

# Voluntary Disclosure in Gold Mining Feasibility Studies

*Andrew Ferguson*  
*University of New South Wales\**

## **Abstract**

Amidst the current boom in the gold price, gold exploration and development companies have enjoyed a much deserved change in investor sentiment. Yet despite this increasing investor interest, relatively little is known about voluntary disclosure practices within the gold industry at certain discrete stages of the mine life cycle. This paper examines the disclosure practices of single project gold mining development companies completing a key project milestone – the feasibility study.

**Keywords: Voluntary disclosure, extractive industry, feasibility study, gold.**

\*Contact Details: School of Accounting, UNSW, 2052, Australia.

Ph 9385 6443

Fax 9385 5925

Email Address: [A.Ferguson@unsw.edu.au](mailto:A.Ferguson@unsw.edu.au)

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## **1.0 Introduction**

Voluntary disclosure has been seen as one response by companies to the ‘information problem’ (Healy and Palepu (2001)). The ‘information problem’ arises from private information held by a manager, also referred to as information asymmetry. Managers may also have different incentives than owners. Consequently, the presence of private information held by managers may lead investors to adopt less favourable assessments of firms future value, since they have no way of distinguishing between ‘good’ and ‘bad’ private information. This problem is known as adverse selection, with the ‘market for lemons’ (Akelof 1970) a classic example.

A rational response from managers in the presence of information asymmetry will be to disclose more information. Studies have also shown that the propensity for managers to voluntarily disclose in an unregulated environment is increasing in firm agencies. For example, Whittred, (1987) examines disclosure of consolidated financial statements, whilst Bazley, Brown and Izan (1985) find that disclosure of leasing arrangements is increasing in agency costs. In the mining industry setting, reductions in information asymmetry through signalling and higher quality disclosure appear to assume greater importance especially at the feasibility phase of the development process. This is because the feasibility milestone is the basis for subsequent project financing, a necessary step for project development.

An alternative view is that managers exercise discretion in supplying information at this critical milestone due to ‘proprietary’ disclosure costs and the fear of informing competitors (Verrechia (1983), Clarkson, Kao and Richardson (1994)). However at the feasibility stage it is difficult to envisage that proprietary costs feature in the

disclosure decision for mining companies, since the project is fairly mature in terms of reserve and resource identification. Consequently there is little to be gained from pre-empting other competitors by pegging surrounding tenements, since this would have occurred at the discovery phase.

There are anecdotal examples that support the proposition of trivial proprietary costs in the gold industry. Appendix 1 documents the granted tenement holdings of competing exploration firms one year prior to a discovery of gold by Helix Resources in the Gawler Craton region of South Australia.<sup>1</sup> This discovery was significant since the region was relatively unexplored and had no prior history of gold occurrence.<sup>2</sup> Appendix 2 documents the tenement holdings at the discovery date one year later on the 18<sup>th</sup> November, 1996. Notable on the discovery date is the near complete absence of available ground around the discovery zone. Consequently, whilst the discovery announcement had important value implications, it held little in the way of proprietary cost implications for Helix Resources.<sup>3</sup>

Proprietary costs as a disclosure explanation in this setting could also be critiqued on the basis that gold extraction is a known process, so technology differences play only a minor role. Gold producers are also price takers with no scope for product differentiation. Consequently, the feasibility completion project milestone provides a

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<sup>1</sup> Tenement data for polygon topology shape file plots sourced from Primary Industries and Resources South Australia (PIRSA).

<sup>2</sup> This case is documented extensively in Ferguson and Crockett (2003).

<sup>3</sup> There are some good contemporary examples of the proprietary cost presence at around discovery announcements. On the 21<sup>st</sup> November 2003, Conquest Mining in an announcement titled 'Conquest Drills then Snaps up Ground' released encouraging drilling results at the Mt Carlton gold and silver project. It immediately exercised a pre-emptive right to acquire 100% of the Mt Carlton project from Xstrata. In another example, Compass Resources announced on 1<sup>st</sup> November 2006 'Wildcat drill hole confirms exploration concept for Compass' Western NSW Projects'. This announcement referred to strongly anomalous copper, zinc, tungsten and silver values. It then went on to refer to 'Land Acquisition' – where 5 new exploration licenses covering 1742 square kilometers had already been applied for.

unique setting where the proprietary cost explanation assumes little or no importance in the disclosure decision.

Disclosure practices in the hard rock mining industry (particularly companies in the exploration and development phase) is also of interest due to added information asymmetry brought about the mining industry's complex information environment (Ferguson and Crockett (2002)). This study builds on prior extractive industry disclosure work by Craswell and Taylor (1992). Craswell and Taylor examine discretionary disclosure of oil and gas reserves using an agency theory approach.

Craswell and Taylor (1992) use a probit model with reserve disclosure as the dependent variable, and degree of leverage, cash flow risk, separation of ownership and control, firm size and auditor identity as predictors. They find weak support for higher audit quality being positively associated with disclosure and against expectations; higher cash flow risk is associated with lower disclosure. In short, their findings suggest a weak linkage between agency cost proxies traditionally utilized in the accounting and finance literature and discretionary reserve disclosure. This study extends Craswell and Taylor by examining whether other idiosyncratic firm level attributes may contribute more to our understanding of discretionary disclosure practise in the extractive industries.

### **1.1 Mine life cycle and disclosure requirements**

The mine life cycle for a mine developer usually evolves through a number of predictable discrete events or project milestones which typically commences with a

drilling discovery.<sup>4</sup> The company then proceeds to the resource definition stage, where a Joint Ore Reserve Committee (JORC) compliant resource is the objective. Once a resource has been defined, the company will typically conduct a scoping study where the objective is to produce some preliminary ballpark economics in order to justify further drilling and or a more intensive pre-feasibility study. Should the pre-feasibility study be successfully completed it will lead to the commencement of an often costly and lengthy full or bankable feasibility study.<sup>5,6,7</sup>

The feasibility study is critical for the firm since it is the platform on which either equity or debt project finance is sought. Depending on the company, it may disclose to differing degrees information on key aspects of the project such as the mining reserves/resources, mining method, the metallurgy, engineering, infrastructure, environmental and social impact, capital cost and operating cost estimates, project economics and timetables. However the content of the feasibility study completion disclosure is at the discretion of the company as there are no guidelines or specific disclosure 'rules'.

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<sup>4</sup> A project may also be acquired, in which case it may have certain milestones completed already.

<sup>5</sup> In this study, the sample constituents include only companies that have immaterial revenues contemporaneous to the feasibility completion announcement. Immaterial pre-production revenues for a mining explorer/developer would normally comprise interest received from cash on deposit, or minor cash flows obtained from third party production where residual royalties or net smelter return rights exist. Essentially the sample constituents are exploration firms that have made gold discoveries and are subsequently developing those gold discoveries. They are 'single project' development firms in the sense that it is extremely rare for an exploration firm to simultaneously develop two independent projects at the bankable feasibility stage.

<sup>6</sup> A 'gold' project is defined consistent with industry assertions by the CEO of Australia's largest gold company Newcrest Mining, Mr Ian Smith. Smith suggests that 'gold' projects constitute mines with at least 70% gold revenue. Some mines are poly-metallic in that by product credits for metals such as copper are material. All projects selected for this study have <30% forecast bi-product credits and thus conform to Smith's definition of a 'gold' mine ('Newcrest keen to keep its halo, Australian Financial Review 25/01/2008 p33).

<sup>7</sup> An example of the text of an extract from a Bankable Feasibility Study completion announcement is found in Appendix 3.

In terms of formal Australian Stock Exchange (ASX) disclosure requirements, there are three primary disclosure requirements that are relevant to both mining exploration and development companies. The first is the ASX's quarterly activities reporting requirements. This is documented in Chapter 5 of the listing rules 'Additional reporting on mining and exploration activities'. Listing rules 5.1 and 5.2 require mining producers and exploration companies to submit a record of activities each quarter. For example listing rule 5.2, applicable to exploration entities, suggests;

*'A mining exploration entity must complete a report concerning each quarter of its financial year and give it to the ASX. It must do so no later than 1 month after the end of the quarter.'*

Specifically, the report must include each of the following;

*5.2.1 Details of exploration activities and a summary of the expenditure incurred on those activities*

*5.2.2 Details of mining production and development activities of the entity relating to mining, mining exploration and related operations and a summary of expenditure incurred on those activities.*

The requirement for mining companies to submit activities information on a quarterly basis is due to the higher information asymmetry in the mining industry and the ASX's desire to keep market participants informed. In contrast, non mining industrial entities need only to lodge activities statements on a half yearly basis.

The second key disclosure requirement is also found in Chapter 5 of the ASX listing rules. This requires the public release of geological information to be in compliance with appropriate reserve and resource recognition and disclosure requirements laid out in the JORC code.<sup>8</sup>

*5.6 A report prepared by a mining entity or an entity which has an interest in a mining tenement must be prepared in accordance with Appendix 5A 'the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. (The JORC Code) if the report includes a statement of Exploration results or Mineral resources or ore reserves.*

Significantly, none of the specific disclosure provisions applicable to the mining industry say anything about the reporting of feasibility completions. Consequently, apart from the fact that any resources or reserves disclosed therein must be JORC compliant, it is entirely at the discretion of the company as to what will be disclosed in such releases.<sup>9,10</sup>

There is one further more general disclosure requirement applicable to all listed entities that mining companies are bound by. This is the ASX's continuous disclosure requirements (listing rule 3.1) which applies to all listed entities. Listing rule 3.1 states;

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<sup>8</sup> The JORC code taxonomy for resource and reserve classification along with appropriate JORC terminology definitions are found in Appendix 4.

<sup>9</sup> The quarterly activities report is accompanied by Appendix 5B, the mining exploration entity quarterly cashflow report, which is an accompanying document informing the market how the entities activities have been financed for the past quarter and its effect on the entities cash position.

<sup>10</sup> The disclosure requirements in Australia can be contrasted with those in Canada where the full feasibility technical report document is required to be released to the exchange. Consequently the Australian setting represents a unique disclosure environment in the mining industry globally.

*3.1 Once an entity is or becomes aware of information concerning it that a reasonable person would expect to have a material effect on the price or value of the entities securities, the entity must immediately tell the ASX that information.*

Not surprisingly, since feasibility completion is a major milestone for single project mining companies, all firms disclose the feasibility completion.<sup>11</sup> However, like the disclosure requirements documented in Chapter 5 of the listing rules, rule 3.1 suggests more that feasibility completion should be disclosed (on materiality grounds), rather than how this might be done. There are no additional specific provisions or guidelines in 3.1 regarding feasibility study completions and how they should be disclosed to the market.

Apart from Craswell and Taylor (1992), who examine oil and gas companies, no published research has examined the voluntary disclosure practices of pre-production single project gold mining firms. This study focuses on single project firms since disclosure quality for existing gold producers is likely to be relatively homogeneous. Gold producers tend to be larger companies, often with multiple projects and with greater financial resources. They have incentives to disclose detailed information on items such as production throughput and cost parameters in response to analysts continuing demand for such information.

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<sup>11</sup> There are no known feasibility completions where no disclosure takes place for single project gold developers, since all projects are monitored sequentially in terms of progress from feasibility commencement.

In contrast, the emphasis in this study is on single project gold mining companies in the development phase. They constitute a fascinating sub-set since they attract little in terms of analyst coverage, and so have added incentives to release recognisable good news. This study comprises two components. The first question is exploratory – what is voluntarily disclosed about reserves / resources, key operating parameters and project economics in feasibility study completion announcements? A second question is whether we can predict disclosure levels.

## **2.0 Testable propositions**

Apart from control variables to be utilised from Craswell and Taylor, a number of further predictors of feasibility disclosure are considered in this study. These further predictors are structured as testable propositions owing to the under-researched nature of this domain. The first testable proposition relates to material changes in the aforementioned JORC code. Appendix 5A requirements were first initiated by the ASX on 1/7/1996, and the JORC code underwent some significant changes on the 1st September 1999.

One of the key changes to the 1999 JORC code was to amend the definition of a ‘Competent Person’ (Clause 10) to refer to Ore Reserves as well as to Mineral Resources. A further key change to the 1999 JORC code was the requirement that ‘Competent Persons’ must provide written approval for any materials they provide prior to that documentation being released to the ASX. Post 1<sup>st</sup> September 1999 this rule applied to ‘Competent Persons’ be they external consultants or employees of the company. The last major change in the 1999 version of JORC was the significant

enhancement of the guidance provisions in Table 1 to assist practitioners in the estimation and reporting of mineral resources and reserves.

Thus, given the enhanced attestation and disclosure requirements following the 1999 JORC revisions the following testable proposition is posed;

*P1 There is an increased level of disclosure by companies post the September 1999 JORC revisions.*

Craswell and Taylor (1992) focus their model predictions on agency cost based predictors of the decision to disclose.<sup>12</sup> However, the mining industry is highly idiosyncratic. This suggests the need for appropriate, firm-level controls, an approach is supported by the mixed performance of the agency cost-based predictors in Craswell and Taylor (1992).

It is argued that off-shore projects are often located in countries with higher political risk compared to Australia, such as Papua New Guinea or countries in Africa.

Anecdotally it has also been observed that Australian companies who own foreign projects trade at a discount to companies that have their projects based in Australia.

For example, in a recent March 2005 broadcast from the Prospectors and Developers Association of Canada (PDAC) Conference in Toronto, internationally renowned gold analyst Paul van Eeden commented in relation to Australian mining stock valuation:

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<sup>12</sup> Craswell and Taylor (1992) include cash flow risk as a predictor of disclosure levels and predict that higher variance cash flows are increasing in disclosure levels. The co-efficient, whilst significant at the  $p < .10$  level, is negative (contrary to expectations). Cash flow risk is omitted from this study since single project gold developers are yet to generate any form of material cash flow.

*“The other thing that happens in Australia is that the Australian equities market often does not reward Australian based companies for non-Australian assets”.*<sup>13</sup>

Consequently, higher levels of voluntary disclosure by companies who hold offshore projects might be expected in order to mitigate greater information asymmetry and possible undervaluation.<sup>14</sup> An alternative explanation is that possible undervaluation of Australian mining companies having projects located outside Australia occurs as a result of poor quality disclosure. Given these competing explanations, no directional prediction is made and the effects of project domicile are examined in the following testable proposition stated in the null form;

*P2 There is no difference in the disclosure quality of firms with offshore projects.*

A further firm level control is the nature of the mining project. Mines typically come in two forms – either open pit producers or underground producers.<sup>15</sup> Typically with open pit mines mine overburden is removed exposing the ore body, which then allows the mining company to remove ore grade material to the processing plant. Open pits are more desirable when the ore body is situated in relatively close proximity to the surface, which minimises the extent of costly waste material to be removed.<sup>16</sup>

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<sup>13</sup> Paul Van Eeden’s interview can be found at:

[http://www.resourceschannel.com/video/pdac3\\_analysthourpve\\_1showmeta.wvx](http://www.resourceschannel.com/video/pdac3_analysthourpve_1showmeta.wvx).

<sup>14</sup> Issues of undervaluation of Australian mining companies are examined in Brown and Ferguson (2007).

<sup>15</sup> The feasibility completion announcement in Appendix 3 identifies a third form of hybrid operation – that is one having a preliminary open pit phase, followed by an underground phase that pursues deeper ore shoots. Hybrid feasibility proposals are classified as open pit, since plant capital payback will routinely occur in the open pit phase implying that project risk by the time the firm goes underground is much lower.

<sup>16</sup> The relative amount of waste material to be removed in open pit mines is often disclosed in the form of the ‘strip’ or ‘waste to ore ratio’.

In contrast, underground mines involve the construction of a box-cut from which a underground decline proceeds to the ore body. Underground mining and construction contains significantly higher risks. For example, ore reserve estimation is more difficult for deeper ore bodies due to the depth with which they occur from the surface and the additional expense involved in drilling.<sup>17</sup> Further, underground mines have safety issues emanating from possible rock falls as observed recently in the Beaconsfield Gold Mine. In some cases, geological instability might result from tectonic activity.

Given the higher risk and greater information asymmetry involved in complex underground mines vis a vis open pit mines, managers may have greater incentives to disclose information about the deposit. Thus, testable proposition three thus becomes;

*P3 Companies with underground projects disclose more than companies with open pit projects.*

One further idiosyncratic industry predictor is considered in this study. Firms may have differing incentives to disclose where the commodities price environment is more or less favourable. For example, in hot commodities markets, CEO's might have incentives to hype the stock and disclose all good news along the lines of Lang and Lundholm (1993). An argument in support of this assertion is that mine financing, be it through seasoned equity offers or debt financing is more achievable when the stock price is high in a hot gold price environment, hence firms have incentives to disclose.

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<sup>17</sup> A useful anecdotal example of resource definition problems occurring for underground deposits is the recent reserve downgrade which occurred at Bendigo Gold Mines underground deposit (source Bendigo Mining ASX release 08/01/2006).

An alternative view is that in a hot gold price environment, gold mine share prices will be high and hence firm incentives to disclose good news will be minimal. The impact of commodity sentiment is therefore tested in the following non directional proposition;

*P4 Ex ante gold price changes have no effect on feasibility disclosure.*

### **3.0 Sampling**

Forty-seven firms having single project gold mine developments over the period from July 1993 (Alkane Exploration's Peak Hill deposit) to December 2006 (Avoca Resources Trident deposit at Higginsville) are selected for the project. These represent the full sample of known single project feasibility disclosures for companies where the project is subsequently financed.<sup>18</sup> The companies selected are all 'single project' in the sense that the projects are material in terms of expenditure and operational focus and have immaterial cash inflows from other operations. They are also all gold companies, since base metals deposits are routinely polymetallic, which makes comparison of reserve disclosure more complicated.

Companies jointly developing two material projects simultaneously are deleted from the sample, along with minor joint venture parties. For example in the current sample only one Beaconsfield Gold Mine venturer is included (Allstate Exploration) to limit the influence of projects under joint venture.<sup>19</sup> The companies are identified through searches conducted on Factiva and Aspect FinAnalysis.

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<sup>18</sup> Subsequent analysis in section 4.3 is undertaken including an additional 9 feasibility studies which were not subsequently financed.

<sup>19</sup> Companies who are joint venturers in a deposit normally each report identical or very similar feasibility disclosures to the ASX.

A careful stock-take of voluntary disclosures in each of the 47 feasibility reports is then undertaken. The types of voluntary disclosures considered in this study include information on mine reserves and resources, mine operating parameters and economic parameters. The full spectrum of known disclosure across each of these broad parameters is considered. For example, in the case of ‘mine reserves and resources’, disclosure of each JORC complying reserve and resource category is considered. In the same way, for ‘economic parameters’, every type of conventional financial comparator such as NPV, IRR and payback period is collected.

### **3.1 Model Specification**

Based on prior literature and discussion, the discretionary disclosure model is specified as follows;

$$D = \alpha_0 + \alpha_1 SIZE + \alpha_2 FINANCE + \alpha_3 FOREIGN + \alpha_4 OPENPIT + \alpha_5 AUDITOR + \alpha_6 SHAREHOLDING. + \alpha_7 JORCCHANGE + \alpha_8 GOLDPRICE \varepsilon$$

The dependent variable D, is calculated 2 ways. First, total reserve, mine operating parameter and project economics disclosures are added together. This measure - TOTALDISC is akin to ‘total disclosure’. A second measure - ECONDISC omits the reserve disclosures, since it is likely that some form of reserve disclosure had taken place previously by the company at the resource definition milestone in compliance with Appendix 5A requirements. The second measure is akin to ‘economic disclosure’ since its focus is primarily on mine operating parameters and financials. Thus, the ECONDISC measure represents a measure of new information disclosed.

Following evidence that voluntary disclosure is increasing in firm size (Bazley, Brown and Izan (1985), Ruland, Tung and George (1990), Craswell and Taylor (1992), Lang and Lundholm (1993), Brown, Taylor and Walter (1999), SIZE is measured as the log of the firm's inflation adjusted market capitalization in the month immediately preceding the release of the feasibility information. Market capitalization data is obtained for all firms from the month immediately preceding each feasibility announcement date from the Australian Graduate School of Management's Share Price-Price Relative database (SPPR). All respective market capitalisation size measures are inflation adjusted to 2006 dollars.<sup>20</sup>

There is evidence that disclosure levels are increasing in leverage of a firm, since lenders require more information to assess the likelihood of a firm meeting debt obligations (Jensen and Meckling, 1976). Craswell and Taylor (1992) argue that oil and gas company reserve disclosure increases with leverage, since information about reserves is important in the estimation of future cash flows. Gearing is largely non-existent for single-project development firms up until the time that the mine is financed.

Also worth considering is that nearly all debt finance arrangements undertaken by mining (apart from convertible note issues) companies in Australia are through private debt as opposed to public debt. There are two implications of this financing environment. First, bank financing in a highly asymmetric information environment carries a very strong reputation signal. Second and paradoxically, many debt financiers often require evidence of the ability to raise equity finance as pre-condition

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<sup>20</sup> Inflation data is obtained from the RBA web site; <http://www.rba.gov.au/>

in providing debt drawdown. As such, the firm's incentives to boost share prices through disclosure of good news to the capital market remains, even though additional private information may be signalled to the financier. Thus, higher disclosure quality might be expected for firms with projects that have a debt finance component.

FINANCE is a dichotomous variable, which takes the value of 1 if the firm has obtained bank finance as part of the subsequent mine financing, and 0 otherwise.

Craswell and Taylor (1992) document two additional controls in their model. The first is the separation of ownership and control. Owner manager conflicts arise as a result of the separation of the ownership and management of the firm. The rational manager has self interested incentives and information asymmetry acts to magnify such agency conflicts. Thus shareholders adopt monitoring mechanisms and management undertake bonding to mitigate asymmetries and potential conflicts of interest (Fama and Jensen, 1983).

One mechanism for reducing information asymmetry is to increase disclosure.

Actions by managers to increase disclosure would reduce any remuneration discount management might obtain in the presence of high agency costs and / or information asymmetry. This separation of ownership and control can be measured in a number of ways. Craswell and Taylor argue that the extent to which the ownership of the firm is diffuse, rather than closely-held is likely to reflect the extent of management ownership, with closely held firms less likely to disclose to mitigate perceptions of agency conflicts. This study adopts two proxies for ownership dispersion in order to examine its impact on voluntary disclosure. The first TOP20 measures ownership concentration of the top 20 shareholders consistent with the approach taken by

Craswell and Taylor. An alternative method of measurement of director share ownership, DIRSH is a percentage and calculated as the aggregate number of ordinary issued shares owned by the board of directors divided by the number of ordinary issued shares taken from the annual report preceding the release of the feasibility study. It is arguably a stronger measure of agency costs than TOP20.<sup>21</sup>

Craswell and Taylor also control for auditor quality in their model. They argue that larger audit firms have reputation at stake should their clients be associated with lower quality reporting (DeAngelo, 1981). Supporting evidence is found in the IPO literature, where Titman and Trueman (1986) argue that the selection of a high quality auditor signals high disclosure quality. Audit quality is designated AUDITOR and controlled for in the model using a large / small auditor dichotomy consistent with prior Australian audit fee research such as Ferguson, Francis and Stokes (2003). AUDITOR is a dummy variable with 1 indicating a large auditor.

In terms of experimental variables, P1 is tested with a dummy variable, JORCCHANGE, where the sample is split with post 1<sup>st</sup> September 1999 feasibilities coded 1 to incorporate JORC reforms, others coded '0'. For the test of P2, FOREIGN is also a dummy variable, with 1 indicating the firm's project is located offshore from Australia and domestic domiciled projects coded '0'. A dummy variable, OPENPIT is also adopted for the test of P3, with an open-pit production profile coded as '1' and underground developments coded '0'. Last, P4 is tested using GOLDPRICE, a

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<sup>21</sup> Further sensitivity testing is undertaken examining whether the firm has executive option schemes in operation. Results are not sensitive to this alternative proxy for agency costs.

continuous variable which is the percentage change in the spot gold price from 1 year prior to the feasibility completion announcement date.<sup>22</sup>

#### **4.0 Univariate Results**

Panel A of Table 1 examines disclosure of reserve nature and quantum in feasibility study completion announcements. High levels of voluntary disclosure of mining reserves are observed. 59.6% of companies disclose some form of mining ‘reserves’. This is interpreted as a high rate of disclosure given that not all companies will have mining reserves per se. 70.2% of companies also disclose some form of total resource either Measured, Indicated or Inferred - or have used the term ‘Total Resources’.<sup>23</sup> Further, not reported in Table 1 is the fact that 89.3% of firms disclosed either reserve or resource figures in their feasibility study completion announcements.

[Insert Table 1]

Panel B of Table 1 documents the key mine operating parameters disclosed in feasibility announcements and the frequency in which they are disclosed. Throughput rates (in tons per annum) are disclosed in 72.3% of cases, percentage recovery rate (59.6%) and mine life in years (80.9%). Annual production rates in ounces are disclosed by 59.6% of firms whilst total expected life of mine production in ounces is disclosed by 53.2% of firms.

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<sup>22</sup> Alternative measures of this variable include an ex ante three year gold price change metric. Reported results are not sensitive to alternative measures of GOLDPRICE.

<sup>23</sup> Where a firm disclosed a figure attributed to measured, indicated and inferred resources, it was recorded in ‘indicated’ resources. Where a firm did not specify its type of resources, it was input as ‘inferred’ resources.

Panel C of Table 1 documents the disclosure of key project economics parameters across the full sample. Two facets of Panel C stand out. First, cash costs per ounce and capital expenditure appear to be the key feasibility financial figures as far as the industry is concerned. Cash operating costs were disclosed in 72.3% of feasibility announcements. Capital expenditure was disclosed voluntarily by 82.9% of sample constituents. Second, in terms of other traditional project economics parameters a relatively lower level of disclosure is observed. For example only 48.9% of firms indicated their gold price assumptions. Similarly, financial valuation parameters such as NPV, IRR and payback period are disclosed by only 17%, 31.9% and 17% of firms respectively. A cash flow measure (either total or by year) is disclosed by only 27.7% of companies.

In terms of firm size, further analysis is depicted in Table 1, where in Panels D, E, F and G, H and I, a partition on firm size is undertaken. Consistent with prior literature, a comparison of panels D, E and F with G, H and I in Table 1 indicate that nearly all parameters (reserves - 4/5, operating - 4/5 and economic - 6/7) are more frequently disclosed by larger companies. A Wilcoxon signed ranks test on the aggregate disclosure levels for all 17 parameters depicts a Z statistic of -2.44, significant at  $p < .05$ .

Table 2 panels A through F depict the descriptive statistics relevant to association tests for the mine financing analysis. Companies financed solely by equity in Panels A, B and C are distinguished from those having a debt finance component

documented in Panels D, E and F.<sup>24</sup> Consistent with expectations, it appears that companies accessing the debt market are characterised by higher levels of voluntary disclosure. The same test comparison between the two groups yields a Z statistic of -1.78, significant at  $p=.076$  (two-tailed).

**[Insert Table 2]**

Table 2 also depicts the splitting of results for the three key areas of disclosure in feasibility announcements according to project domicile. Panels G, H and I record descriptive statistics for feasibility disclosures of firms with off-shore projects, whilst Panels J, K and L depict descriptive statistics for companies with domestic projects. Comparison of descriptives indicates that companies with foreign projects disclose more in terms of resource parameters (5 out of 5 parameters) and more in terms of mine operating parameters (3 out of 5 parameters). Further, companies with offshore projects disclose more than domestic gold development companies across all 7 measures. A Wilcoxon signed ranks test on the aggregate disclosure levels for all parameters depicts a Z statistic of -2.96, significant at  $p<.01$ .<sup>25</sup>

Further descriptive statistics are documented in Table 3. Figures in Table 3 indicate that the average firm makes 8.27 disclosures across reserve, operating and economic parameters (TOTALDISC). The maximum is 14 disclosures whilst the minimum is 3. Omitting reserves and resources from the dependent variable (ECONDISC) indicates

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<sup>24</sup> To ascertain whether a project was ultimately debt financed, a meticulous analysis of a company's post feasibility completion disclosure was undertaken, and all known equity and debt tranches recorded.

<sup>25</sup> Further analysis is undertaken of those gold mines having an underground component, and those that are solely open cut. Whilst underground projects disclose slightly more in terms of key economic parameters – in particular the two key parameters of cash costs, and capital expenditure, no significant difference is identifiable between the two groups.

the average firm makes 6.34 disclosures, with a maximum of 12 disclosures (the total possible) and a minimum of 2.

The average percentage holding by the TOP20 is 59.25%. Ownership by the board of directors (DIRSH) shows an average shareholding of 14.64% by all board participants. 36.2% of firms obtain some form of debt financing for their project, whilst most projects are open-pit (68.1%) as opposed to underground mines. 61.7% of firms are audited by large Big N auditors. Last, nearly 75% of observations fall post September 1<sup>st</sup> 1999.

#### **4.1 Multivariate Analysis**

Results from running OLS regression models are reported in Table 4. Model 1 had the dependent variable 'total disclosure'. It obtains an adjusted  $R^2$  of .37, with the F-statistic significant at  $p < .001$ . In terms of control variables, only size is significant. SIZE has a positive co-efficient as hypothesised and is significant at  $p < .02$ . The agency cost proxy, TOP20 the proxy for the 20 largest shareholders has a negative co-efficient as expected, but is not significant. Unlike Craswell and Taylor, AUDITOR is also not significant. FINANCE has a positive co-efficient consistent with expectations, but the t-value is 1.25 and is not significant in this model. These results indicate that the traditional agency cost proxies derived from the prior literature perform relatively poorly in this context.

In terms of experimental variables, the co-efficient for JORCCHANGE is positive and significant at  $p < .01$ , indicating support for *P1*. Thus, changes implemented in the JORC Code in 1999 had a significantly positive impact on disclosure. The test of *P2*

indicates that FOREIGN is positive and significant at  $p < .03$ , suggesting firms with off-shore projects disclose more. OPEN PIT and GOLDPRICE are not significant in the model.

In model 2, the results of Model 1 are re-run, this time replacing TOP20 with the enhanced agency cost proxy DIRSH, proxying for percentage of shareholding by the board of directors. Once again the agency cost proxy is not significant in the model, although its sign is consistent with expectations. All the other significant predictors in Model 1, remain significant in Model 2 with the same signs.

In Model 3, the dependent variable is altered to ECONDISC which includes disclosure of mine operating parameters and project economics. This dependent variable is more closely aligned with 'new' information disclosed in the feasibility completion announcements. Model 3 has an adjusted  $R^2$  of .35, with the  $F$ -statistic of 4.03 significant at  $p < .002$ . The results in Model 3 are similar to those reported in Models 1 and 2, a slight change being that SIZE is now significant only at  $p = .06$ .

The main difference is that FINANCE becomes significant at  $p < .05$ , suggesting that projects ultimately debt financed disclose more in terms of project operating parameters and project economics. Once again, re-running Model 3 with the enhanced agency cost proxy DIRSH has no effect on the results.<sup>26</sup>

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<sup>26</sup> Collinearity diagnostics including variance inflation factors (VIFs) run on all 4 models indicate that all the VIF's are less than 2, indicating no evidence of problematic multicollinearity. Inspection of scatter plots also indicates no influential outliers.

## 4.2 Non Financed Projects

The careful sample screening process resulted in the identification of a further 9 gold project feasibility studies where the project was subsequently demonstrated to be an unfunded project. An unfunded project is one that meets any one or more of the following criteria. The project:

1. Fails to attract financing in the 5 years following feasibility completion,
2. Is disposed in the following 5 years following feasibility completion
3. Is deferred, and is not reactivated within 5 years of feasibility completion, or
4. The company enters into administration within 5 years of feasibility completion.

A question arises as to whether there may be any difference between the disclosure patterns of unfunded versus funded projects. To examine this question, an additional model is run, deleting the FINANCE dummy for project finance type, and including in the model a dummy variable, UNFUNDED, where '1' indicates an unfunded project and '0' a project that attracts either debt or equity financing in the subsequent 5 year period. The revised model specification is as follows;

$$D = \alpha_0 + \alpha_1 SIZE + \alpha_2 FOREIGN + \alpha_3 OPENPIT + \alpha_4 AUDITOR + \alpha_5 SHAREHOLDING. + \alpha_6 JORCCHANGE + \alpha_7 GOLDPRICE + \alpha_8 UNFUNDED + \varepsilon$$

Results reported in Table 5 conform to the same model sensitivity testing procedures as adopted in Table 4. All of the models are significant at  $p < .01$  with adjusted  $R^2$ 's ranging from .23 to .29. The key finding is that the UNFUNDED dummy variable is negative and significant at  $p = .07$  (two-tailed) in Model 1, and at  $p = .06$  (two-tailed) in Model 2. UNFUNDED is also negative and significant on a one-tailed basis in

Models 3 and 4. Once again analysis of co linearity diagnostics indicates no multi-co linearity is present. Inspection of residual scatterplots indicates no overly influential observations in accordance with OLS assumptions. Results from this subsequent analysis can be summarized as follows; poorer quality projects are identifiable by poorer quality feasibility disclosure.

## **5.0 Conclusion**

The completion of a feasibility study is a crucial phase of the mine development process, and is seen as a major project milestone. Yet, there is a significant void in the financial economics literature dealing with the mining industry in general, and specifically voluntary disclosure issues. This is despite the industry enjoying a recent resurgence brought about by higher commodity prices in more recent times.

This study exists in a unique setting for disclosure research, since the mining projects at this phase or milestone exhibit negligible proprietary costs. Rather, voluntary disclosure in this case takes on a signalling role, since managers have strong incentives to release good news with a view to optimising their chances of attracting project financing. Voluntary disclosure is found to increase with size, for firms with foreign projects, and for projects having a debt component in their project financing. It is noted that the idiosyncratic industry specific controls perform well in comparison with previous attempts to model voluntary disclosure in the mining industry using accounting based agency cost proxies.

A second contribution is to partition the findings based on project outcome. Results indicate that unfunded projects have poorer levels of disclosure, a potentially

important finding for resource analysts and those involved in project valuation. Effectively this research indicates that if mining companies have good news at this stage of the life cycle, they will disclose it. The absence of proprietary costs post discovery supports this interpretation.

A final note is that the levels of traditional financial valuation disclosure such as NPV, IRR and Payback periods are seemingly lower in comparison to throughput and reserve disclosure. The likely reason for this is that it is possible to back out basic financial measures from the key project operating and economic parameters such as per annum production rates, mine life, cash costs per ounce and capital expenditure (CAPEX) similar to a Hotelling (1931) approach.<sup>27</sup> In this case, industry participants may feel more specific valuation disclosure is trivial or excessive.

The findings of the study are subject to the obvious limitations in generalising the findings of an industry specific study to other industries or sectors. Further research may include examination of the relationship between the extent of disclosure at the feasibility milestone event and security returns.

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<sup>27</sup> The 'Hotelling model' is given by  $V = -F + \sum_{i=1}^N \frac{(p_i - vc) \times q_i}{(1+r)^i}$  where  $V$  is project value,  $F$  is project capital cost,  $p$  is commodity price,  $vc$  is variable costs of production per unit of output,  $q$  is the quantity of production and  $(1+r)^i$  is the discount rate in period 'i' and  $N$  = project life in years.

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**Table 1 Disclosure scores for full sample and small and large size partitions**

<b>Full Sample (N=47)</b>						
<b>Panel A - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
9 (19.1%)	28 (59.6%)	7 (15.9%)	21 (44.7%)	23 (48.9%)		
<b>Panel B - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
34 (72.3%)	28 (59.6%)	38 (80.9%)	28 (59.6%)	25 (53.2%)		
<b>Panel C - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
23 (48.9%)	34 (72.3%)	13 (27.7%)	8 (17.0%)	15 (31.9%)	8 (17.0%)	39 (82.9%)
<b>Small Size Partition (N=24)</b>						
<b>Panel D - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
4 (16.7%)	15 (62.5%)	3 (12.5%)	8 (33.3%)	9 (37.5%)		
<b>Panel E - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
14 (58.3%)	12 (50%)	19 (79.2%)	9 (37.5%)	16 (66.7%)		
<b>Panel F - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
11 (45.8%)	15 (62.5%)	8 (33.3%)	3 (12.5%)	4 (16.7%)	2 (8.3%)	16 (66.7%)
<b>Large Size Partition (N=23)</b>						
<b>Panel H - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
5 (21.7%)	13 (56.5%)	4 (17.4%)	13 (56.5%)	14 (60.9%)		
<b>Panel I - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
19 (82.6%)	16 (69.6%)	19 (82.6%)	20 (86.9%)	9 (39.1%)		
<b>Panel J - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
12 (52.2%)	19 (82.6%)	5 (21.7%)	5 (21.7%)	11 (47.8%)	6 (26.1%)	23 (100%)

<b>Table 2 Disclosure scores for equity / debt financed partitions and foreign / domestic projects</b>						
<b>Equity Finance Partition (N=16)</b>						
<b>Panel A - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
3 (18.8%)	7 (43.8%)	5 (31.3%)	11 (68.8%)	9 (56.3%)		
<b>Panel B - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
10 (62.5%)	9 (56.3%)	11 (68.8%)	10 (62.5%)	6 (37.5%)		
<b>Panel C - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
7 (43.8%)	9 (56.3%)	1 (6.3%)	2 (12.5%)	4 (25%)	2 (12.5%)	11 (68.8%)
<b>Debt Finance Partition (N=31)</b>						
<b>Panel D - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
6 (19.4%)	21 (67.7%)	3 (9.6%)	10 (32.3%)	14 (45.2%)		
<b>Panel E - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
24 (77.4%)	19 (61.3%)	27 (87.1%)	20 (64.5%)	18 (58.1%)		
<b>Panel F - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
16 (51.6%)	24 (77.4%)	10 (32.3%)	6 (19.4%)	11 (35.5%)	6 (19.4%)	28 (90.3%)
<b>Foreign Sample (N=13)</b>						
<b>Panel G - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
5 (38.5%)	10 (76.9.2%)	2 (15.4%)	6 (46.2%)	7 (53.8%)		
<b>Panel H - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
12 (92.3%)	7 (53.8%)	11 (84.6%)	13 (92.3%)	5 (38.5%)		
<b>Panel I - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
9 (69.2%)	13 (100%)	4 (30.7%)	5 (38.5%)	6 (46.2%)	6 (46.2%)	13 (100%)
<b>Domestic Sample (N=34)</b>						
<b>Panel J - Reserve Parameters</b>						
Proved Reserves	Probable Reserves	Measured Resources	Indicated Resources	Inferred Resources		
4 (11.8%)	17 (50%)	5 (14.7%)	15 (44.1%)	16 (47.1%)		
<b>Panel K - Mine Operating Parameters</b>						
Throughput (tpa)	Recovery Rate (%)	Mine Life	Production Rate	Total Production		
21 (61.7%)	21 (61.7%)	27 (79.4%)	18 (52.9%)	20 (58.8%)		
<b>Panel L - Economic Parameters</b>						
Gold Price	Cash Cost (per oz)	Cash Flow	NPV (discount rate)	IRR	Payback Period	Capex
14 (41.1%)	21 (61.7%)	9 (26.5%)	3 (8.8%)	9 (26.5%)	2 (5.9%)	26 (76.5%)

**Table 3 Descriptive Statistics**

<u>Variables</u>	<u>Mean</u>	<u>Std. Dev</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Skewness</u>	<u>Kurtosis</u>
TOTALDISC	8.27	3.07	14	3	0.127	-0.97
ECONDISC	6.34	2.59	12	2	0.014	-0.78
SIZE	17.28	0.96	19.97	15.48	0.037	0.076
TOP20	59.25	15.2	96.29	26.82	0.099	-0.12
DIRSH	14.64	15.51	68	0.01	1.66	2.72
GOLDPRICE	.10	.13	.51	-.14	.96	1.61
FINANCE	36.20%					
FOREIGN	27.65%					
OPENPIT	68.10%					
AUDITOR	61.70%					
JORCCHANGE	74.50%					

**Definitions**

TOTALDISC = Sum of disclosure relating to reserve/resource, mine operating and economic parameters

ECONDISC = Sum of disclosure relating to mine operating and economic parameters only

SIZE = Log of inflation adjusted market capitalization measured at month end prior to feasibility release

TOP20 = Proportion of the companies shares held by the top 20 shareholders

GOLDPRICE = % change in the gold price 1 year prior to feasibility completion

DIRSH = % shareholding of the board of directors

FINANCE = 1 if the project is debt financed

FOREIGN = 1 if the project is located off-shore

OPENPIT = 1 if the project is an open pit mining operation

AUDITOR = 1 if the company is audited by a large auditor

JORCCHANGE = 1 if the project is the feasibility is released September 1<sup>st</sup>, 1999

**Table 4 Feasibility Disclosure Models**

Dependent Variable	<u>Model 1</u>				<u>Model 2</u>			<u>Model 3</u>			<u>Model 4</u>		
	<u>Total Disclosure</u>				<u>Total Disclosure</u>			<u>Economic Disclosure</u>			<u>Economic Disclosure</u>		
<u>Control Variables:</u>	Exp. Sign	Estimate	t-value	Prob*	Estimate	t-value	Prob*	Estimate	t-value	Prob*	Estimate	t-value	Prob*
Intercept		-13.47	-1.8	0.08	-12.79	-1.7	0.1	-9.01	-1.39	0.17	-8.62	-1.33	0.19
LTA	+	1.16	2.55	0.02	1.05	2.39	0.02	0.77	1.95	0.06	0.68	1.79	0.08
TOP20	-	-0.02	-0.88	0.39				-0.02	-0.77	0.45			
DIRSH					-1.35	-0.58	0.57				.19	0.09	0.93
FINANCE	+	0.98	1.25	0.22	1.03	1.31	0.2	1.35	1.99	0.05	1.41	2.07	0.05
FOREIGN	+	1.99	2.32	0.03	1.99	2.29	0.03	1.5	2.02	0.05	1.51	2.02	0.05
OPENPIT	-	-0.15	-0.19	0.85	-0.14	-0.18	0.86	.19	0.27	0.79	.17	0.25	0.8
AUDITOR	+	0.03	0.04	0.97	-0.12	-0.15	0.88	-0.23	-0.31	0.76	-0.32	-0.44	0.67
JORCHANGE	?	2.78	2.68	0.01	2.91	2.83	0.01	2.56	2.86	0.01	2.69	3.03	0.01
GOLDPRICE	?	-0.90	-0.25	0.8	-1.21	-0.34	0.74	-0.55	-0.18	0.86	-0.75	-0.24	0.81
F-statistic (p-value)			4.42(<.001)			4.31(<.001)			4.03(<.002)			3.89(<.002)	
Adjusted R <sup>2</sup>			0.37			0.37			0.35			0.34	
Sample Size			N=47			N=47			N=47			N=47	

\*All p-values are two-tailed tests

Variables Descriptions

Dependent Variables

Total Disclosure = Number of respective company specific disclosures across the reserve, mine operating parameter and mine economics variables

Economic Disclosure = Number of respective company specific disclosures across the mine operating parameter and mine economics variables

Control Variables

LTA = natural log of market capitalization (inflation adjusted)  
TOP 20 = % shareholding of the top twenty shareholders  
DIRSH = % shareholding of the board of directors  
FINANCE = indicator variable, 1 = debt component in mine financing  
FOREIGN = indicator variable, 1 = developing mineral deposit located outside Australia  
OPENPIT = indicator variable, 1 = openpit deposit  
AUDITOR = indicator variable, 1 = Big N auditor  
JORCCHANGE = indicator variable, 1 = disclosure post 01/09/1999  
GOLDPRICE = % change in the gold price in year preceeding feasibility completion

**Table 5 Feasibility Disclosure Models (including unfunded projects)**

Dependent Variable	<u>Model 1</u>				<u>Model 2</u>			<u>Model 3</u>			<u>Model 4</u>		
		<u>Total Disclosure</u>			<u>Total Disclosure</u>			<u>Economic Disclosure</u>			<u>Economic Disclosure</u>		
<u>Control Variables:</u>	Exp. Sign	Estimate	t-value	Prob*	Estimate	t-value	Prob*	Estimate	t-value	Prob*	Estimate	t-value	Prob*
Intercept		-10.87	-1.28	0.21	-10.52	-1.25	0.22	-7.16	-1.01	0.32	-7.04	-0.99	0.33
LTA	+	1.04	2.05	0.05	1.02	2.09	0.04	0.72	1.69	0.1	0.69	1.67	0.1
TOP20	-	-0.01	-0.17	0.87				-0.01	-0.29	0.78			
DIRSH					-1.88	-0.67	0.50				-1.14	-0.06	0.95
FOREIGN	+	2.01	2.06	0.05	1.98	2.05	0.05	1.58	1.94	0.06	1.57	1.93	0.06
OPENPIT	-	-0.30	-0.34	0.74	-0.28	-0.32	0.75	.16	0.21	0.83	.16	0.22	0.83
AUDITOR	+	-0.41	-0.44	0.66	-0.45	-0.49	0.63	-0.47	-0.60	0.55	-0.50	-0.64	0.53
JORCCHANGE	?	2.11	1.83	0.07	2.11	1.86	0.07	1.86	1.93	0.06	1.9	1.99	0.05
GOLDPRICE	?	-2.17	-0.55	0.58	-2.24	-0.57	0.57	-1.27	-0.38	0.7	-1.33	-0.40	0.69
UNFUNDED	?	-2.17	-1.84	0.07	-2.26	-1.92	0.06	-1.57	-1.59	0.12	-1.55	-1.56	0.13
F-statistic (p-value)			3.74(<.002)			3.83(<.001)			3.02(<.008)			3.00(<.008)	
Adjusted R <sup>2</sup>			0.29			0.29			0.23			0.23	
Sample Size			N=56			N=56			N=56			N=56	

\*All p-values are two-tailed tests

Variables Descriptions

Dependent Variables

Total Disclosure = Number of respective company specific disclosures across the reserve, mine operating parameter and mine economics variables

Economic Disclosure = Number of respective company specific disclosures across the mine operating parameter and mine economics variables

Control Variables

LTA = natural log of market capitalization (inflation adjusted)

TOP 20 = % shareholding of the top twenty shareholders

DIRSH = % shareholding of the board of directors

FOREIGN = indicator variable, 1 = developing mineral deposit located outside Australia

OPENPIT = indicator variable, 1 = openpit deposit

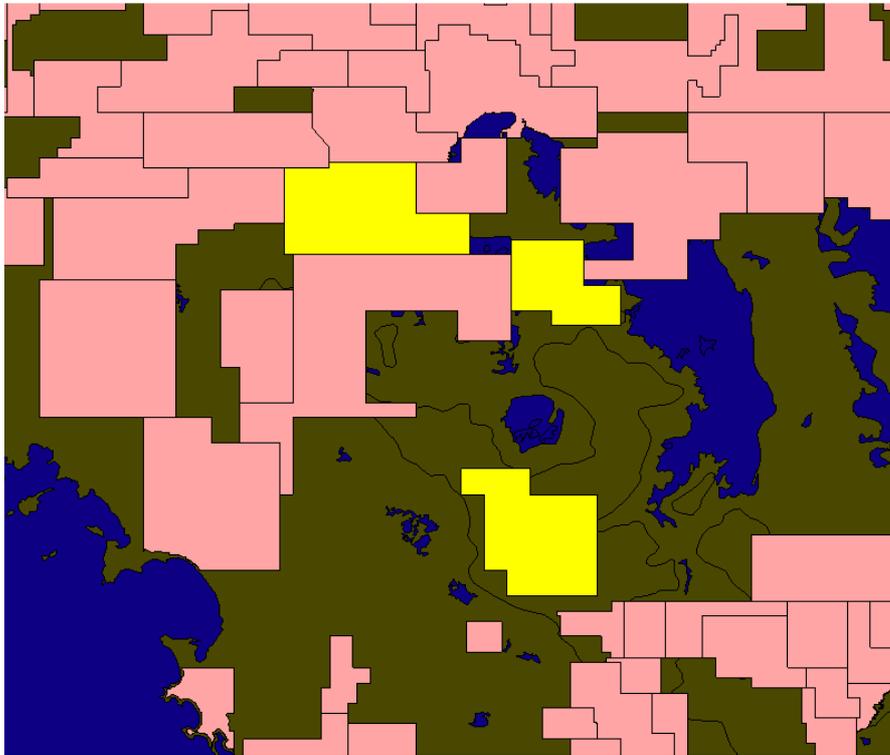
AUDITOR = indicator variable, 1 = Big N auditor

JORCCHANGE = indicator variable, 1 = disclosure post 01/09/1999

GOLDPRICE = % change in the gold price in year preceding feasibility completion

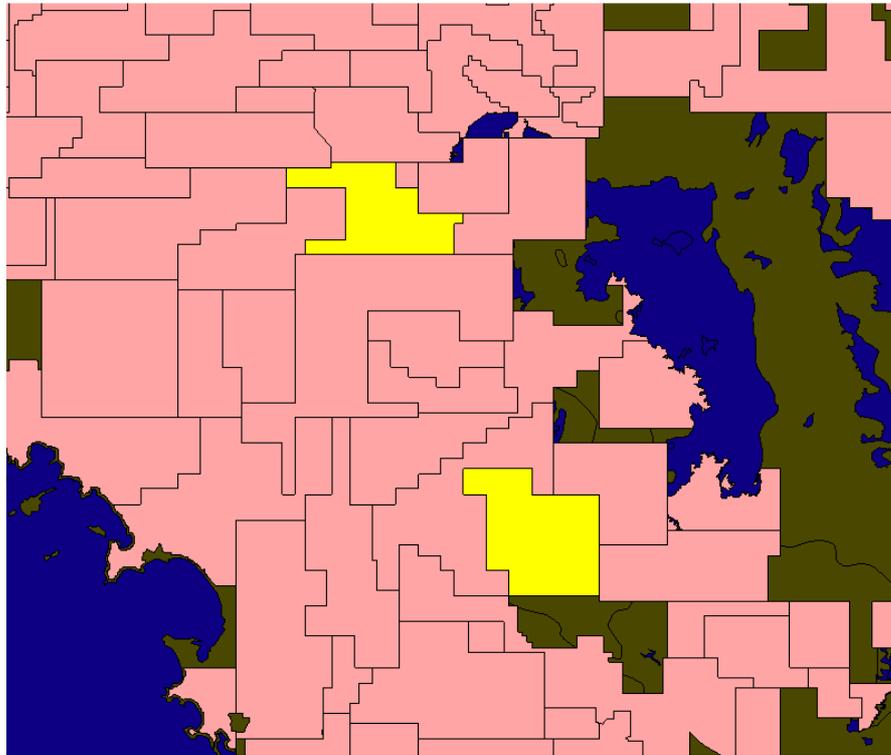
UNFUNDED = indicator variable, 1 = project does not obtain debt or equity finance within 5 years of feasibility completion or was disposed.

# Tenement Grants



-  Helix Resources NL
-  Tenement grants on 18/11/1995

# Tenement Grants



-  Helix Resources NL
-  Tenement grants on 18/11/1996

## Appendix 3

1 September 2003

### **Perseverance Announced Today**

- The completion of the Fosterville Gold Project Bankable Feasibility Study;
- Fosterville Sulphide Mineable Reserves;
- An updated Sulphide Resource Statement;
- A commitment to proceed with a mine development at Fosterville, subject to securing the requisite financing.

### **Bankable Feasibility Study**

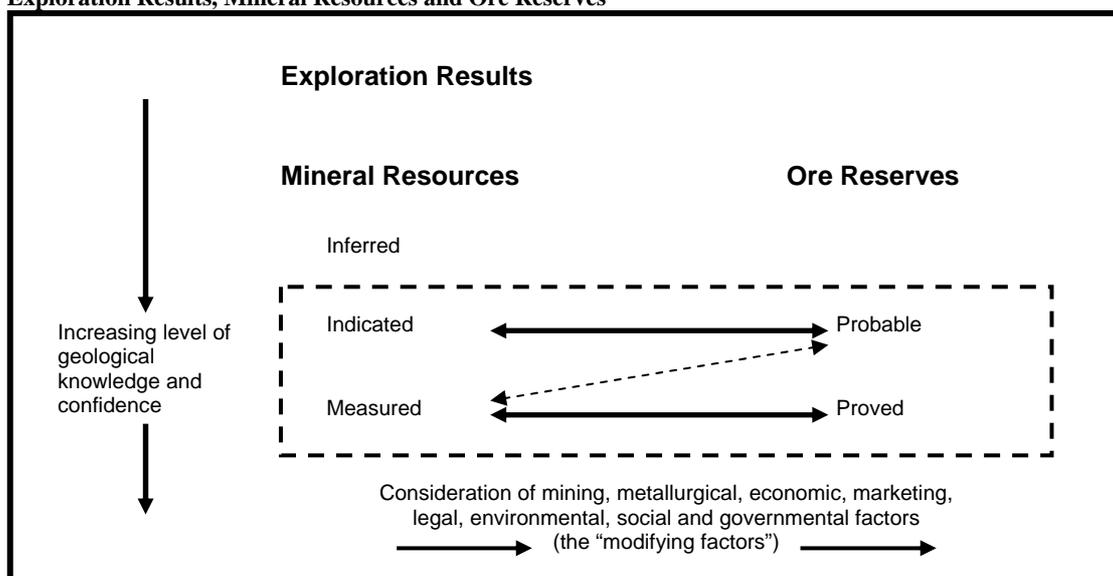
The Company announces the successful completion of the Fosterville Gold Project Bankable Feasibility Study.

The Study is predicated on the following Sulphide Mineable Reserves:-

	<b>Tonnes</b>	<b>Grade (g/t Au)</b>	<b>Contained Ounces</b>
<b>Open Cut</b>	1,748,000	3.90	219,000
<b>Underground</b>	4,348,000	4.94	691,000
<b>Total</b>	6,096,000	4.69	910,000

Due to constraints associated with data cut-off dates, current Mineable Reserves do not reflect the expected enhancement to near surface grades and tonnages from the inclusion of metallurgical drill holes in the resource model, mineralisation in the 400 metre extension to the Phoenix Shoot south to 7000N, which strongly indicates potential to extend the Mineable Reserve shell to greater depths than currently modelled in this area. The study proposes an integrated surface and underground mine and treatment plant capable of extracting and processing 800,000 tonnes of refractory ore annually. The Project has an initial mine life approaching 7.5 years based on the currently defined Mineable Reserves. Conversion of inferred resources, which are not reflected in the current Mineable Reserves, can be expected to extend mine life towards ten years. Production is expected to average in excess of 110,000 ounces of gold per annum, once production commences, at a weighted average estimated cash cost of \$A321 (\$US209) per ounce. The start up capital, estimated at \$A75 (\$US49) million, will fund pre-stripping of the surface mine, portal establishment and initial decline development to access the Phoenix and Ellesmere orebodies underground, the treatment plant, related infrastructure and capitalised commissioning and start up expenses. Total cost per ounce based on the current Mineable Reserves is \$A463 (\$US301). Total costs per ounce reflects full amortisation of the project capital over the initial mine life. Extension of the mine life to ten years could be expected to reduce total cost per ounce by approximately \$A30 (\$US20) per ounce. The Project has been evaluated at an assumed gold price of \$A550 (\$US357) per ounce and generates an acceptable return on an ungeared and unhedged basis. The Project IRR can be expected to be greater than 25% when development financing is finalized and reflected in the corporate financial model. The development phase of the project will take approximately 16 months including 2.5 months of commissioning. Assuming that funding arrangements can be completed expeditiously, the first gold pour from the Fosterville Sulphide Mine should take place in the December Quarter, 2004. Discussions with potential financiers to the project are advancing satisfactorily.

**Appendix 4. THE 2004 AUSTRALASIAN CODE FOR REPORTING EXPLORATION RESULTS, MINERAL RESOURCES AND ORE RESERVES (THE JORC CODE) - general relationship between Exploration Results, Mineral Resources and Ore Reserves**



**Relevant JORC Terminology and definitions (clause)**

19. A **‘Mineral Resource’** is a concentration or occurrence of material of intrinsic economic interest in or on the Earth’s crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

20. An **‘Inferred Mineral Resource’** is that part of a Mineral Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which may be limited or of uncertain quality and reliability.

21. An **‘Indicated Mineral Resource’** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.

22. A **‘Measured Mineral Resource’** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

28. An **‘Ore Reserve’** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.

29. A **‘Probable Ore Reserve’** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.

30. A **‘Proved Ore Reserve’** is the economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.