and Cave Creek itself, on Chidna station flow an iridescent blue after rainfall.<sup>247</sup> Blue discolouration occurs for more than one kilometre downstream of the mine site.<sup>248</sup> The water flowing out of the abandoned mine is acidic; when it mixes with stormwater, dissolved copper settles out as a bright blue precipitate. This precipitate gathers on creek beds making the water look blue.<sup>249</sup> The exact sources of the contamination are difficult to identify, but include stockpiles of waste material<sup>250</sup> and leakage from the mine pit.<sup>251</sup>

The water quality in Cave Creek was sampled in March 2011. The presence of metals exceeded the acceptable levels set for the protection of ecosystems and human and livestock drinking water.<sup>252</sup> Sediment samples also exceeded the sediment quality guidelines.<sup>253</sup>

The contamination may harm livestock and wildlife that drink the contaminated water or lick precipitate from rocks and earth.<sup>254</sup> Fish and other aquatic life present on the property may also be harmed; they have the least resistance to copper contamination.<sup>255</sup> The photograph below shows the contamination present at Mt Oxide.

Mt Oxide is an example of the sort of environmental damage that may occur during a flood. Similar environmental damage may be occurring in other parts of the state. It is not possible to determine the impact of the 2010/2011 floods on abandoned mines, or the resulting impact on the environment, because of the lack of monitoring and physical inspections, and information collected on those mines. That paucity of information makes it necessary for the Commission to examine the wider issue of abandoned mine management, in order to address the impact of floods.



*Contaminated creek near Mt Oxide Mine, abandoned (photo supplied)*

### 13.8.2 The abandoned mine land program

The Queensland Government's current estimate is that there are approximately 12 000 abandoned mines located on private land, and 3000 on state-owned land in Queensland.<sup>256</sup> The Queensland Government, through the Department of Employment, Economic Development and Innovation, maintains an abandoned mine land program, the primary purpose of which is to ensure human safety.<sup>257</sup> Its secondary purpose is to minimise environmental harm,<sup>258</sup> although it does not hold any environmental authority under the *Environmental Protection Act*. The program is overseen by the abandoned mines co-ordinator, Mr Oskar Kadletz, who was appointed in 2011.<sup>259</sup>

It should be said at the outset that Mr Kadletz impressed the Commission as a dedicated public servant who held deep concerns about the matters for which he was responsible. The fact that the program has, as will be made clear below, been limited in its effectiveness cannot be attributed to his performance.

The abandoned mine land program is chiefly intended to deal with problems arising from abandoned mines on state-owned land; the government considers the owner of the land on which the mine is located to have primary responsibility for it.<sup>260</sup> The Department of Employment, Economic Development and Innovation will take action under the program in respect of abandoned mines on private land only if there is an associated public hazard;<sup>261</sup> it can act with the permission of the landholder or without permission under section 344B of the *Mineral Resources Act 1989*.<sup>262</sup> The department determines what rehabilitation action to take at the site.

### 13.8.3 Mt Oxide mine (abandoned)

Mt Oxide serves as an example by which to assess the Department of Employment, Economic Development and Innovation's efforts to manage abandoned mines. The mine came to the attention of the department in 2009 upon complaints made by the owner of the land on which the mine is located.<sup>263</sup> Prior to the 2010/2011 wet season, the department commissioned an expert panel to give advice on options for rehabilitation. The department was also, before the 2010/2011 wet season, sampling water quality at the site.<sup>264</sup>

In an attempt to minimise the environmental harm occurring at the site, the Department of Employment, Economic Development and Innovation:

- covered stockpiles with high density polyethylene (black plastic)<sup>265</sup>
- provided lick blocks to cattle on the property to reduce their attraction to the contaminated water<sup>266</sup>
- moved waste stockpiles out of the waterway<sup>267</sup> and
- cleaned blue copper precipitate out of the creeks.<sup>268</sup>

No site visits were made during any previous wet season because of concerns about access and the safety of personnel.<sup>269</sup>

The management of the Mt Oxide mine prior to the 2010/2011 wet season was unsatisfactory in more than one respect. Firstly, the lack of a systematic approach to abandoned mine management meant that the Department of Employment, Economic Development and Innovation did not start its investigations until 2009, when the landholder made complaints to the Queensland Government.<sup>270</sup> According to the landholder's statement to the Commission, water quality concerns were identified as early as 2001.<sup>271</sup> Queensland Government sampling effectively ceased in 2003, following the end of the mining lease.<sup>272</sup> It may be that the contamination would have been addressed earlier had there been a systematic risk assessment and regular site inspection program in place.

Secondly, the pace at which rectifying works have proceeded since the department began managing the site in 2009 leaves much to be desired. The expert panel was formed in 2009. From the minutes of its meeting in July 2011, it appears it was discussing investigations of a very preliminary nature. For example, the panel agreed to undertake a library search for information as to the impact of the contamination on wallabies and birds.<sup>273</sup> There is no obvious reason, apart from lack of resources, why research of such a basic type had to wait until 2011.

This same lack of resources appears responsible for the failure to proceed with the rehabilitation of Mt Oxide mine sooner. Mr Kadletz explained that he had to apply the funding available to the sites deemed to have the highest priority; Mt Morgan, for example, was considered a higher priority than Mt Oxide.<sup>274</sup>

It should be noted that some work has been completed since the 2010/2011 wet season. A remote weather station which reports to the Department of Employment, Economic Development and Innovation via satellite uplink was installed in the first half of 2011.<sup>275</sup> Additional monitoring sites to measure stream flow and mine pit water levels are planned.<sup>276</sup> Works to be completed in 2011 and 2012 include installation of a water evaporator, maintenance work on the plastic covers, and identifying projects to be put to tender for the removal or remediation of stockpiles.<sup>277</sup>

The short term goal of the Department of Employment, Economic Development and Innovation's operations at Mt Oxide is to reduce the flow of contaminated water from the site.<sup>278</sup> Mr Kadletz said that to understand the hydrology of the site, it was necessary to monitor conditions in wet and dry seasons over many years: another reason that the department should attend to abandoned mines as quickly as possible.<sup>279</sup>

The medium and long term goals at Mt Oxide are to remove the contaminating material or encapsulate it onsite.<sup>280</sup> Obstacles in the way of these goals include the need for agreement from the current exploration permit holder, whose authorisation covers the Mt Oxide site, resource constraints and the requirement for a tendering process.<sup>281</sup> Mr Kadletz said that he was not aware of any 'really good answers in the world' to the problems of removing and encapsulating the Mt Oxide material.<sup>282</sup>

No timelines have been set by the Department of Employment, Economic Development and Innovation, for the achievement of these goals.<sup>283</sup> Consequently, it is unknown for how long the waters of Mt Oxide will continue to flow iridescent blue.

### 13.8.4 Taking responsibility for abandoned mines

The Commission considers that an agency of the Queensland Government should take responsibility for the management of all abandoned mines. The subject of responsibility was discussed by the Service Delivery and Performance Commission (a Queensland Government entity) in its 2007 report 'Review of the Roles and Responsibilities of the Department of Natural Resources, Mines and Water, Environmental Protection Agency and Department of Primary Industries and Fisheries'. The report reasoned that because the Queensland Government authorised access to the resources at a mine site, it was ultimately responsible for any inadequate rehabilitation of the site.<sup>284</sup> The Service Delivery and Performance Commission recommended that the then Department of Mines and Energy (now part of the Department of Employment, Economic Development and Innovation) take immediate responsibility for managing all existing and new abandoned mine sites.<sup>285</sup> It appears that the Queensland Government did not adopt that recommendation; as outlined above, the evidence was that the state considered abandoned mines on private land to be the responsibility of the landholder.

The situation at Mt Oxide demonstrates the type of environmental harm that can be caused by abandoned mines in times of flood. One agency's having responsibility for all abandoned mines might assist in identifying which mines might cause harm and responding to that possibility. There would also be a practical advantage in the Queensland Government's taking responsibility for abandoned mines; imposing responsibility for abandoned mines on landholders may deter them from reporting environmental harm that may be occurring. Adopting the recommendation of the Service Delivery and Performance Commission would be a useful first step. That recommendation is endorsed.

### *Recommendation*

13.17 The Queensland Government should determine which of its agencies should take responsibility for the management of all existing and new abandoned mine sites in Queensland.

### 13.8.5 Steps in the management of abandoned mines

The Commission engaged Associate Professor David Laurence to provide an expert opinion on flooding and abandoned mines. Dr Laurence outlined a four step process for the appropriate management of abandoned mines:<sup>286</sup>

1. collection of data and information
2. risk assessment

3. decision as to prioritisation
4. decision as to rehabilitation works.

A similar approach is outlined in the Commonwealth Government publication ‘Strategic Framework for Managing Abandoned Mines in the Mineral Industry’.<sup>287</sup> That publication focuses on the development of a consistent approach in all states and territories to the collection of information about, and management of, abandoned mines.

## Collection of data and information

The first step in the management of abandoned mines is to collect basic data on each mine, including the type of minerals or ore present, size and basic mine features. The Strategic Framework identified data collection as integral to appropriate management.<sup>288</sup>

The Department of Employment, Economic Development and Innovation’s source of information on all known abandoned mines in Queensland is the Queensland Minerals Occurrence database.<sup>289</sup> Compiled by geologists, and not specifically designed for use in the management of abandoned mines, it contains information about the features of each site such as shafts, open cuts, processing areas and tailings dams. It also identifies whether the mine is on private or state-owned land. The database suggests the majority of known abandoned mines are small in size and isolated from towns.<sup>290</sup>

The database is not exhaustive. Upon inspection the Department of Employment, Economic Development and Innovation has found that some mines have more features than the database suggests and others actually comprise a group of smaller mining operations treated as one.<sup>291</sup> For some sites, the information is more than 40 years old.<sup>292</sup> Very few of the mines on the list have been individually inspected. When staff from the Department of Employment, Economic Development and Innovation or DERM visit other mines in the area, they try to inspect abandoned mines to gather further information.<sup>293</sup> Constraints on resources mean that the Department of Employment, Economic Development and Innovation must prioritise the collection of information at what it knows to be high risk sites.<sup>294</sup>

This database represents, for most abandoned mines in Queensland, the entirety of information collected.<sup>295</sup> The Department of Employment, Economic Development and Innovation has further information on some individual sites which it has inspected, or on which it is completing or has completed rehabilitation works.<sup>296</sup>

A new abandoned mines database is currently under construction by the Department of Employment, Economic Development and Innovation. It will contain all the information in the Queensland Minerals Occurrence database,<sup>297</sup> and add some analysis machinery that will be dealt with below in *Risk assessment*. The Commission considers it would be useful for the Queensland Government to review the information held by all of its agencies, and seek information from the public, to add to this database.

## Risk assessment

Risk assessments are an integral part of abandoned mine management – they allow the identification of risks and mitigation options and the proper allocation of resources.<sup>298</sup> The risk assessment should consider all relevant information and data available on the abandoned mine, and deal with public safety, social, economic and environmental risks.<sup>299</sup> Public safety is the most important consideration, and should be emphasised accordingly.<sup>300</sup> The risk posed by flood is another important factor.

Ideally, risk assessment would be conducted after a site inspection of the abandoned mine.<sup>301</sup> Given the large number of abandoned mines in Queensland, any process of inspection will face obvious practical challenges. The order of performing the site inspections will have to be prioritised in some way (see next section *Prioritisation of sites for site inspection*).

In 2005, the Department of Employment, Economic Development and Innovation completed a desktop risk assessment.<sup>302</sup> (The spreadsheet containing the results of the risk assessment was tendered in the Commission’s public hearings.<sup>303</sup>) It enabled the department to arrive at a numerical representation of the risk at each known abandoned mine. The risk was determined on the basis of the features of the mine contained in the database, including the number of mine features (pits, shafts, declines), dredging activities, the size of the mineral deposits at the site, the depth and width of the workings, and number of gullies, as well as the size of population nearby.<sup>304</sup>



The risk number assigned was described as a rough evaluation, obtained by assigning a level of risk for each feature and adding together the risk for all features at a particular abandoned mine.<sup>305</sup> Mr Kadletz gave evidence that he believed environmental risk was incorporated into the risk number,<sup>306</sup> although that fact was not discernible from any of the columns in the spreadsheet. It may be that the features of the mine were assigned risk ratings on the basis of how that feature would ordinarily affect the surrounding environment. In any case, it is clear that the full environmental impact of an overwhelming majority of the known abandoned mines cannot be known because a site inspection has not been completed.

Mr Kadletz gave evidence that flood risk was not a risk directly taken into account by the review, but might have formed part of the incorporation of environmental risks.<sup>307</sup> He agreed that to obtain information on the effects of flood, some sort of observation or monitoring of those effects was necessary.<sup>308</sup>

The Department of Employment, Economic Development and Innovation's risk assessment process had these obvious limitations:

- it did not involve site inspections, and was done as a desktop exercise
- it did not take into account economic, social or flooding risks
- the extent to which environmental risks were considered is not discernible
- it did not involve parties with an interest and who might have valuable information, such as industry and the community.

The new abandoned mines database proposed by the Department of Employment, Economic Development and Innovation will contain a new risk assessment module.<sup>309</sup> No evidence was provided by the department as to how this risk assessment module would function. If it is to rely on the information currently available in the database, it will continue to be inadequate. It seems unlikely that the department will be able to undertake a proper risk assessment of the bulk of abandoned mines without considerably more funding.

Dr Laurence gave evidence that a risk assessment should be conducted by a group which includes local landholders and experts who, collectively, have knowledge of the mine and relevant technical expertise (for example, geotechnical or hydrological).<sup>310</sup>

### Prioritisation of sites for site inspection

Mr Kadletz agreed with Dr Laurence that a physical inspection of a site was essential when making a risk assessment<sup>311</sup> and was necessary to obtain an understanding of the effects the mine might have on the environment during flooding.<sup>312</sup> He gave evidence that there was no current plan to do site inspections of all known abandoned mines,<sup>313</sup> citing the program's lack of funding as the reason.<sup>314</sup>

Mr Kadletz estimated that there were 120 to 130 medium sized abandoned mine sites most likely to have infrastructure, such as tailings dams, that might be affected by flood.<sup>315</sup> The risk assessment spreadsheet indicates that there are 317 giant, very large, large or medium sized abandoned mines.<sup>316</sup> These are the mines that should be prioritised for physical site inspection.

### Prioritisation of sites for rehabilitation

It is clear that the Queensland Government cannot commence rehabilitation work at all 15 000 abandoned mines in Queensland immediately. It may be that there is no need to accelerate the rehabilitation of some mines, if they are low risk but will take substantial resources to rectify. The risk assessment process and completion of site inspections will assist in prioritisation of sites for rehabilitation.

The Department of Employment, Economic Development and Innovation, in using its resources, currently gives priority to abandoned mine sites that:

- have been the subject of community concerns<sup>317</sup>
- are already the subject of rehabilitation programs, including Mt Morgan mine, Mt Oxide mine, Horn Island and Croydon<sup>318</sup>
- were identified as the highest risk sites by the desktop risk assessment performed in 2005.<sup>319</sup>

This method of prioritisation is inappropriate. As already explained, it is not the product of any proper risk assessment. Nor is it systematic, being, at least in part, reactive to concerns expressed by the community. Mr

Kadletz said that it worked well, proposing Mt Oxide as an example of a high-risk remote site identified to the Department of Employment, Economic Development and Innovation by a land holder.<sup>320</sup> But the lack of data held on abandoned mines makes it impossible to determine whether the Mt Oxide case is representative, or whether it is simply an instance in which the affected land holder was particularly persistent or attentive.

A particular problem arises with respect to remote sites, which are assigned a lesser risk number than mines close to communities.<sup>321</sup> Remoteness from relevant populations may be a factor lowering risk, but that very distance increases the chance that high levels of environmental damage are occurring without the department's knowledge. As Mr Kadletz agreed, because of remoteness and the lack of consideration of flooding in the risk assessment, sites with problems like those of Mt Oxide will not be prioritised for a full risk assessment.<sup>322</sup>

## Rehabilitation

Once it is established which mines should be rehabilitated, decisions must be made about what rehabilitation activities will be undertaken. The first step is to commission the further studies and investigations necessary to obtain a list of options for rehabilitation. Such studies and investigations will depend on the individual mine and may involve:

- hydrological studies to gain an understanding of overland flow and groundwater<sup>323</sup>
- geotechnical studies to investigate the stability and competency of any pit walls, tailings dams or levees<sup>324</sup>
- characterising the waste material present on the site<sup>325</sup>
- evaluating the mine for potential reopening.<sup>326</sup>

Once those investigations are complete, the decision as to the rehabilitation measures that should be taken will depend on the particular characteristics of the site and the resources available.

## Recommendations

13.18 The Department of Employment, Economic Development and Innovation should assemble all information currently available to the abandoned mine land program into a single database. The Queensland Government should ensure, using whatever information is available, that the list of abandoned mines is as complete as possible. This should at least include a review of all information held by the Department of Environment and Resource Management and the Department of Employment, Economic Development and Innovation.

13.19 The Queensland Government should seek information about the size, features and condition of abandoned mines, including whether the mine or its surrounding environment were adversely affected by flood, from private landholders who have abandoned mines on their properties.

## (Endnotes)

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| <p>1 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4766: line 2].</p>  | <p>Exhibit 746, Statement of Pier Westerhuis, 26 September 2011 [p7: para 24].</p>  |
| <p>2 For example, see Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p7: para 32-34], Annexure SJR6; Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3073: line 26]; Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p2: para 8]; Exhibit 746, Statement of Pier Westerhuis, 26 September 2011 [p5: para 9(c)]; Exhibit 606, Statement of Mark Heaton, 6 September 2011 [p2: para 5].</p> | <p>4 State Budget 2010-2011 Mid Year Fiscal and Economic Review [p7].</p>   |
| <p>3 For example, see Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p10: para 56(a)];</p>   | <p>5 Budget Paper 2 - Budget Strategy and Outlook 2011-2012 [p59].</p> <p>6 Budget Paper 2 - Budget Strategy and Outlook 2011-2012 [p60].</p> <p>7 Percentage calculated from \$257.707 billion gross state product – Qld State Accounts for the June Quarter 2011 [p17].</p> |

- 8 Exhibit 945, Statement of Michael Roche, 26 October 2011, Annexure 2, Item 27.
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- 9 Section 3, *Environmental Protection Act 1994*.
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- 10 Submission of the Queensland Resources Council, 11 March 2011; Submission of Rio Tinto Coal Australia Pty Ltd, 11 March 2011; Submission of Anglo American Metallurgical Coal Pty Ltd, 1 April 2011.
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- 11 Submissions of the Queensland Greens, 4 April 2011, 8 April 2011, 20 September 2011; Submission of the Queensland Conservation Council, 4 April 2011.
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- 12 Submission of the State of Queensland, DERM-06 [p15-16].
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- 13 Submission of Rio Tinto Coal Australia Pty Ltd, 11 March 2011 [p3]; Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p2: para 10(c); p6: para 25, 27].
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- 14 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p2: para 11].
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- 15 Exhibit 1018, First Statement of Pier Westerhuis, 12 May 2011 [p1: para 3].
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- 16 Submission of Anglo American Metallurgical Coal [p1].
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- 17 Submission of Anglo American Metallurgical Coal [p1].
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- 18 Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p2: para 6, 7].
- 
- 19 Exhibit 738, Statement of Robert Lawrence, 27 September 2011 [p2: para 4].
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- 20 Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3069: line 29].
- 
- 21 Transcript, Graham Cordingley, 8 November 2011, Brisbane [p4688: line 50].
- 
- 22 Transcript, Graham Cordingley, 8 November 2011, Brisbane [p4689: line 15].
- 
- 23 Transcript, Karl Spaleck, 5 October 2011, Brisbane [p3727: line 54].
- 
- 24 Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3070: line 6].
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- 25 Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3069: line 46].
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- 26 Section 3 of the *Environmental Protection Act 1994* states ‘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)’.
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- 27 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p5: para 28]; Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p5: para 22]; Exhibit 746, Statement of Pier Westerhuis, 26 September 2011 [p6: para 15]; Transcript, Karl Spaleck, 5 October 2011, Brisbane [p3731: line 16]; Transcript, Stuart Ritchie, 22 November 2011, Brisbane [p3091: line 26]; Transcript, Robert Lawrence, 8 November 2011, Brisbane [p4790: line 1].
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- 28 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4770: line 15].
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- 29 Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3091: line 19].
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- 30 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p5: para 22].
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- 31 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p5: para 29-31].
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- 32 Exhibit 606, Second Statement of Mark Heaton, 15 September 2011 [p1: para 1].
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- 33 Exhibit 606, Second Statement of Mark Heaton, 15 September 2011 [p1: para 1].
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- 34 Exhibit 746, Second Statement of Pier Westerhuis, 26 September 2011 [p5: para 12(a)].
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- 35 Exhibit 748, Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p2: para 9].
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- 36 Exhibit 923, Statement of Graham Cordingley, 26 September 2011 [p4: para 17; p5: para 23].
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- 37 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p6: para 42]; Exhibit 933, Statement of Andrew Brier (Rolleston), 27 September 2011 [p2: para 10].
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- 38 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p5: para 34].
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- 39 Transcript, Karl Spaleck, 5 October 2011, Brisbane [p3731: line 23]; Exhibit 606, Second Statement of Mark Heaton, 15 September 2011 [p1: para 1].
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- 40 Correspondence from Commonwealth of Australia, 1 December 2011, Request for information- Bureau of Meteorology – Forecasting relevant to the mining industry [p2: para 2].
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- 41 Exhibit 738, Statement of Robert Lawrence (Century Mine), 27 September 2011 [p2: para 8]; Transcript, Robert Lawrence, 8 November 2011, Brisbane [p4788: line 28].
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- 42 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p2: para 9].
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- 43 Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p2: para 8].
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- 44 Exhibit 748, Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p2: para 8, 11]; Annexures ASB-E01-01 – ASB-E01-05.
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- 45 Exhibit 937, Statement of Andrew Brier (Dawson), 27 September 2011 [p2: para 8].
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- 46 Exhibit 738, Statement of Robert Lawrence (Century Mine), 27 September 2011 [p2: para 9]; Annexure RAL-CM01-03; Annexure RAL-CM-01-06; Transcript, Robert Lawrence, 8 November 2011, Brisbane [p4787: line 52; p4788: line 1].
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- 47 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4767: lines 8-12]; Exhibit 748, Statement of Andrew Brier (Ensham), 27 September 2011 [p1: para 4]; Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011; Exhibit 933, Statement of Andrew Brier (Rolleston), 27 September 2011 [p1: para 4]; Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p1: para 4]; Exhibit 936, Statement of Andrew Brier – (Moranbah North), 27 September 2011 [p1: para 4]; Exhibit 937, Statement of Andrew Brier (Dawson), 27 September 2011 [p1: para 4].
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- 48 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p28: para 166].
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- 49 Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p7: para 33]. Water storages at mine sites are required to have a limited safety margin (or 'freeboard') that can be temporarily consumed if needed. This is generally how the storages are able to be above 100 per cent capacity. See Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3072: line 14].
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- 50 Submission of Rio Tinto Coal Australia Pty Ltd [p3].
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- 51 Submission of Rio Tinto Coal Australia Pty Ltd [p3]; Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3074: line 1].
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- 52 Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p4: para 19].
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- 53 Submission of Rio Tinto Coal Australia Pty Ltd [p3]; Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p11: para 64].
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- 54 Submission of Rio Tinto Coal Australia Pty Ltd, 11 March 2011 [p3].
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- 55 Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p11: para 64].
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- 56 Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p12: para 64].
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- 57 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p8: para 57].
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- 58 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p3: para 21-25].
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- 59 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p8: para 60].
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- 60 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p8: para 56].
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- 61 Exhibit 938, Statement of Glenn Burlinson, 19 October 2011 [p3: para 20].
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- 62 Exhibit 1018, First Statement of Pier Westerhuis, 12 May 2011 [p1: para 6].
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- 63 Exhibit 1018, First Statement of Pier Westerhuis, 12 May 2011 [p1: para 6].
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- 64 Exhibit 746, Second Statement of Pier Westerhuis, 26 September 2011 [p7: para 24].
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- 65 Exhibit 941, Third Statement of Pier Westerhuis, 2 November 2011 [p7: para 19].
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- 66 Exhibit 606, Second Statement of Mark Heaton, 15 September 2011 [p2: para 3].
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- 67 See section 13.6.1 The Moranbah North Emergency Direction.
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- 68 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 25]; Annexure ASB-MN03-15.
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- 69 Exhibit 937, Statement of Andrew Brier (Dawson Mine), 27 September 2011 [p3: para 14].
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- 70 Exhibit 606, Statement of Mark Heaton, 6 September 2011 [p2: para 5].
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- 71 Statement of Carl Grant, 1 November 2011 [p6: para 10].
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- 72 Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p4: para 25].
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- 73 Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p4: para 28].
- 74 Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p4: para 29]; Annexure ASB-MCSG02-09.
- 75 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p1: para 4].
- 76 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p1: para 3].
- 77 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p1: para 3].
- 78 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p2: para 6].
- 79 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p2: para 8].
- 80 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p3: para 9(c)(ii)].
- 81 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p2: para 8].
- 82 Exhibit 737, Statement of Karl Spaleck, 30 September 2011 [p2: para 7]; Exhibit 738, Statement of Robert Lawrence, 27 September 2011 [p4: para 18]; Annexure RAL-CM02-04.
- 83 Submissions of the Queensland Greens, 4 April 2011, 8 April 2011, 20 September 2011; Submission of the Queensland Conservation Council, 4 April 2011.
- 84 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p25: para 147]; Exhibit 748, Statement of Andrew Brier (Ensham), 27 September 2011 [p11: para 64]; Exhibit 933, Statement of Andrew Brier (Rolleston), 27 September 2011 [p11: para 61]; Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p12: para 65]; Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p12: para 70]; Exhibit 937, Statement of Andrew Brier (Dawson), 27 September 2011 [p12: para 65].
- 85 Transcript, Michael Birchley, 9 November 2011, Brisbane [p4801: line 30]; Transcript, Andrew Brier, 8 November 2011, Brisbane [p4779: line 30].
- 86 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p26: para 149, 152]; Exhibit 748, Statement of Andrew Brier (Ensham), 27 September 2011 [p12: para 66, 69]; Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p13: para 90]; Exhibit 933, Statement of Andrew Brier – (Rolleston), 27 September 2011 [p12: para 63, 66]; Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p12: para 67, 70]; Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p12: para 72, p13: para 75]; Exhibit 937, Statement of Andrew Brier (Dawson), 27 September 2011 [p12: para 67; p13: para 70].
- 87 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4780: line 29].
- 88 Statement of Julia Playford, 24 November 2011 [p3: para 12, 15].
- 89 Statement of Peter McGinnity, 24 November 2011 [p11: para 40].
- 90 Statement of Julia Playford, 24 November 2011 [p3: para 12]; Statement of Peter McGinnity, 24 November 2011 [p3: para 10].
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- 93 Statement of Julia Playford, 24 November 2011 [p4: para 19-26]; Statement of Peter McGinnity, 24 November 2011 [p7: para 21-24].
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- 100 Sections 148 and 330 of the *Environmental Protection Act 1994*.
- 101 Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p3: para 15]; Exhibit 933, Statement of Andrew Brier (Rolleston), 27 September 2011 [p4: para 16]; Exhibit 748,

- Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p3: para 15]; Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p13: para 16]; Exhibit 937, Statement of Andrew Brier (Dawson Mine), 27 September 2011 [p4: para 15].
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- 102 See Exhibit 738, Statement of Robert Lawrence, 27 September 2011 [p4: para 19]; Exhibit 924, Statement of Andrew Brier (Moranbah CSG), 27 September 2011 [p5: para 30].
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- 103 Section 18(b), *Environmental Protection Act 1994*.
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- 104 Sections 426, 426A, *Environmental Protection Act 1994*.
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- 105 See sections 148(4), 168A, 168B and 176, *Environmental Protection Act 1994*.
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- 106 Section 430, *Environmental Protection Act 1994*.
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- 107 Section 162, *Environmental Protection Act 1994*. An environmental impact statement outlines the potential adverse and beneficial environmental, economic and social impacts of the project, and proposes solutions to minimise any harm. See section 40(a) of the *Environmental Protection Act 1994*.
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- 108 Section 163B, *Environmental Protection Act 1994*.
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- 109 Section 39, *Environmental Protection Act 1994*.
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- 110 Exhibit 748, Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p14: para 81].
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- 111 Exhibit 746, Statement of Pier Westerhuis, 26 September 2011, Annexure PW-14-17 [p11: para 50-55]; Exhibit 748, Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p14: para 81].
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- 112 Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p14: para 82].
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- 113 Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p14: para 82].
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- 114 Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p14: para 83].
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- 115 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p13: para 73 – p14: para 75].
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- 116 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p13: para 73 – p14: para 79].
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- 117 Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p15: para 83].
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- 118 Exhibit 949 Statement of Frances Hayter, 7 September 2011, Annexure C, items 2, 4 [p6: para 13]; Submission of the Queensland Resources Council, 11 March 2011 [p8].
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- 119 Submission of the Qld Resources Council [p7]; Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p14: para 76].
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- 120 Exhibit 747, Statement of Michael Birchley, 5 September 2011, Annexure MFB-06-01c [p6]; Exhibit 604, Statement of Stuart John Ritchie, 14 September 2011 [p5: para 18(c)(ii)]; Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3071: lines 38-40]; Transcript, Michael Roche, 10 November 2011, Brisbane [p4862: line 21-28].
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- 121 Transcript, Michael Roche, 10 November 2011, Brisbane [p4862: line 39].
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- 122 Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p3: para 15]; Exhibit 933, Statement of Andrew Brier (Rolleston), 27 September 2011 [p4: para 16]; Exhibit 748, Statement of Andrew Brier (Ensham Mine), 27 September 2011 [p3: para 15]; Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p3: para 16]; Exhibit 937, Statement of Andrew Brier (Dawson Mine), 27 September 2011 [p4: para 15].
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- 126 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4766: line 22].
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- 128 Exhibit 945, Statement of Michael Roche, 26 October 2011 [p12: para 53].
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- 129 For example see Exhibit 934, Statement of Andrew Brier (Hail Creek), 27 September 2011 [p2: para 10].
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- 130 Exhibit 746, Statement of Pier Westerhuis, 26 September 2011 [p5: para 9(c)]; Exhibit 748,

- Statement of Andrew Brier (Ensham), 27 September 2011 [p3: para 14; p14: para 82].
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- 144 Exhibit 747, Statement of Michael Birchley, 5 September 2011, Annexure MFB-06-24b, Fitzroy Model Conditions 2011 [p5]; Exhibit 949, Statement of Frances Hayter, 7 September 2011 [p12: para 22(a)].
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- 149 See section 13.5.1 *DERM's approach to granting transitional environmental programs in the 2010/2011 wet season*.
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- 150 Exhibit 949, Statement of Frances Hayter, 7 September 2011 [p11: para 19 – p19: para 42].
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- 154 Section 330 of the *Environmental Protection Act 1994*. See section 13.5.4 *A proper use of transitional environmental programs?*
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- 155 Sections 332-333 of the *Environmental Protection Act 1994*.
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- 156 Section 337 of the *Environmental Protection Act 1994*.
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- 157 Section 346 of the *Environmental Protection Act 1994*.
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- 158 Transcript, Michael Birchley, 9 November 2011, Brisbane [p4797: line 38]; Transcript, Andrew Brier, 8 November 2011, Brisbane [p4774: line 33].
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- 159 Transcript, Michael Birchley, 9 November 2011, Brisbane [p4797: line 38].
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- 160 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4767: line 44; p4768: line 10].
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- 161 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4769: line 1].
- 162 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4769: line 1; p4769: line 48]. See for example, the directions given to Rio Tinto: Statement of Stuart Ritchie, 14 September 2011, Annexure SJR 7.12.
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- 165 Transcript, Michael Roche, 10 November 2011, Brisbane [p4864: line 19 – p4868].
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- 170 Exhibit 604, Statement of Stuart Ritchie, 14 September 2011 [p8: para 42; p9: para 50]; Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3078: line 14].
- 171 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4770: line 42; p4771: line 21].
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- 175 Section 338(1)(b)(ii), *Environmental Protection Act 1994*.
- 176 Section 338(1)(b)(iii), *Environmental Protection Act 1994*; Exhibit 747, Statement of Michael Birchley, 5 September 2011 [p8: para 42].
- 177 Schedule 4, *Environmental Protection Act 1994*.
- 178 Section 51(1)(a), *Environmental Protection Regulation 2008*.
- 179 Section 51(1)(aa), *Environmental Protection Regulation 2008*; Section 9, *Environmental Protection Act 1994* defines environmental value as ‘(a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or (b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation’.
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- 181 Section 51(1)(b), (c), *Environmental Protection Regulation 2008*.
- 182 Section 51(1)(e), *Environmental Protection Regulation 2008*.
- 183 Section 51(1)(d), *Environmental Protection Regulation 2008*.
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- 186 Section 49, *Environmental Protection Regulation 2008*.
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- 201 Transcript, Michael Birchley, 9 November 2011, Brisbane [p4793: line 50 – p4794: line 20].
- 202 Exhibit 604, Statement of Stuart John Ritchie, 14 September 2011 [p10: para 55]; Transcript, Stuart Ritchie, 22 September 2011, Brisbane [p3079: lines 30-40].
- 203 Exhibit 746, Statement of Pier Westerhuis, 26 September 2011 [p8: para 30].
- 204 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4777: line 22].
- 205 Exhibit 945, Statement of Michael Roche, 26 October 2011 [p8: para 30 – p11: para 50]; Annexure 2, items 10-28; Transcript, Michael Roche, 10 November 2011, Brisbane [p4860-61; 4877-4892]; Exhibit 949, Statement of Frances Hayter, 7 September 2011 [p19: para 43].
- 206 Exhibit 945, Statement of Michael Roche, 26 October 2011 [p10: para 40, 41; p11: para 49-50]; Annexure 2, items 18,19,27 and 28.
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- 208 Exhibit 945, Statement of Michael Roche, 26 October 2011, Annexure 2, item 20.
- 209 Transcript, Michael Roche, 10 November 2011, Brisbane [p4859: line 25].
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- 211 Section 493A(2)(g), *Environmental Protection Act 1994*.
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- 213 Exhibit 949, Statement of Frances Hayter, 7 September 2011 [p19: para 43]; Submission of Queensland Resources Council [p8].
- 214 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4778: line 21].
- 215 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 27]; Annexure ASB-MN-03-01.
- 216 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 27]; Annexure ASB-MN-03-01; Transcript, Andrew Brier, 8 November 2011, Brisbane [p4778: line 11].
- 217 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 22]; Annexure ASB-MN-03-01.
- 218 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 22]; Annexure ASB-MN-03-02.
- 219 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 23]; Annexure ASB-MN-03-03, ASB-MN-03-04.
- 220 Exhibit 936, Statement of Andrew Brier (Moranbah North), 27 September 2011 [p5: para 27]; Transcript, Andrew Brier, 8 November 2011, Brisbane [p4781: line 26].
- 221 Statement of Carl Grant, 1 November 2011 [p2: para 2(f)].
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- 225 Transcript, Michael Roche, 10 November 2011, Brisbane [p4860: line 50].
- 226 Transcript, Michael Birchley, 8 November 2011, Brisbane [p4799: line 41].
- 227 As described above, this position was not necessarily a rejection of what the Queensland Resources Council was requesting, as the details of the request were unclear.
- 228 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4777: line 46]; Exhibit 747, Statement of Michael Birchley, 5 September 2011, Annexure MFB-03-37.
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- 231 Exhibit 937, Statement of Andrew Brier (Dawson), 27 September 2011 [p5: para 19].
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- 233 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4776: line 39].
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- 238 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p4: para 13].
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- 244 Exhibit 942, Statement of Rob Lawrence (Mt Oxide), 27 September 2011, Annexure RAL-MO01-01 [p3].
- 245 Exhibit 608, Statement of Oskar Kadletz, 20 September 2011 [p1: para 3].
- 246 Exhibit 942, Statement of Rob Lawrence (Mt Oxide), 27 September 2011, Annexure RAL-MO01-01 [p6].
- 247 Transcript, Oskar Kadletz, 22 September 2011, Brisbane [p3106: line 54].
- 248 Exhibit 608, Statement of Oskar Kadletz, 20 September 2011 [p6: para 26].
- 249 Exhibit 942, Statement of Rob Lawrence (Mt Oxide), 27 September 2011, Annexure RAL-MO01-01 [p7].
- 250 Exhibit 608, Statement of Oskar Kadletz, 20 September 2011 [p3: para 11]; Transcript, Oskar Kadletz, 22 September 2011, Brisbane [p3108: line 37].
- 251 Transcript, Oskar Kadletz, 22 September 2011, Brisbane [p3108: line 37].
- 252 Exhibit 942, Statement of Rob Lawrence (Mt Oxide), 27 September 2011 [p4: para 17].
- 253 Exhibit 942, Statement of Rob Lawrence (Mt Oxide), 27 September 2011 [p4: para 17(a)].
- 254 Exhibit 608, Statement of Oskar Kadletz, 20 September 2011 [p7: para 27].
- 255 Transcript, Oskar Kadletz, 22 September 2011, Brisbane [p3110: line 10].
- 256 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p2: para 11; p3: para 16].
- 257 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p8: para 45].
- 258 Transcript, Andrew Brier, 8 November 2011, Brisbane [p4761: line 20].
- 259 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p14-15: para 80].
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- 288 Ministerial Council on Mineral and Petroleum Resources and the Minerals Council of Australia, Strategic Framework for Managing Abandoned Mines in the Mineral Industry, 2010 [p15].
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- 299 Transcript, David Laurence, 7 November 2011, Brisbane [p4681: line 51].
- 300 Transcript, David Laurence, 7 November 2011, Brisbane [p4682: lines 5-12].
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- 302 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4743: line 40; p4747: lines 36-52].
- 303 Exhibit 932, Working Risks Spreadsheet, 8 November 2011.
- 304 Exhibit 932; Transcript, 8 November 2011, Brisbane [p4743: line 40 – p4746: line 11].
- 305 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4746: line 23].
- 306 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4746: line 48].
- 307 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4746: line 52].
- 308 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4749: line 19-23].
- 309 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4747: line 42 – p4748: line 15].
- 310 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p4: para 15]; Transcript, David Laurence, 7 November 2011, Brisbane [p4680: line 56; p4682: line 16].
- 311 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4748: line 20-22].
- 312 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4750: line 50-56].
- 313 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4748: line 29-31; p4751: line 2].
- 314 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4748: line 40 – p4749: line 11; p4750: lines 1-13].
- 315 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4750: lines 21-48].
- 316 (7 giant, 6 very large, 77 large and 227 medium): Exhibit 932, Work Risks Spreadsheet, 8 November 2011.
- 317 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p7: para 43(a)].
- 318 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p7: para 43(b)].
- 319 Exhibit 929, Second Statement of Oskar Kadletz, 3 November 2011 [p7: para 43(c)].
- 320 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4749: line 53 – p4750: line 6].
- 321 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4746: line 38].
- 322 Transcript, Oskar Kadletz, 8 November 2011, Brisbane [p4749: lines 43-49].
- 323 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p6: para 22 – p7: para 24]; Transcript, David Laurence, 7 November 2011, Brisbane [p4678: line 51].
- 324 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p6: para 22 – p7: para 24]; Transcript, David Laurence, 7 November 2011, Brisbane [p4680: line 5].
- 325 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p6: para 22 – p7: para 24]; Transcript, David Laurence, 7 November 2011, Brisbane [p4679: line 29].
- 326 Exhibit 922, Report of Associate Professor Laurence, Flooding and Abandoned Mines, 4 November 2011 [p6: para 22 – p7: para 24]. Note also economic opportunities that may be available at abandoned mines: see Ministerial Council on Mineral and Petroleum Resources and the Minerals Council of Australia, Strategic Framework for Managing Abandoned Mines in the Mineral Industry, 2010 [p9].