

CO-OPERATIVE PARTNERSHIP AND INNOVATION IN THE PLANNING AND EXECUTION OF THE DECOMMISSIONING OF THE MT M^CCLURE GOLD PROJECT

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Background of the Mt M^CClure site

The Mt M^CClure Gold Project commenced as a mining operation in 1991 and was owned and operated by four different mining companies before Mt M^CClure and the neighbouring Bronzewing mine came under the control of Newmont Australia in 2002. The mining operations consisted of a standard Carbon in Leach (CIL) processing plant with multiple pits and two tailings facilities treating ~1.2 Million tpa of ore sourced from oxide and fresh rock, with some pyritic shales.

Shortly after Newmont took control of the respective mining leases, and in accordance with Newmont's "Closure and Decommissioning Standards", work began in earnest on the research and planning phases for the full decommissioning and rehabilitation of the Mt M^CClure Project. In mid-2002, an internal Newmont audit had identified approximately 14 non-compliances with lease and licence conditions and commitments over the Mt M^CClure and Bronzewing leases. Although the operations were preparing for closure, Newmont considered any non-compliance to be unacceptable and rectified these outstanding issues in conjunction with final decommissioning.

Following an extensive closure planning process, which incorporated a framework integrating all components of decommissioning, the final implementation of the mine closure and rehabilitation programme was completed in late 2004. The successful outcomes achieved in the Mt M^CClure rehabilitation was recognised by State Regulators, with the awarding of the Golden Gecko Award for Environmental Excellence, the highest environmental award available in the WA mining industry.

The prime purpose of this paper is to outline the importance of the cooperative partnerships formed by the Newmont-Mt M^CClure management team during the closure process, however because there were considerable closure challenges faced by the Newmont-Mt M^CClure management team a brief background of the Mt M^CClure site and the a list of challenges are also described. The innovative ideas utilised by the closure team to overcome these obstacles are presented, in addition to the positive contributions made to the community as a result of these processes. Finally, a review outlining the breadth of cooperative partnerships developed and maintained during stakeholder consultations and Newmont's closure commitments derived from these relationships are also listed.

Location and local environment

The Bronzewing/Mt M^cClure operation is located in the Northern Goldfields 80km north-east of Leinster, Western Australia (**Figure 1**). The operations are set in the region of WA known as the Arid Shrublands, a region where the general landuse is for grazing rangeland. The vegetation communities on the land-systems which the project is situated are dominated by Mulga (*Acacia sp.*), and include *Eucalypt sp.*, Spinifex (*Triodia sp.*), and Chenopodiaceous (salt and blue bush shrubs) plants.

The Mt M^cClure mine is within a region of high climatic variability, with monsoonal and Mediterranean weather patterns dominating from time to time. Average rainfall is in the order of 250mm per annum and is notably erratic, with high intensity storm events in summer, steady winter rainfall events, with regular and occasionally prolonged droughts.

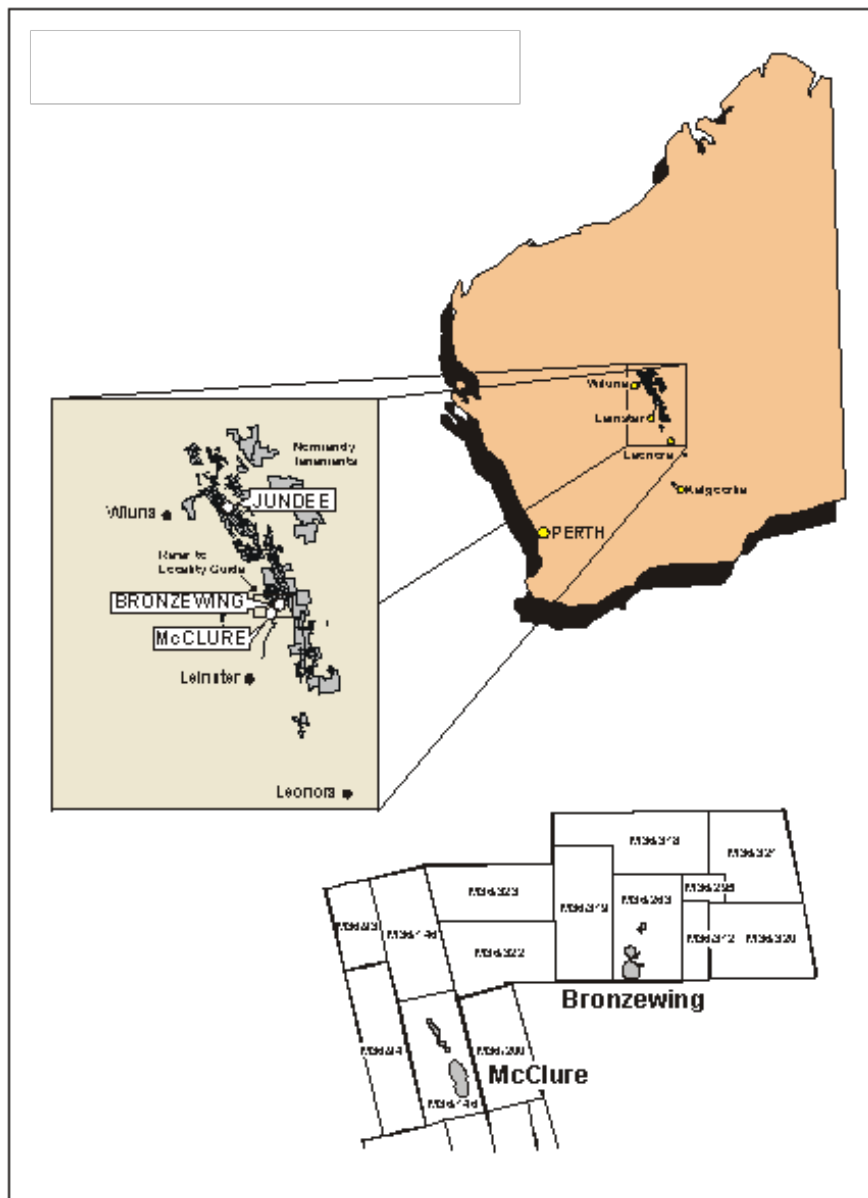


Figure 1 - Location of Mt M^cClure Mine Site in relation to Western Australia

A plan built in cooperation, responsiveness and innovation

The whole Mt M^cClure closure planning program was heavily influenced by reference to the important closure guidelines, "Strategic Framework for Mine Closure", (ANZMEC / MCA) and the Best Practice Environmental Management in Mining – Mine Decommissioning, Environment Australia (2000).

Contract negotiations and preliminary rehabilitation earthworks commenced in early 2003, in parallel with a range of research activities. These activities increased in scale and intensity from that time, such that for 15 months, approximately 30 Newmont staff, contractors and consultants were dedicated solely to the project of decommissioning and rehabilitation.

Prior to the stakeholder consultation process commencing, a risk assessment was conducted by the closure management team and external consultants and was an important process that focussed the team on the key issues and formed the basis for the closure plan. Another key feature of the closure plan was the development of a process map which outlined in a detailed manner the planning steps and sequences. The plan was broken into four components, which dealt with -

- a. *Introductory and background issues*
- b. *Closure management systems and processes*
- c. *Supporting documentation*
- d. *Project Task Areas, which broke down into almost 300 discreet task sheets*

Mt M^cClure's Stakeholder consultation incorporated a broad spectrum of people including regulatory, indigenous, pastoral, miscellaneous land users and other interested parties.

Stakeholder participation was actively implemented during the Mt M^cClure closure planning process to comply with Newmont's Statement of Commitment to "*Conduct stakeholder engagement activities to keep stakeholders involved in our closure process and having their interests considered.*" During the planning process a stakeholder register was compiled detailing organisations and contact details for reference throughout the consultation process.

Challenges and innovations

The significant challenges identified in the initial scoping process and the innovative management systems implemented to rectify these issues for the project can be broken down into ten key areas:

- 1) **Planning:** Initially, there was a lack of a detailed, fully-costed and technically-justified Closure and Rehabilitation Plan to guide and direct all works throughout the project area – no plan had been submitted to government. To rectify this situation, specialists with experience in closure plan development were recruited by Newmont to drive and develop the Closure Plan. This plan addressed all aspects of closure and rehabilitation that had been brought out in a prior scoping process, and included a review of literature, conditions, commitments and standards, and a closure planning workshop with stakeholders.
- 2) **Material Characterisation:** There was a lack of sufficient data on the characteristics of mine waste and rehabilitation materials, to adequately develop a robust plan for rehabilitation. A program of research and investigation was commenced in mid-2002, to establish a detailed understanding of materials characteristics to adequately form the plan. This involved extensive sampling programs and detailed analysis by a range of specialists.

- 3) Incomplete Earthworks: Due to the sudden end of operations in 1999, (the mine went into receivership) little progressive rehabilitation had been completed to the standards set by the site licence conditions and commitments. Extensive design work and modelling of options for the rehabilitation of incomplete facilities was carried out, including a benchmarking process within the region, to establish best practice for the local context. This included cover material assessments, bunding specification designs, water retention and freeboard capacity calculations and materials inventories.
- 4) Unsuccessful Rehabilitation: Some rehabilitation works had been completed, but these had failed or been constructed inadequately with regard to conditions and commitments. Previously rehabilitated areas were mapped to establish problem areas and develop detailed plans for each waste landform. Cover depths were verified through a system of test pits, and rainfall simulation studies were carried out to test erodibility of waste materials and covers. Finally, a landscape evolution model was created for some of the rehabilitated waste dumps to gauge likely improvement in landform stability after the planned remedial works.
- 5) Financial Provisioning: There was a lack of cash-flow from operations associated with the Mt M^cClure Project, necessitating the injection of significant capital. A very detailed process of estimation and quantification was carried out in 2002 to develop accurate cost assessments for each aspect of the Closure and Rehabilitation Process at Mt M^cClure.
- 6) Biodiversity Issues: There was a lack of adequate feral animal management programs in the previous five years, which had led to significant vegetation damage on rehabilitated areas. Large goat populations had built up in association with the fresh water in mine pits. Weeds had also established on a number of the facilities. A comprehensive feral animal control strategy was developed in addition to fencing rehabilitation areas. Newmont, as owner of the pastoral lease, has also participated in dingo, feral cat and goat control programs in the area. A very comprehensive weed eradication program was carried out in both mining rehabilitation and exploration areas in 2003, with follow up spraying in May 2004.
- 7) Rehabilitation Monitoring: There was a lack of a comprehensive and consistently-applied environmental and rehabilitation monitoring regime, and poor or non-existent documentation of that which had occurred. An Ecosystem Function Analysis (EFA, Tongway and Hindley, 1995; Tongway *et al.*, 1997) monitoring programme was commenced in early 2003, to provide baseline data for the project area using this highly-regarded monitoring practice. This EFA monitoring programme has been repeated three times since the initial assessment.
- 8) Plant Site Decommissioning: A complete processing plant remained at the project, but had degenerated to the point to which there was no resale value. The removal of the processing plant and associated infrastructure was the focus of a specifically-recruited project manager, safety officer and an environment professional that were responsible for supervising the salvage and demolition contractor. Through this process, all parties involved were able to maximise the re-use and recycling of scrap and salvage, and ensure management of any contaminated sites or potential contaminants through the process.
- 9) Contractor Management: There was a general lack of competency in the earthmoving contracting sector with regard to rehabilitation earthworks, and a prevailing contractor attitude that rehabilitation works were not core business. A rigorous and transparent contract tendering process was carried out for the rehabilitation earthworks and the plant decommissioning contracts. This included high standards required for day to day environmental management for tenderers and criteria focused on quality, training and safety. Training in environmental earthwork competencies was a requirement within the contracts, as was a commitment to indigenous participation, quality control and cost efficiencies, based on innovation.

10) Verification: There was no process of verification of the design and material utilisation principles promoted in the initial closure plan, to assure regulators and other stakeholders of the quality and consistency of the designs. A verification process by a third party was developed and included aerial surveys and *in-situ* test pit sampling to provide assurance to regulators and other stakeholders that the project was implemented according to the design criteria (**Plate 1** and **2**). Such critical issues as water holding capacities over potentially acid forming areas, cover depths and freeboard, could be demonstrated with verifiable as-built data.



Plate 1 - Mt McClure Mine Site Prior to Closure – 2000

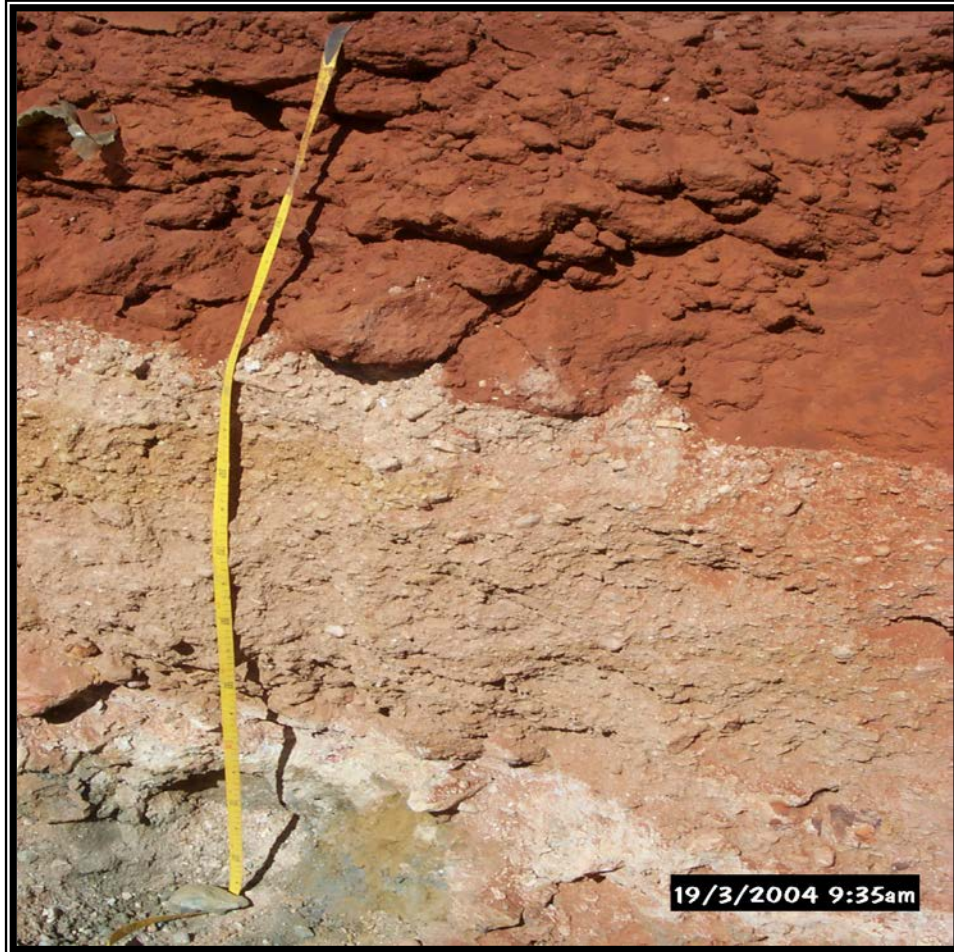


Plate 2 - Capping material over potentially acid forming tails material

Benchmarking

One of the most significant innovations throughout the project was the benchmarking tours undertaken by key personnel involved in designing and supervising the project, and included the bulldozer driver, contractors and consultants. Dozens of closed and abandoned mines were visited and an immense amount was learned with regard to the response of certain materials and design concepts over time, and as a result of particular weather patterns. By visiting closed mines within a 500km radius of the site, the project leadership group gained first hand appreciation of trends and design concepts throughout much of the regional rehabilitation estate.

One of the key features developed as a result of these tours was the considerable effort put into good drainage control to manage water appropriately on the tops and berms of the facilities. In many cases, rolled clay bunds were built and then armoured with a coarse caprock. In other places, bunding was used to create cells across the upper surface of the tailings facilities and landforms, to ensure that areas of ponded water were minimised, and infiltration maximised.

Positive Contributions to the Community

Throughout the closure process a number of significant and pro-active initiatives were instituted including –

1. Over 1000 tonnes of scrap metals and other recyclables were recycled through the project, with some of the funds generated being donated to a recycling charity. This came to approximately \$10,000 in donations.
2. Neighbouring properties were actively engaged in the process, through local pastoralists (Weebo, Barwidgee, Banjarn and Wonganui) taking away a range of scrap and salvage items for use on their properties.
3. A media tour was conducted by Newmont throughout the Mt M^cClure Project Area in late 2003 in partnership with the Western Australian Chamber of Minerals and Energy, giving more than 20 journalists first-hand experience of the closure process, and the techniques being utilised.
4. Newmont generated public reports in 2002, 2003 and 2004 which detailed progress in the closure and rehabilitation of Mt M^cClure.
5. A Closure Planning workshop was held in early 2003, specifically to create a forum for regulatory, technical and Newmont stakeholders to contribute to improved design principles and processes for the project. This included visits to most of the facilities and reviews of information and data available.
6. Indigenous participation was significant, due to the fact that the majority of the parties tendering for the rehabilitation contract were Native Title holders in the region. Indigenous leaders in the region participated in a detailed site tour, prior to commencement, and received detailed presentations and a scope of works as part of the process. All tenderers were required to make substantial commitments to indigenous participation as a part of the contract. The successful tenderer committed to 20% of the earthworks workforce being indigenous people, including supervisory roles. The Mt M^cClure rehabilitation contract achieved one of the highest rates of sustained indigenous employment in the history of the region and consistently maintained a training position for a young Aboriginal person throughout the life of the project.
7. A most significant historical issue on the Mt M^cClure leases were the remnant exploration drill holes, drill pads and access gridlines inherited from previous owners. Over an 18-month period from mid-2002, a team of 3 to 5 Newmont and contract personnel worked continuously to rehabilitate over 20,000 drill holes and pads and over 100km of grid lines in the region, surrounding the Mt M^cClure Project.

Collaboration in Mine Site Closure

The “People” part of a minesite closure process can involve a surprising array of different groups of people and individuals. Successful mine closure can only truly occur when all of these people have been effectively engaged and given the ability to participate in the closure process. This paper will give limited details with regard to the process of engagement, participation and consultation involved with mine site closure but more so about the depth and breadth of the relationships required to realise outcomes for which most stakeholders acknowledge as being “good”.

Closure process relationships fall into a number of broad categories, and can include:

- *Indigenous People*
- *Post Closure Land Users*
- *Regulators*
- *Industry Peers*
- *Contractors*
- *Consultants*
- *Universities*

- *Land Owners*
- *Mine Owners*
- *Machine operators*
- *Closure Project Team*

The key points identified by the Newmont-Mt M^cClure management team for each of the respective stakeholders are listed under the following categories.

Indigenous People

There are a range of activities that a mine site can embark upon to ensure that Indigenous People are intimately involved in the Closure process.

These include:

- *Agreement review and commitment considerations during planning*
- *Participative processes during Closure Plan development*
- *Opportunities identification and consultation*
- *Direct employment*
- *Training outcomes for Indigenous people*
- *Cultural Awareness training outcomes for closure personnel*
- *Respect for sites and country during closure process*

Post Closure Land Users

Post closure land use is something easily conceived at the start of an operation, but often more complex when post closure land use becomes a reality.

Considerations include:

- *Public safety*
- *Long term management of feral animals*
- *Sustainable land use on mined landscapes*
- *“No use” is a valid use if long-term stability of the rehabilitated environment is an issue*

Regulators

The experience of the Newmont-Mt M^cClure management team has been that regulators are willing to enter into a partnership to investigate what are the best possible outcomes for a site in closure. Regulators will endeavor to have positive input by collaborating in the planning process (However, it must be remembered that they are not consultants – and they are not to be held to advise that may be received). If commitments or expectations are not practicable, there has generally been a sense in the M^cClure closure that the framework can be varied to suit the context.

Considerations included:

- *Tap into regulators as a resource of experience, but respect their limitations*
- *Liaise and review project specifics based on unique circumstances*
- *Review achievability of thresholds in the context of environmental harm*
- *Align on measurable criteria as early as you can – and document achievable criteria*
- *Create mutual incentives for the regulator and the company to realise relinquishment*
- *Suggest some ongoing formal regulation of the Closure Plan going forward to ensure future owners are aware of the context and commitments in their due diligence and on acquisition of the property - accountable.*

Industry Peers

Sometimes Company Environmental professionals will only benchmark within their own organization- however its valuable to look beyond this. Time spent in benchmarking visits can seem intangible but the learning's can be invaluable:

- *Benchmarking is some of the best spent time and energy*
- *Through benchmarking we can avoid re-creating the errors of the past*
- *Every closed site has information about what to do and what not to do*
- *Company-centric mind set (and therefore limitations) can sometimes prevail. You think you're the "Biggest and the Best" – however you may be the "Biggest and the most Blind".*

Contractor Selection and Management

Good quality processes for contractor selection and management are essential. It is an opportunity that involved Indigenous People and other stakeholders in the commercial benefits of the closure process and to select contractors with proficient operators. Good contractors can save considerable energy and cost due to knowledge and expertise. Planners and Designers need to be respectful of what all contractor personnel can add.

- *Often onsite entrenched contractors lack specialist expertise*
- *Rehabilitation seen by them as a sideline - a bit of extra work*
- *Supervision can be patchy*
- *Development of low conflict contracts vital*
- *Capacity to listen to contractors essential*
- *Performance measurement based on specific agreed criteria*

Consultants

Relationships with consultants SHOULD be sometimes strained. A consultant telling you what you want to hear all the time is a bad consultant. A company representative accepting without questions what a consultant puts forward is failing in their duty. There is no singular, definitive right answer in rehabilitation. There should be lively debate and disagreement or something is wrong.

- *The KAOS theory. Ask dumb questions to make sure the experts know what they are talking about*
- *A necessary evil? or a great potential partnership*
- *If you treat them mean - you won't keep them keen. Mutual respect will give both parties great returns*
- *Be very clear on what you seek in your scope of works – spell it out*
- *Second opinions - seek them to add value (but be prepared to become confused)*
- *Answers or only ever more questions?*
- *Multiple right answers – how do you sort it out?*
- *Local and agriculture knowledge is well worth listening to (keep in mind often based often experiential knowledge)*

Universities

Universities can have a role in the strategic studies which collaborative groups can mount to solve significant local, regional and systemic challenges in the closure process.

Positives

- *Developing young people through post graduate studies – future staff development*
- *Support longer term projects and regional scale problem solving*

- *Long term repository for information*
- *High levels of scientific capability and experience from Senior Academics*
- *A social and societal good*

Negatives

- *Not necessarily focused on the answer you seek –(focused on solution of hypothesis) an academic right!!*
- *Inexperience – and not necessarily bound to the confidentiality of consultancies*
- *Legal dangers of employing students as ‘consultants’. Be aware of the legal limitations and potential breach of competition laws.*
- *Very large environmental/economic outcomes can be riding on student findings*
- *Student often move on with the information they collect, as not commercially bound.*

Owners (Corporate Entity)

Reconciling companies stated policy with its practice becomes most challenging when tens of millions of dollars must be laid out for closure.

- *May be different from the prevailing site situation*
- *Site Manager’s positions vs the Company Board’s requirements – turning policy into practice*
- *Company closure standards, and criteria may not relate to the local environment*
- *Diversity of views right along the food chain*
- *The Value of Values*

Operational Level

Operational personnel, including management, having often gone through a lean wind down period , or surprise shut down, may not be the best people to implement considered closure processes. Works carried out that is not to plan (in attempt to save money –in the lean period), can be exponentially more expensive over the longer term.

- *The tyranny of cashflow can result in little progressive closure on the mine site*
- *Mismatch of skill sets (operators vs rehabilitators)*
- *One group redundant while another ramps up*
- *Protecting the honey pot*
- *J. Dowd Chairman Newmont Ltd - recently stated “the cost of prevention is 1/5 the cost of remediation”. (pers.coms. ACMER. 2005. Perth).*

Closure Project Team

A closure project team bears some resemblance to a construction team. They are involved for a relatively short term, they need to be safety, quality and cost focused, and they are operating when some of the usual trappings of a minesite have reduced or disappeared.

- *The right mix of competencies is essential*
- *Communication and alignment*
- *Clarity of aspiration*
- *Ability to be decisive as a group*
- *Attention to detail*

Conclusions

Effective Mine Closure cannot occur without broad engagement and participation across a range of organisations, communities, disciplines and aspects of society. Facilitating this engagement – requires great leadership - so that people are operating in relationships based on ‘good faith dealings’ (with a broad outcome based framework). In our opinion this is the best approach to try to achieve a general sentiment of satisfaction with the process and the outcome.

Processes will probably be longer and more painful with such engagement, but the diversity of views, needs and expectations will ultimately generate a much more robust outcome grounded in the realities of the specific project, with decisions and strategies most likely to anticipate and satisfy current and future requirements. To facilitate the process into the future, the mining industry must invest in quality people forming quality relationships with all relevant stakeholders well before closure takes place, it costs - but the returns are high.

Conversely, command and control based relationships during closure - with a focus on “to the letter” scope of works control, with high levels of bureaucracy, can stifle and destroy the development of healthy closure relationships.

Work based on high levels of prescription can lead to failure if the prescription has fatal flaws that are discovered in the process of applying designs. A cowered workforce – will not be providing feedback – and you the company representative will not receive a most valuable commodity – workforce commitment to continuous improvement.

The key to the successful closure of Mt M^cClure was the genuine and dynamic partnerships, which were developed and nurtured primarily by the Newmont-Mt M^cClure management team, with a vision to create the best possible closure outcome “effectively a closure with pride”.

This was achieved by Newmont engaging and working closely with leading consultants, researchers and contractors in earth-moving, plant demolition, tailings closure design, land rehabilitation, environmental monitoring and feral animal control to achieve the closure of Mt M^cClure.

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