

Indigenous perspectives on closure and abandonment of mines and oil wells

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Abstract

The past five years has shown a massive increase in exploration for minerals, oil and gas in the on-shore and offshore areas of Australia's Northern Territory. Although many Aborigines are now quite familiar with land-based mining, proposals to mine the seafloor or use reservoir stimulation (hydraulic fracturing) for production of oil and gas are relatively new to them. Aboriginal perceptions of mine closure are affected by historical practices that have led to a number of legacy sites and there is consequently a developing concern that further environmental degradation will also result from modern practices and techniques.

This paper primarily seeks to discuss the rationale behind Aboriginal concerns and examines standards currently applied to mine closure and well abandonment. The outcomes are placed in the context of Aboriginal cultural and ecological knowledge; and the inclusion of improved standards for closure in Agreements related to mining and oil and gas production in the Northern Territory is discussed.

1 Introduction

The twin concepts of Corporate Social Responsibility and the Social Licence to Operate require effective stakeholder engagement by the resources industry. This can become difficult where the need to cross a significant cultural divide exists. Significant cultural divides occur frequently where the mining industry comes into contact with indigenous systems, such as those belonging to Aboriginal Australia, who hold worldviews somewhat different to that of industry. Industry executives and managers often find these differences hard to overcome, particularly where materialism and scientific philosophy are confronted by indigenous spiritual considerations.

Unfortunately, there appears to be few papers that address the indigenous worldview and spirituality as they relate to stakeholder engagement and project closure. Many of these papers are anthropological discourses and provide insight into the indigenous perspective of the origin of resources (Ernst, 2004), but few (Keen, 2004; Kirsch, 2004) actually provide traditional ecological information that might be of value for development of mine closure plans. In the absence of a detailed indigenous perspective, it becomes difficult to argue that the goals of stakeholder engagement at any phase of mining can be effectively achieved.

Aboriginal people talk about ecological systems from a holistic perspective – one that considers that if you are doing the right thing, there will be positive social and spiritual as well as ecological outcomes (Rose, 1996). Consequently, Aboriginal people are likely to hold different views on how the post-mining environment should be constructed and how it might or should be used; and this may lead to a different perception of the success or otherwise of the mine closure process that might be held by industry. The Aboriginal perception is also greatly affected, not only by the impacts they see resulting from active mining operations, but also in the legacies of mines where rehabilitation is seen to have failed.

Since 2007, the Northern Land Council (NLC) has been working a project to understand the Aboriginal view with respect to the environment and implement steps where this view can be incorporated into all aspects of the mining process, from pre-mining environmental impact assessments to post-closure stewardship. To date, this has included work on rehabilitation and closure at a number mines around the Northern Territory, including Ranger Uranium Mine, Rum Jungle, Woodcutters and several legacy sites in the South Alligator Valley. Steps are also being taken to apply the same understanding to an active mine at Gove;

prior to mining at the Western Desert Iron Ore project; and now to a burgeoning on-shore oil and gas industry.

The NLC project seeks first to understand the complex interplay between the natural environment and belief systems and second, to tie traditional knowledge and land management practices together with modern scientific principles. The aim is to develop a set of cultural tools that can be incorporated into environmental management processes at all phases of exploration, mining and oil and/or gas production. Tools thus far developed include cultural risk assessments, cultural landscaping and a tie-in between traditional ecological knowledge and environmental engineering.

This paper details the concerns and perspectives of Aboriginal people that provided the background against which those tools were developed. It highlights how Aboriginal people interpret environmental impacts and mine closure activities in terms of their belief systems and provide limited insight into some of the spiritual and psychological concepts that are involved. Even though there will be some argument that this is not a strictly scientific approach, it is one that needs to be taken if mine closure practitioners are to meet the aim of closing mines in a manner that is culturally (and therefore socially) acceptable to all affected landowners.

2 Methodology

Information was gathered by two methods: participative discussion and survey by questionnaire. All discussions were undertaken in accordance with protocols and procedures developed and refined by the NLC over the past 30 years and previously reported (Smith, 2012). Data was initially collected from records of over 300 separate consultations across a period of five years and involved more than 20 distinct Aboriginal groups. These consultations represent a part of the process of free, prior and informed consent required for decision making with respect to mining, and exploration for minerals, oil and gas. Statistical analysis has not been applied to this information but it was scrutinised closely to uncover common themes and provide insight into the rationale behind concerns raised.

A basic questionnaire style survey was used to determine a semi-quantitative understanding of the perceptions held by Aboriginal people of how mining affects the environment and to identify the matters that were of principal concern at mine closure. The survey was undertaken with three culturally distinct groups of Aboriginal landowners (Biniŋ from the Jabiru region; Yolŋu from the Gove Peninsula and Kurdanji from Borroloola), all of who are affected by large mining projects. Each group's geographical location is shown in Figure 1. Individual responses to the questionnaires were recorded, and then group discussion was held to generate a consensus response in accordance with traditional Aboriginal decision-making processes. All participation was voluntary and these surveys were undertaken in accordance with ethical requirements of the Charles Darwin University in Darwin (Charles Darwin University, 2009).

3 Results

Outcomes of the surveys and consultations were consistent across groups and within each group (where subsequent analysis was determined using sub-groups based on gender and geographical location). Greater than 90% of respondents indicated that they had serious concerns about how mining was affecting the environment – especially water, land, traditional food sources and personal health. There was an almost equal split across the four basic elements (land, water, food and air) identified by respondents as their principal concern. This is shown in Figure 2.

Of all the respondents, 67% also felt that communication and consultation on environmental matters was poor, leading to a high degree of distrust directed towards mining companies and regulators. Only 45% of respondents believed that the mining companies had sufficient knowledge to rehabilitate the environment effectively, while more than 80% considered that traditional ecological knowledge had a role to play in design of a useful post-mining environment and development of rehabilitation and mine closure plans.

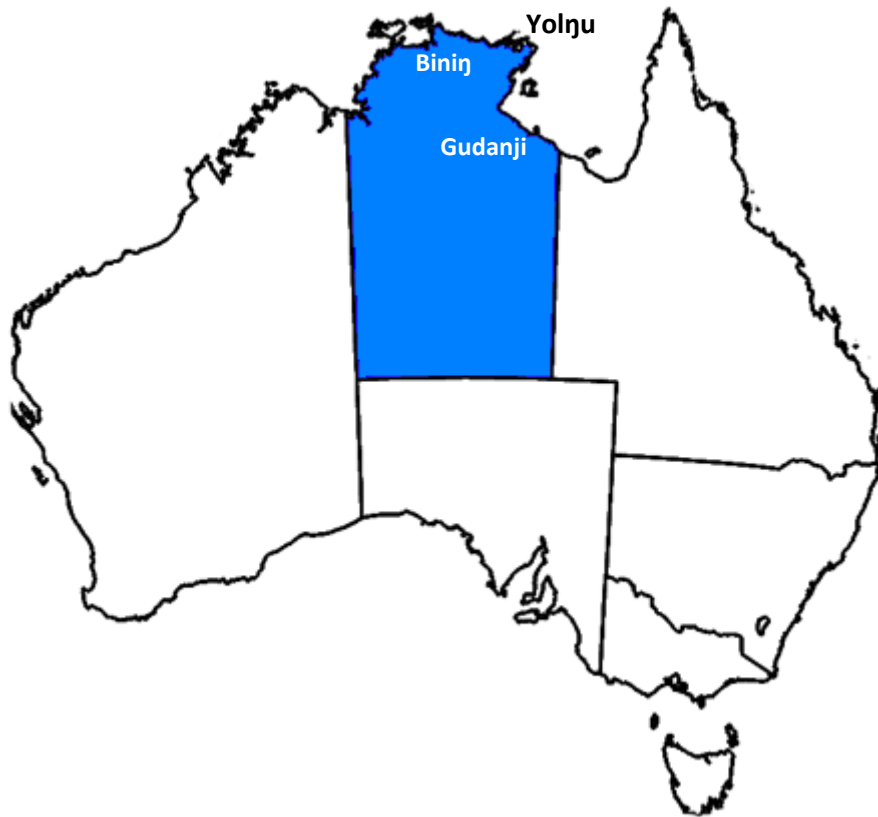


Figure 1 Approximate locations of the three surveyed Aboriginal land owner groups in the Northern Territory

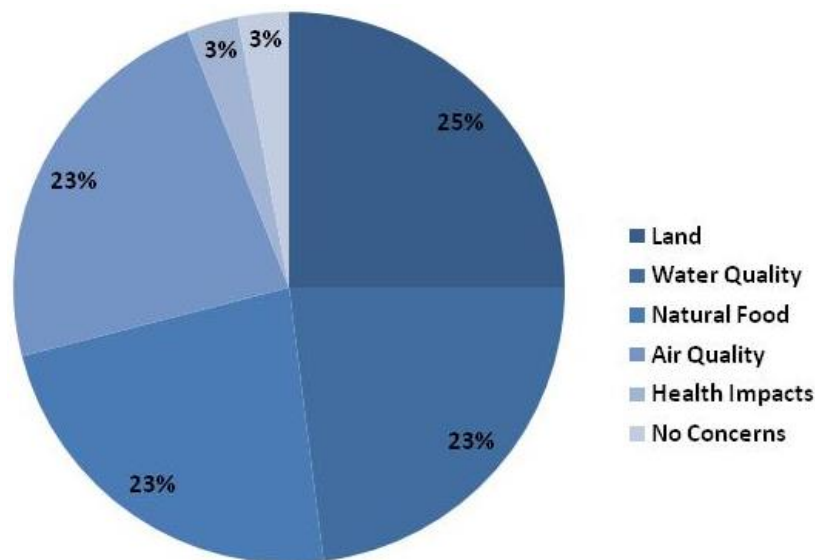


Figure 2 Principal concerns about the physical environment

Outcomes from on-country consultations as part of the process of free, prior and informed consent with respect to mining and oil and gas exploration projects support the survey results (Smith, 2008). Although there is no statistical summary for information gathered under these circumstances, discussions indicate that impacts on the natural environment (especially water and natural foods) are of paramount concern to Aboriginal people. Considerable frustration is often expressed at the on-going environmental damage caused by 'closed' or abandoned mines; and there is some degree of angst that their concerns will continue to be ignored when the time comes for closure of operating mines and abandonment of oil and gas wells.

4 Discussion

This paper focuses on two of the main concerns namely water quality and land and interprets them in terms of Aboriginal belief systems. Concerns related to air quality and natural foods will be discussed in respect to their relationships to the land. The paper also focuses briefly on communication problems and what this means in terms of land management and control. Many concepts that are 'alien' to a strictly scientific approach will be discussed in a manner intended to inform those readers not familiar with such an approach. However, it is an essential and necessary analysis in order to better understand how to make the most of the nexus between traditional knowledge and engineering principles at all phases of resource production. In taking this approach, a better understanding of alternative worldviews might be obtained and blueprints developed, that lead to a higher quality and level of stakeholder engagement applicable to Aboriginal landowners at time of mine closure.

4.1 The cultural importance of water

Water is a sacred element and a symbol of life in the belief systems of Australian Aborigines (Langton, 2006) while aquatic resources represent an important part of the indigenous economy. Of primary importance are the spiritual values of groundwater that involve serpents and snakes (McDonald et al., 2005; Goode and Irvine, 2003; Yu, 1999). These creatures are believed to have created most major rivers, smaller creeks, springs and lakes and left other environmental features, including caves and other limestone formations as they travelled through the landscape. Their health and wellbeing is directly connected to the vitality of groundwater features, and intertwined with the health of Aboriginal cultural identity. If they depart, then the features with which they are associated will dry up and the processes of renewal will be brought to an end. They are also considered a bringer of justice – bringing good things to those who perform good acts for their community, and malevolence to those who do not.

These values are, at least partially, now recognised by Australian water standards. Under water quality guidelines (ANZECC & ARMCANZ, 2000), cultural and spiritual values may relate to a range of uses including spiritual relationships, sacred sites, customary use, the plants and animals associated with water, drinking water or recreational activities. This provides a meaningful backdrop against which an understanding of Aboriginal views about the importance of security and integrity of water supplies can be understood. The belief systems and water standards apply equally to groundwater and surface water, each of which will be discussed separately in this paper.

4.1.1 Groundwater quality

Aside from placing water into the context of their belief system, many remote Aboriginal communities in the Northern Territory rely on potable water aquifers for domestic and/or agricultural purposes. Groundwater feeds the springs and rivers; and is essential to the provision of a wide array of ecological services and the health and wellbeing of native flora and fauna. Each of these has a particular role in Aboriginal culture, so it is not surprising that contaminants are viewed as a flow of alien substances into the lifeblood of the community that affects custom and the Law (Strang, 2004). In the context of Aboriginal belief systems, high levels of contamination are seen as responsible for the departure of the serpent beings, which inevitably leads to destruction of ecological services followed by loss of flora and fauna.

The types of contaminants in groundwater and severity of their impact are dependent on the nature of the mine. For example, the extent of radionuclide contamination of groundwater beneath the Tailings Storage Facility at Ranger Uranium Mine remains largely unknown (URS, 2010). Concern has been raised in Parliament that this is seeping and will continue to seep into Kakadu National Park (Commonwealth of Australia, 2009). Mirarr landowners are aware of this development and what it implies both physically and culturally. A major failing of the Rum Jungle rehabilitation project was the lack of rehabilitation of groundwater, which receives saline water from the waste rock dumps and discharge of significant metal loads into the Finnis River (Parker, 1999; Taylor et al., 2003).

Production of oil and gas from shale using hydraulic fracturing requires the underground aquifers to be penetrated and the shale to be cracked using pressurised water and chemicals. This has created a concern amongst Aboriginal people that groundwater aquifers may undergo long-term and irreversible contamination by residual oil and gas leaking from improperly closed and abandoned wells, or from the chemicals used in the hydraulic fracturing process. Intuitively, the level of contamination by oil and/or gas will depend on the integrity of the well construction – especially the susceptibility of the steel casings and cements to corrosion – and the rate of seepage of residual oil and/or gas into the aquifer through the corroding well. Unfortunately, adequate answers to questions related to the rate of decay of wells or seepage of oil and gas into the aquifer cannot be provided.

4.1.2 Surface water quality

Surface water is viewed as essential to bringing life to the land and all of its inhabitants, human or otherwise. In the Aboriginal belief system, major surface watercourses and springs appear in places where the ancestral serpents come to the surface or return into the ground. Consequently, the impacts on groundwater and surface water are considered essentially to be the same. On-going pollution creates an unhealthy environment for the serpent and this accumulates to a point where the serpent departs and environmental decay begins.

In the post-mining physical environment, most contamination arises from Acid Mine Drainage leading to impacts on surface water quality and ultimately subsistence food resources. At Redbank mine (which is in 'care and maintenance'), nearby Hanrahan's Creek is acidic and contains high copper levels (Ecoz Environmental Services, 2009), which results in the water taking on a distinctive blue colour. High salt and chemical loads are reported to be present in the creeks and to seep from the overburden heaps at Rum Jungle (Robertson Geoconsultants, 2011). Mirarr carry a constant perception that even the low levels of contamination that are entering the Magela river system from the Ranger Uranium Mine are ultimately detrimental to the ecological systems of the creek and the downstream wetlands listed under the Ramsar Convention (the Convention on Wetlands of International Importance).

Past experiences coupled with an increase in understanding of the scientific aspects of mine site rehabilitation and a wider dissemination of information have left many Aboriginal people sceptical of the mining industry's ability to effectively rehabilitate waste dumps and prevent leakage of unwanted pollution into precious water systems. They see the linkages between the individual parts of the environment and consider how these also impact on their relationships with the overall landscape.

4.2 The cultural importance of land and all it contains

Relationships to the land are crucial to Australian Aboriginal people. Behind their belief system rests a philosophy that each individual belongs to certain territories within the family group and has spiritual connections and obligations to particular country. It is not a question of owning the land; but rather, one of belonging to the land. Aboriginal people experience the land as a symbolic, spiritual and cultural landscape rather than merely a physical environment.

The World Heritage Commission acknowledges that cultural landscapes represent the "combined works of nature and of man" (UNESCO, 2005). They often reflect specific techniques of sustainable land-use; and consider both the characteristics and limits of the natural environment they are established in and specific spiritual relations to nature. The Australian Aboriginal cultural landscape is one that reflects the song-lines, or paths across the land laid-out by ancestral beings. A knowledgeable person uses the words of the song, which describe the location of landmarks, waterholes, and other natural phenomena, to navigate across the landscape. This creates a sense of place and time that can become perturbed by rapid changes to the environment. The sense of place and time can remain perturbed after rehabilitation, because the environment and its underlying ecological systems are not returned in the same detail that existed before development. It has been observed that:

“Clearing of trees and digging of the earth is painful to us (Yolŋu) because it is like cutting your backbone. Even when rehabilitation is done well it is never the same again. Like at Yirrkala, the backbone has been broken and can’t be fixed properly that’s why the final mixture of trees is wrong. There are Dhuwa trees in Yirritja areas and Yirritja trees where Dhuwa should be. We become lost and no longer know where we are.” Dhanggal Gurruwiwi, 15/10/2008, pers. comm.

In this example, while a sustainable post-mining environment has been established, the correct vegetation patterns and song-lines remain disturbed and the sense of time and place has been lost.

Yolŋu resource management and conservation practices are linked to a number of environmental and seasonal cues. These cues link seemingly unrelated flora and fauna species, but indicate to Yolŋu the most appropriate time to search for specific food resources. A concern often expressed by Yolŋu relates to the potential for loss of these flora and fauna species of significance from the environment in the face of continued mining. Where the re-established environment is missing these natural cues, traditional hunting, gathering and land management practices may fall into decay. Consequently, Yolŋu consider the risk to traditional environmental management systems and to their physical, social and cultural survival has increased and is unlikely to be fully rectified once rehabilitation is undertaken at closure.

Environmental fragmentation brought about by the accumulation of infrastructure required for exploration and production of minerals, oil and gas is considered a major cultural and environmental concern. Much like the impacts of pollution on the water serpents, it weakens the environment’s natural resistance to invasion by weeds and leads to decreased biodiversity and species abundance. Although some weeds can be used and have gained some level of acceptance, others have spiritual and ecological concern.

Kungurikany-Warai people observe that high concentrations of Gamba grass has resulted in reduced animal populations and biodiversity at the Woodcutters and Rum Jungle mines. Their concerns are expressed through the totemic relationships they hold with animals and plants, which describe the highly localised associations between them and the native species with which descent is shared. They have always been linked together and Aboriginal people believe that when one suffers, so does the other. To them, loss of a totemic species represents not only a decrease in biodiversity and a natural resource – but a loss that permeates throughout the environment and into the human soul.

Belief systems also link ancestral beings to the creation of specific structures of land. For example, Mirarr consider Mount Brockman (*Djibi-Djibi*) to be a dangerous place because both it and surrounding water bodies filled with *djang* (evil spirits). A constant vigil is therefore required to ensure that people remain safe; and if the reconstructed landform does not permit Mirarr to maintain a close watch, an unacceptable risk will be created. Aboriginal people are always wary of the spiritual implications of remnant pit voids and waste rock and tailings impoundments.

In Aboriginal society, the ability to hold ceremony is of vital importance not only to the Law, but also to maintaining connectivity with the land and its resources, as well as maintaining the totemic relationships. Although it represents a minor aspect of closure in most circumstance, the ability to access sacred sites may be diminished by on-going exhalation of unsafe levels of natural gas from inadequately closed and abandoned wells or radon in the case of closed uranium mines. While areas may need to be isolated in the event of on-going high levels of exhaled gases, to the Aborigine this represents further diminishment of the environment and an inability to control the processes and ceremonies necessary for its full healing.

4.3 Loss of control over land management

The Federal Government has recognised that the history of uranium mining (in particular) in Australia and its impact on Aboriginal people is deplorable. Past mining in places like Rum Jungle has left areas so degraded that traditional owners are unable to use them (Commonwealth of Australia, 1997). Consequently, Mirarr are concerned that a similar outcome will occur at Ranger but are uncertain how to circumvent this.

In general, Aboriginal people see that the resource industry has removed much of their control over the environment through lack of proper communication, destruction of ceremony and have thereby further diminished their sense of place. Companies who do not engage effectively are viewed as blindly damaging the country and hurting people. This hurt is emotional and spiritual and may eventually become physical (Rose, 1996).

Aboriginal people know that the land will eventually be returned to their control and management, but they are not usually afforded input to the closure process and often left with situations that remain beyond their capacity to control. Aboriginal people have indicated that although they are willing to contribute to closure planning, many companies continue to ignore their concerns and aspirations for the future. This perception has been reinforced over the years by unsuccessful attempts at rehabilitation of sites such as Rum Jungle, which continues to drain large amounts of acidic waste into what were once fertile tropical waterways. Given the fundamental Aboriginal philosophy that “our land is our life”, there remains an interest in achieving positive outcomes and a belief that their traditional ecological knowledge can and should be used to assist with mine closure.

Finally, there is a fear that they will inherit environmental liabilities with which they are currently unable to deal. They believe that a more traditional approach could be effective if it is employed prior to mining and used for environmental management during mining operations and as a guide towards closure and final land use. Integrating a traditional approach into early planning may provide the most effective outcomes (Commonwealth of Australia, 2006), but if implemented solely at the time of closure, there is a high risk of failure because the traditional approach would be overwhelmed by the extent of damage caused by mining. It may have a better chance in the post oil and gas production landscape, where pit voids and large waste dumps do not usually exist.

4.4 Applying the outcomes

It has been suggested (Solomon et al., 2008), that when the mining industry is gone from the Pilbara region in Western Australia, it is the Aboriginal people who remain and who would seem to be strategically placed to manage mine-closure issues. This is generally true for most remote regions of Australia, but existing evidence shows that rehabilitation problems associated with mines are usually beyond their capacity to cope. To be successful, Aboriginal landowners will need to be provided with the necessary tools, funding and equipment. A small, but growing number of Aboriginal owned and operated companies are now being engaged in this region to undertake rehabilitation work for mining companies.

In response to the concerns expressed by its Aboriginal constituents, the NLC is continually seeking to develop systems that meet their future physical and cultural needs. This includes cultural land management tools and negotiated outcomes in mining and oil and gas agreements that raise current regulatory standards. These include practical land management targets such as backfilling pit voids and reducing residual surface waste and tailings where possible; and ensuring the integrity of well construction in the oil and gas industry. Support for these initiatives through company sponsored opportunities that lead to self-sustaining environmental management businesses in the future are being sought. If these are successful, then under the Aboriginal belief systems the spirits and the underlying cultural and environmental balances will return.

Exploration and recovery of minerals from the seafloor represents a new challenge to Aboriginal people in the Northern Territory, but there is little doubt that similar practices to those used on the land will be useful. However, application of these practices cannot be done effectively until a similar level of background submarine cultural and traditional knowledge to that presented here has been obtained.

5 Conclusions

Unlike modern scientific thought, Aboriginal environmental views do not separate belief systems from the physical. The realm of spiritual existence is not divorced from the material world, but embedded in it and as a result, people and nature are viewed as one. The two are indelibly intertwined but must be recognised as

equally important considerations if successful stakeholder engagement at all phases of resource production is to be achieved. This is Aboriginal Law and encompasses all things in the environment. This is a concept that is difficult for some scientists to grasp, but it is one that must be grasped if the multi-disciplinary approach required under a social licence to operate is to be achieved. However, it is difficult to operate within another group's cultural mores if you do not understand them.

Even if metaphysical explanations are stripped away, Aboriginal perspectives on the closure of mines and abandonment of wells are strongly affected by two major factors – the outcomes of environmental rehabilitation techniques that have been applied in the past and remain visible; and the level of inclusion of Aboriginal people in the environmental management process. Both have left a strong negative impression and Aboriginal people remain concerned that, even with modern techniques and processes, the long-term integrity of vital water supplies and subsistence foods will not be maintained.

Although the application of traditional knowledge and traditional land management practices is important in cross-cultural situations, these are limited in their capacity to assist with rectifying failed rehabilitation. Even if they cannot be used in a practical sense under some circumstances (for example dealing with a pit void), they remain essential to the cultural and spiritual wellbeing of future generations of Aboriginal people who will continue to use the post-mining environment.

The best approach to date seems to be the application of cultural tools based on traditional knowledge throughout mining operations and into mine closure because this may assist with returning some semblance of control to the landowners. If this can be set in motion before a new mine comes into operation, then Aboriginal people may be able to maintain some measure of their sense of place in the post-mining environment. This, after all, would surely reflect one of the outcomes necessary to achieve the high level of stakeholder engagement required by the twin concepts of Corporate Social Responsibility and the 'Social Licence to Operate'.

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