Environmental and Social Disclosure and Data-Richness in the Mining Industry

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Abstract

Self-regulation by firms and industries in relation to the environmental impact they cause is not a full substitute for more traditional regulation of environmental externalities. However, some self-regulatory efforts do involve very specific actions that serve to reduce externalities for a specific industry and certainly achieve more than the presentation of a responsible image to the world. An example of such efforts that go beyond common claims about "sustainable activities", are seen in the increasing numbers of mining firms that generate and issue environmental reports. While there is as yet no indisputable proof that reporting has a direct effect on environmental performance, this paper shows that within a single industry there are wide variations in reporting practices and that sincerity is apparent in the process.

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Introduction

The discovery, extraction and processing of mineral resources is widely regarded as one of the most environmentally and socially disruptive activities undertaken by humankind. For some, the activities of the mining industry are coupled with images that include exploitation of the weak, whether they be workers, indigenous populations, local villagers or developing nations. Mining, along with other extractive industries, is also widely perceived to represent the depletion of a strictly limited stock of natural resources. These factors contribute to a view held by many that mining is a thoroughly unsustainable industry. The overall dim view of the industry has been compounded by specific events surrounding a limited number of controversial companies and sites. A highly visible category being those instances where tailings have been released as a result of poor engineering, deliberate disregard for appropriate levels of safety, or for reasons of economic expediency within malleable regulatory frameworks. An outcome of this is that the industry and its individual members have increasingly been forced to justify their existence and document their performance in order to gain access to resources of all kinds, whether they be exploration leases, financial support, risk insurance, or human resources. Many of the environmental and social concerns have demonstrably translated into "License to Operate" and "Access to Resources" issues. Some mining firms acknowledge this; one Australian mining organisation put it as follows: '*As a resources company, WMC requires "access to land" and a continuous "licence to operate" to grow shareholder value. In order to achieve this objective, we need to acknowledge changing societal values and expectations.*' (WMC, 2001). As a result, the mining industry as a whole, and individual mining groups[1] spend considerable resources, time and effort in presenting their views to a range of stakeholders. Among other things, they emphasize the real benefits mining has brought to many previously poor regions.

1 In this paper we use the term 'mining groups' to denote any mining firm with more than one operating site.

The mining industry is under increasing pressure in its traditional home regions. This is especially apparent in the US, Canada and Australia, where ore body depletion and restrictions upon exploration land access are increasingly constraining operations. One solution is for members of the industry to promote a more positive image in these traditional home regions and this is where environmental reporting or "sustainability communication" plays an important role. Although reporting may serve to ameliorate some of the constraints on mining, depletion and other restrictions have long constituted drivers for mining groups to invest outside their home regions. Much of this investment occurs, for a range of reasons, in countries where environmental concerns receive less attention.[2] In these regions where significant environmental regulation may be absent or lax, lesser costs can be incurred in order to achieve compliance, thus adding to the attraction of investing there. For operations in these "overseas" regions reporting on environmental performance is also less likely to make a significant difference to how "welcome" a mining operation is. However, once a mining group begins reporting in one part of the world, the expectations of a range of stakeholders make it significantly more difficult to avoid reporting for all operations, regardless of location.

One of the specific tools adopted by the industry in recent years has been the environmental report or statement. Often addressing dimensions of social as well as environmental performance, most significant mining companies have commenced some form of external reporting. Some reports are rudimentary while others have been recognized as among the best produced by industry in general. For example, WMC was among the companies mentioned in a benchmarking report published by SustainAbility Ltd. and the United Nations Environment Program (SustainAbility/UNEP, 1997). In contrast, several large and influential companies examined for inclusion in this paper had to be excluded for the simple reason that we could not find any facts, figures, or significant

2 We do not wish to hammer the "pollution haven" drum – even though in some cases it may play a role. Many of these countries are both rich in minerals and under-explored. The exploitation of first class resources is likely to be of more interest to serious mining operations than the conduct of operations in lax regulatory climates.

statements of intent related to environmental performance substance in the material we examined.

This paper addresses several issues of importance to anyone interested in strategic environmental communication; in this instance, the use of disclosure of environmental and social performance data at the level of the individual firm, site, or facility. The fundamental issue is whether disclosure can be explained as an effort to remove or reduce resource dependency constraints (Pfeffer and Salanchick, 1978). The second issue concerns the need to establish a benchmark against which it will be possible to compare subsequent reports. This is necessary in order to examine whether the reporting practices of individual firms change over time, either in different directions or converging towards some stable and broadly accepted standard format. Thirdly, by exploring what may become a standard for the mining industry, this paper lays the foundation for subsequent comparisons of actual environmental performance. Finally, by distinguishing between motivation and openness on the one hand, and data richness and reporting ability on the other hand, we make an important distinction between "soft" and hard data, respectively. The "soft" side of the data, that which we classify as "motivation and openness" reveals aspects of strategic intent on the part of individual reporters. In contrast, the "hard" side of the data, that which we classify as "data richness and reporting ability", is indicative of the extent to which firms possess the competencies needed to collect and process the vast volumes of data involved.

We have chosen to concentrate on the environmental reports of mining companies as they appear on the Internet. Although this might introduce a bias favouring mining groups based in regions with superior IT infrastructure, we have not found indications that important industry members did not have a web presence. In contrast to other areas in which mining firms work to project a more congenial image to the public at large, environmental reports are becoming quite well defined both in terms of the subject matter they deal with, and in the manner in which they fulfil the preferred requirements presented by a number of guide frameworks developed by UNEP, GRI (the Global Reporting Initiative) and

private report verifiers. Within the sector, the environmental reports of several industry actors have now been produced for a number of years. With a sample of sufficient number and depth over several years, both cross-industry and temporal comparisons are now feasible. It is possible to begin assessment of how the reporting of individual firms has changed over time.

Examination of environmental reports produced by miners raises a number of general questions about the process leading them to undertake the very significant effort involved in external reporting. What internal and external effects does reporting have on the mining groups? What are the underlying strategies being pursued by firms, given that they have already developed their own perceptible style of reporting? And to what extent does reporting contribute to better environmental performance? In this paper we begin answering some of these questions and thereby lay the foundation for more specific answers by mapping the observable reporting behaviour of mining firms. More detailed work on control variable such as location of parent company, location of mineral production facilities and sources of financial support, is required to provide explicit answers to the questions of why reporting takes place and how the practice affects the environment (if at all).

An examination of how reporting affects individual mining groups requires detailed fieldwork outside the scope of this study. Further, even if such work were undertaken a broader study would be required to determine the degree to which voluntary regulations such as reporting are at all effective in securing better environmental performance of firms – an outcome that some theoretical expositions have expressed scepticism of (Bomsel et al., 1996). More recent work on the political economy of self-regulation is more optimistic about the potential of this approach. This conclusion is based on models where efforts to pre-empt government intervention are induced by threats to this effect. The results of modelling work suggest that such regulatory pre-emption may explain observed declines in toxic chemical releases (Maxwell, Lyon and Hackett, 2000). There are no studies of the relationship between firm's publication of environmental reports and their performance in that area. The closest approach to such a study

is probably the analysis of the chemical industry's "Responsible Care" program (King and Lenox 2000), which did not find a link between membership and level of emissions.

This paper proceeds as follows. In the next section we provide details of three very different underlying motives for engaging in reporting work, In section three we outline the methodology adopted for evaluating the reports and describe our sources of data. In section four we present the results and section five concludes with a discussion of our findings and suggestions for further research.

Reporting as Strategy

Judging from the richness of data involved in some reports, external reporting of environmental and social performance is an activity that must entail very substantial expenditure and diversion of resources from other tasks. The scale of the task is exacerbated by the need to maintain the reporting system and infrastructure once it has been put in place.[3] Mining companies that report obviously have a reason for doing so. However, in order to gain a better understanding of why we observe extensive variation in the approach to reporting in this industry, and why in many cases efforts go far beyond legal requirements for operations in countries with weak regulatory systems and enforcement, we start from the existing literature on environmental and social disclosure.

Within this literature, several distinct debates seem to proceed independently. One set of contributors has performed content analysis upon data derived from company annual reports. These concentrate on issues such as decision significance (Epstein and Freedmann, 1994), avoidance of agency costs (Ness and Mizra, 1991) and the maintenance of corporate legitimacy (Abbott and Monsen, 1979). In their survey of these studies, Grey and co-workers (2001) first note the common emphasis in this stream of research on links between environ-

3 One-off reports would invariably signal opportunism and insincerity.

mental and social disclosure and indicators of firm size, profitability and industry affiliation. Secondly, they note the mixed and sometimes contradictory results generated. Finally they extend previous models by accounting for the effects of mandatory reporting requirements and country affiliation of firms. By doing so they find strong links between disclosure and corporate characteristics such as size, profitability and industry (Grey et al, 2001). The greatest weakness of these studies is that they do not establish any causality between disclosure and size or financial performance.

A very different set of studies are those that seek to establish a link between corporate social performance and financial performance. Studies in this vein rely on an index of corporate social performance compiled by the independent rating service Kinder, Lyndenburg, Domini & Co, Inc. (henceforth KLD). The results yielded have aroused some academic controversy. The initial study by Waddock and Graves (1997) concluded that social performance depends on financial performance, in the sense that better financial performance allows better social performance. At the same time the study finds that financial performance depends on social performance.

The conclusion reached by Waddock and Graves (1997), that social performance improves when there are slack resources available, opens the classical debate about the proper duties of corporate managers (Friedman 1970). In the case of the results from Waddock and Graves, the work was criticised because their model did not account for R&D investment and industry effects. When such controls are added the positive relationship disappears (McWilliams and Siegel, 2000). Further work using the KLD data but distinguishing between on the one hand stakeholder management in the narrow sense of the term, where stakeholders are only considered such when they are risk-bearers (Mitchell, Agle & Wood, 1997), and on the other hand social issues participation unrelated to primary stakeholders, finds that there is a positive link in the first instance, but not in the second. Stakeholder management contributes to competitive advantage whereas social issues management does not, being at best a

transactional investment which is easily copied and thus of little strategic advantage. (Hillman & Keim, 2001).[4]

All of these studies, however, rely on data from a cross-section of industries. This makes it difficult to establish more precisely what issues drive adoption of more socially responsible practices. Public reporting is only an indirect example of such a practice and its value to firms must be viewed in terms of the legitimacy openness regarding performance generates. Thus, it must be assumed that the decision to report is made by firms that are well aware that the information they provide may be used to compare their environmental performance to that of other firms in their industry.

Judging from the richness of data involved in some mining reports, external reporting of environmental and social performance is also an activity that must entail very substantial expenditure and considerable diversion of personnel resources from other tasks. The scale of the task is made larger by the need to maintain the reporting system and infrastructure once it has been put in place. Mining companies that report obviously have a reason for doing so. We propose that three very different forces are involved in driving firms to incur the expenditures related to reporting. It should be noted that while these forces are likely to operate in parallel, the outcome is probably not yet recognisable as a stable institutional arrangement, nor may those engaged in reporting have a clear idea of the outcome they desire.

As indicated by WMC, *resource access* is an explicit reason for reporting in some cases. We stress that "resource access" should be considered in the broadest possible way and refers to all of the resources needed to run a mining company. The first resource that comes to mind is naturally natural, in the form of land access for mineral deposit prospecting and development. However, financing – especially the very considerable capital sums required for mineral project development, managerial talent, and competent miners are as essential for the

4 Note, however, that the Hillman and Keim study does not control for industry or R&D investment.

success of a mining project as the mineral resources themselves, although by nature less unique.[5] It is already clear that both financial institutions and capital markets require environmental information, or are in the process of developing protocols for doing so (Chen, 2001). However, requirements vary, as different stakeholders demand different types of information to satisfy their particular interest. New projects almost invariably require the completion of an Environmental Impact Assessment, but this may be more or less separate from the overall environmental performance of each mining group. However, regardless of the different audiences seemingly addressed by EIAs, environmental reports and other forms for environmental communication, they all represent a clearly expressed concern with the fundamental need for access to all the resources needed for a successful mining operation.

We propose that the second force are forms of institutional pressure exerted in one or more ways via employees and their professional networks, from actors that have the power to directly specify what firms must do (i.e. regulators), from cooperative industry groups (which may in turn be influenced by professional networks) and from the often ignored and perfectly reasonable incentive to copy solutions arrived at by other industry members rather than finding one's own solutions. These pressures are often referred to as coercive, normative and mimetic (DiMaggio and Powell, 1991). An example of coercive pressure for environmental reporting is that mining groups may fear that unless they report voluntarily, or in a pre-emptive fashion they may be forced to report on in even more detail upon matters they would rather keep private (Maxwell et al., 2000).

In practice the three forces are likely to complement rather than exclude one another. It is likely to be more reassuring to financial, regulatory, and as well as other stakeholders, when a mining group claims a "strategic resource access" motivation rather than one that is essentially institutional. In any case, even

5 Very little has ever been written about mining firm's sources of profit. Much traditionally comes from their share of mineral rent (due to high grades) but an unknown fraction, comes from the portfolio of mining, mineral processing, management, marketing, and other skills accumulated within the organisations of mining firms over time.

those mining groups whose environmental reporting was driven by institutional pressure are influenced indirectly by the resource access argument adopted by those groups they are imitating.[6] Following the analysis below we will return to the issue of motivation and the possibility of distinguishing between motives for reporting.

A separate and distinct reason for engaging in environmental reporting is that it may over time be used to differentiate mineral products from one producer from those of another (dirtier) producer. This argument is well known in other industries, and a number of examples of such strategies have been described, see Reinhardt (2000) and Arora and Gangopadyhay (1995).[7]

Assessment of environmental and social reports

In a recent paper Kolk (1999) has provided a thorough review of environmental report evaluations. This metaevaluation reviews the different criteria used to rate or benchmark reports. The criteria evaluated in the study were found to vary in terms of the level of detail they include but it was found that a number of core features were common to all ratings or benchmarking. These common features include the presence (or absence) of an environmental policy, environmental management systems, performance (against) targets, emissions data, liabilities and sustainability. Also common to most of the ratings of reports is the use of a more or less arbitrary system to describe the quality of reports. The UNEP/SustainAbility version, for example, award a maximum of 194 points spread over six categories.

All of the benchmarking covered by Kolk's metaevaluation, as well as others (e.g. Lober et al., 1997) has a focus on either a group of large firms (Fortune 50

6 The influence does not necessarily originate within the mining industry but may come from any industry with which the imitator comes into contact.

7 At this point in time industry representatives interviewed find the idea intriguing and also something they have discussed internally. However, they did not as yet see how such strategies would work in practice.

or Fortune 100), on those that happen to have published reports or on a specific sector. This is all of considerable interest as the practice of developing environmental reports and especially making use of them evolves. However, at best these ratings are a snapshot of reporting at a given point in time. Such exercises must be repeated at regular intervals in order to deliver information regarding the temporal development of reporting.

The survey described in this paper was approached as a web-based study, with the objective of finding mining companies using the Web as a core outlet of their environmental communication.[8] The Mining groups were selected from a base list of the 50 largest mining groups drawn from the Raw Materials Group (RMG) database.[9] From this list we selected a group of 30 mining organisations producing reports on the web. As noted in the introduction, this analysis primarily addressed the image mining firms project externally by reporting on environmental and social issues and was based on information from 1998 and 1999 reports available mid-2000. The group contained a roughly equal number of organisations from each of the four major mining centres in the world (Australia, Canada, South Africa and the US).[10]

After a primary analysis stage, most sites were revisited during the spring of 2001. During this secondary work stage, a handful of additional mining groups using the Internet for environmental and social reporting were identified and included in the analysis. In most instances reports from 1999 were used. Where these were not yet available, reports from 1998 were used. By the secondary

8 This approach simulates the reality of today, where users of environmental reports are unlikely to be willing to wait until a paper copy arrives by surface mail.

9 Access to the database was kindly provided by Mr. Magnus Ericksson of RMG.

10 Three reporters not on the top 50 list, Pasminco, Outoukumpu, Falconbridge and Cambior. Falconbridge is wholly owned by Noranda. These were included to represent slightly smaller mining groups. Firms in developing countries are clearly underrepresented in the list. A number of firms that were candidates for inclusion by virtue of their size had to be excluded because they did not have any form of web-based environmental reporting. This bias might have be reduced had we included printed versions in the study. However, since all candidates for inclusion in the study, even those based in developing countries, did have a web presence, and since none of

analysis stage, a number of newer (i.e. year 2000) reports were available, but these were excluded to facilitate comparison.

Our examination of the environmental and social communication activities of the mining firms indicated that there were a range of common categories of information contained in their reports. In order to provide a generally objective analysis relevant to this discussion, we developed a framework for assessing the reports based on the categories of information observed in the reports. This approach yielded in a total of 30 parameters or common data categories for cross industry comparison.

The core of our assessment is the definition of two key dimensions of external communication that allow us to identify four markedly different modes of overall behaviour shown by the mining groups in our sample. While the groups may not fully deserve the labels we have applied if one were to examine their behaviour "on the ground", we hasten to emphasize that we base our analysis, and consequent judgement, exclusively on the communication that firms have chosen to make public on the Internet.

The first dimension of our classification is the *motivation and openness* that a company expresses regarding social and environmental engagement, as indicated by the material presented in its report or web site. This is essentially an external dimension, in the sense that the categories on which this dimension of the rating is based are part of a communications strategy aimed at the constituencies deemed relevant by each firm. In a sense, the first category also reflects the individual firm's statement of intent in terms of it wants to do and be seen doing. The second dimension used in this is the *data richness* and the *performance reporting ability* of each of the companies. This is where firms have the opportunity to demonstrate how well they meet their own criteria. The focus on data richness and reporting ability reflects the degree to which a competence

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these mentioned any form of communication about environmental matters we consider the bias to be significant.

has been developed that is consistent with the statements and ambitions included under the first dimension.

Figure 1 illustrates the generic reporting patterns available to organizations within these two dimensions. The analysis addresses only the reporting behaviour of an organization relative to its peers and NOT the quality of the reporting against a set standard of excellence. The length of the arrow leading to "the complete report" is of indeterminate length.

Figure 1. Reporter Matrix

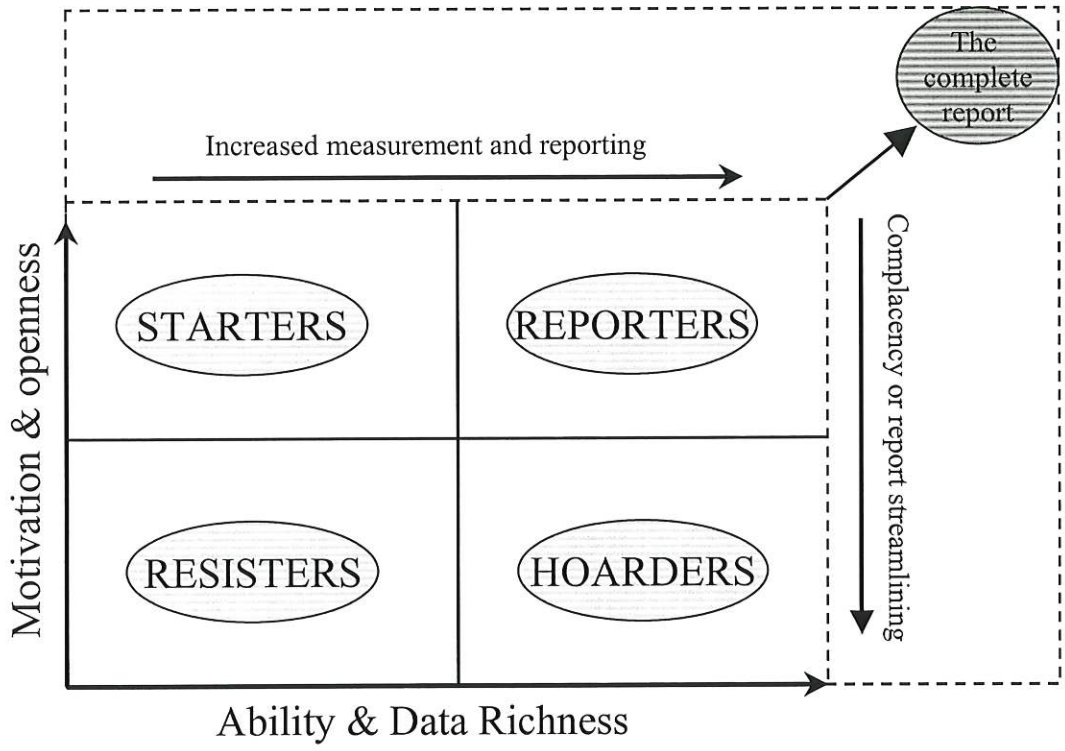


Table 1 lists the parameters we chose to determine the degree of *motivation and openness* and the *ability and data richness* displayed within each company's report. In the right hand column of the table we include the criteria according to which we rate firm performance within each parameter. Each parameter was scored as 0, 1 or 2 according to the following criteria:

0: Absent or essentially insignificant in depth or coverage.
1: Present but minimal in depth or coverage, or presented in a non-comparable form.
2: Present, covered to some depth and presented in a form directly, or nearly comparable to other reporting organizations.

The individual reporting categories were not weighted, and a score in each category was awarded on a comparative basis to the sample group.

Table 1. Report criteria assessed

Generic categories	Indicator or reporting categories	Maximum points	Performance matrix category & comment
Environmental and social commitments	Environmental policy Goals & targets Social policy Code of ethics Contributions Local social reports Foundations/research	14	Motivation & openness *Reflecting willingness to engage & support society*
Comparability and verification	Business level indicators Group level indicators External verification Comparable site indicators Comparable group indicators Progress summary	12	Motivation & openness *Reflecting openness to comparison with others*[11] *and to being seen as a corporate entity*
Environmental management	Financial liability or closure provisions EMS implementation EMS audits Risk Assessments	8	Data richness & ability *Indicative of ability to manage its environmental parameters & data*
Data and quantifiable operational performance indicators	Site level EPIs Fines Water, Land, Waste discharge SO_2, CO_2, Energy, Specific toxics & heavy metals Data pages	12	Data richness & ability *Reflecting data collection, management capacity and thoroughness.*
Health and safety	HSE incidents Safety system OHS monitoring	6	Data richness & ability *Health and safety is viewed in this report as a site operational indicator with social parameters, it also reflects site management capacity.*

11 Note that **comparison against others** is not presently the aim of mining groups that involve themselves in environmental and social reporting. It is presented here in the belief that cross sector comparability is in line with the general ethos of social responsibility, stakeholder involvement and openness, and that this functionality will be of interest to the industry.

This assessment is primarily concerned with the mechanistic thoroughness of the report, the accessibility of performance data, and the manner in which a number of social, health and developmental issues particularly relevant to the mining industry have been addressed. It does not judge the quality of the environmental or social performance *per se*. Nor has it been attempted to grade presentation factors such as readability, layout, clarity, and Web-site user-friendliness. A report scoring highly in both dimensions of this assessment is one that is full of both raw and normalised environmental, and health and safety (EHS)[12] data. The presentation of the data will allow site-by-site, and organization-by-organization performance comparison, and such a report will contain clear communication of a range of social commitments, and listings of financial commitments to social, or environmental work. The reasoning behind the placement of the various organizations within the distinct groupings is explained in the following sections.

Given that we base our assessment of reports on the total suite of observed indicators it is necessary to comment on their origin. A number of the categories were identified from the reports of mining groups that are signatories to the Australian Minerals Industry Code for Environmental Management (Minerals Council of Australia, 1996). This code was developed with considerable involvement of the Australian organisations assessed in this study and they are also the high scorers, as indicated below. However, the code does not specifically set out reporting categories. Rather, it limits itself to defining what signatories should do (be in compliance, both in fact and in spirit, facilitate community partnerships and report on environmental performance and code implementation).

The observed indicators are thus the outward expression of how the mining groups see themselves in relation to the code, at least as far as Australia is con-

12 Note that health and safety performance of both workers and neighbour communities are also key issues for the industry.

cerned.[13] By relying only on the indicators observed in actual reports, we have intentionally avoided a normative approach, even if this means that we may be criticised for measuring the less extensive reports to a standard defined by the strongest reports. To address this would require an extended discussion of the relative merits of various proposed reporting formats and details. More importantly, we are primarily interested in how and why mining groups use reports as they do and for this purpose a normative approach would not add value to our discussion.

Observed communications performance

Our assessment of the communications performance of mining companies found that performance across the industry could be semi-quantitatively described by the four generic categories shown in figure 1. The graphing of the numerical results obtained from two axes applied in the analysis is shown in Figure 2. Commonality of reporting behaviour was observed in each of the groupings. Generic profiles for each of the four quadrants identified in figure 1 are described here. Note, however, that we refrain from distinguishing too closely between the groupings. It can be seen from Figure 2, that Figure 1 was significantly idealised. For example, there are many organisations that could be deemed to be either resisters, or starters. However in the application of qualitative measures, the difference becomes quite clear. A good example of a starter for example is an organisation that makes unequivocal commitments via an environmental policy and/or code of ethics. This may even be in the absence of any significant legal requirement to perform environmental works. While, they may have no data as yet to show evidence of progress and have a correspondingly low score, it is clear that a start has been made.

Starters (upper left-hand corner) observed in the study are typically taking the first steps towards external reporting, or are at least pledging to do so. A typical

13 The MIM web site (see: www.mim.com.au) refers to a grading of reports in relation to the code carried out by the World Wildlife Foundation.

starter has communicated an environmental policy, has initiated dialogue, and commenced forms of external communication. Communication is likely to focus on social activities, and the development of EMS structures, but a *starter* is yet to produce a report containing significant amounts of environmental data. The *starters* examined in this analysis appeared to be motivated by increased external scrutiny although this can take various forms and have different underlying reasons for development. One example that reflects this could be the new international profiling associated with a head office move from South Africa to London on the one hand, while another could be a reaction to strong negative publicity and public censure as a result of poor environmental performance in a developing country, or the occurrence of an accident with wide environmental impact.

Resisters (lower left-hand corner) have generally made no attempt at an environmental or social report of the type delineated earlier in this paper and do not actively communicate an environmental policy, or in some cases even evidence that they have one.[14] It is not unusual for a *resister* to limit external their external reporting activities to financial performance, share price and ore reserves. While *resisters* may show little evidence of willingness to engage in social or environmental areas, they may have significant unheralded capacity for external reporting and communications should they wish to do so. Resisters, for example, have considerable "hidden" capacity for reporting if they are subject to statutory reporting requirements for any release to the environment (i.e. they may have to report under the US Toxic Release Inventory, the Canadian National Pollution Release Inventory or the Australian National Pollution Inventory). The data that they are required to collect and publicly report for specific operations is also highly likely to be suitable for broader environmental reporting. Resisters may also be pursuing certification in an environmental management system such as ISO 14001, a process that in itself requires considerable levels of internal data collection and monitoring (Roberts and Robinson, 1998).

14 While some of these organizations may have policies, no material or statements were found for when examining their web-based information.

Hoarders (lower right-hand corner) are typified by the withholding of data or performance details. They seem rather unwilling rather than unable to provide information allowing comparison with other groups, and thus avoid normalisation of site or group data relative to production figures. A *hoarder* may also choose non-standard performance metrics, again hindering cross-industry comparison. Hoarders appear to focus on local stakeholders, supplying site data but avoiding aggregation to commodity, group or company level. When utilising the Internet as a communication vehicle, a *hoarder* may include data, but makes it inaccessible to all but the most determined and expert searcher by setting it deep within a much broader web site. It is not always clear if a *hoarder* has entered this category by ascent from the category of *resister*, or whether they have fallen from the category of *leader*.[15] An actor in this category may have been publishing external environmental and social reports of significant detail and quality for some time, but their report has failed to achieve the degree of completeness required for the status of *reporter* in this analysis. A *hoarder* could also be a generally *resistant* actor that has demonstrated the ability to collate performance data but carefully limits communication of it to stakeholders.[16]

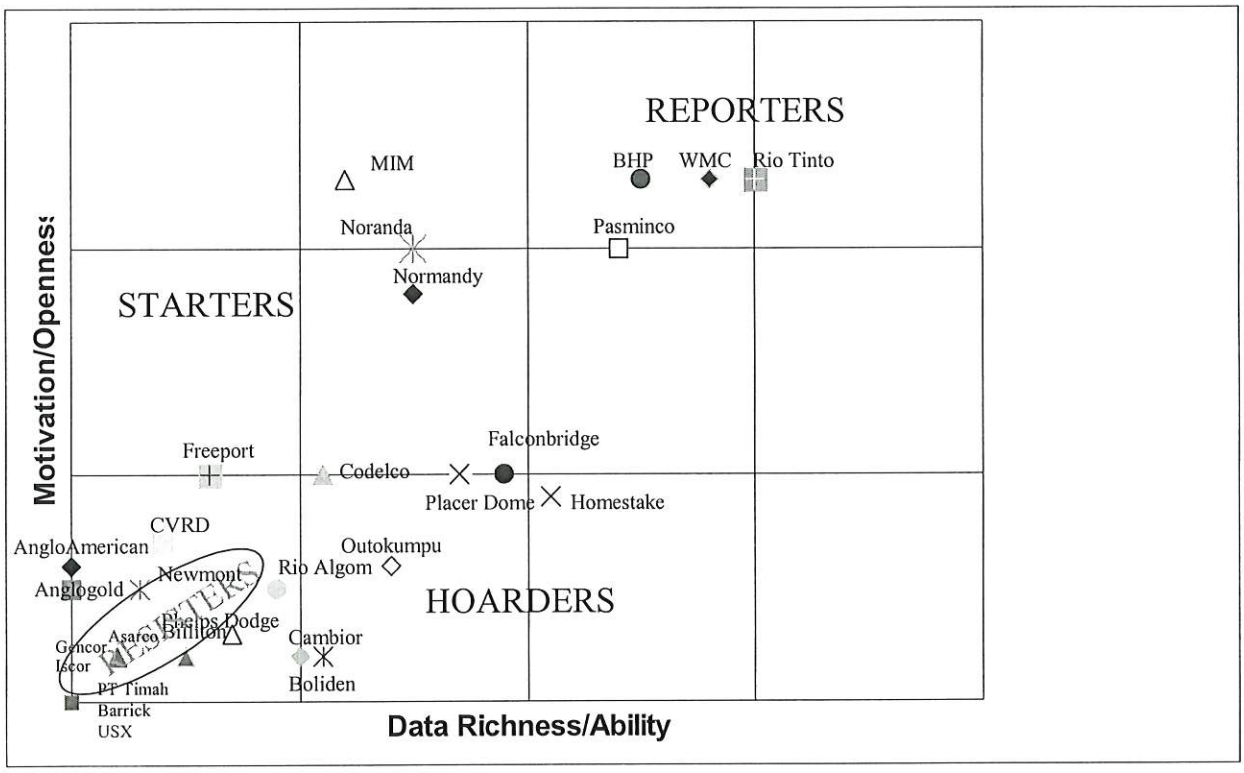
Reporters are presently publishing external environmental and social reports of quality and detail that significantly exceeds the rest of the industry. While a *reporter* may relatively recently have been a starter, their reporting is rapidly approaching "best practice". A *reporter* seems willing to present site or aggregated organisational performance in a manner that allows comparison to other organizations. This data addresses a range of generic resource intensity indicators such as energy (GJ consumed/tonne metal) and environmentally related parameters such as hectares of land disturbed/rehabilitated at one or more organ-

15 It may also be the case that the company has maintained a certain standard of reporting that was a "reporter" standard in the past, but has failed to (or chosen not to) further develop their report following the formats and habits of other organizations.

16 Some of the mining groups that fall into this category were among the first to publish significant documents relating to environmental performance. It is interesting to note that they have either reversed their reporting strategy or have been overtaken by more communicative competitors. A longitudinal study of reports would reveal such changes but would require study of the paper documentation pre-dating Internet reports.

isational level (i.e. for a copper group, and/or for the entire organisation). Reports also include detailed data sheets allowing a motivated reader to perform their own limited data manipulation exercises. It is interesting to note that reporters are presenting such data in forms reminiscent of more "accepted" performance indicators. A good example being Lost Time Injury Frequency Ratios (LTIFs) included in health and safety statistics. (e.g. These are more or less universally accepted and are reported across a wide range of industries. Nearly all reporters present data in such volumes that a layman is perhaps overwhelmed.

Figure 2. Plot of environmental reporting status



Discussion

The purpose of rating or benchmarking environmental reports is to determine which firms are doing most to provide stakeholders with information. From this perspective the best performers are those we have labelled 'reporters' and the

worst are the 'resisters'. Putting starters ahead of hoarders is not necessarily appropriate and would depend on what dimension is deemed to be more important. It is also interesting to note that for some reason there is an overlap between three of the four categories and the major home country of the mining groups: Reporters are Australian, Hoarders are from Canada and Resisters are based in the US. Starters also show consistency in that they are likely to be based in a developing country or an "emerging" economy. These broad summaries in fact hide more interesting variations as well as possible explanations for the observed patterns.

One item was clear - the leading organizations producing open, data rich reports that are comparable to some degree all have operations based in Australia. This reflects at least three important drivers: high expectations for environmental performance from the citizens of a developed country, the effect of the Australian minerals industry "Code for Environmental Management", a voluntary self regulatory code initiative launched in 1996. The code requires reporting and is explicitly aimed at improving the reputation of the industry. The learning and practices generated during Mining Council of Australia participation in activities such as Australia's Greenhouse Challenge Programme launched in 1996, promoting the generation of greenhouse gas inventories and greenhouse gas emission reduction also had synergistic effects on the quality of code implementation.

The Canadian miners – the same companies that led the environmental reporting trend from the early 1990s, are dominant in the *hoarder* category. Organizations representing the minerals sector such as the Mining Association of Canada and Natural Resources Canada appear to have engaged the industry in a different manner. These Canadian "motivators" seem to have focused their attention on regulatory compliance categories related to the Canadian National Pollutant Release Inventory.[17] While this practice produces one picture of performance –

17 The NPRI in Canada has been in use for significantly longer than the newly launched NPI in Australia, it has thus (presumably) had a much larger influence in the development of performance indicators etc. in the Canadian industry. Indicator development for the major miners in

"substance release to the environment", it is far from meaningful in the mining perspective. In many instances, the impact of mining is activity specific rather than substance specific. For example the assessment of tailings disposal performance requires indicators far more specific performance measurement than the NPRI indicators of "metal to water" or "metal to land" can yield. Metrics detailing land use, volumetric emissions, bioavailability *and* the relative metals content are required to give a clearer picture of environmental performance.

The dominant reasons for the less quantifiable nature of the *hoarder* reports are not known. It is possible that there is a calculated avoidance of perceived dangers of comparability,[18] but other factors are also likely. For some groups, their reporting habits may be explained in part by the low levels of environmental activism against mining in their home countries, by their medium size – and the consequent lack of personnel resources, or by a combination of both.[19]

Thus, within the framework for analysis applied in this assessment, it was found that while actors in this group have strong reputations as being proactive, have detail data available, and have a generally good international record for their reporting, they are producing reports that are less open, comparable and meaningful than the *reporters*.

At first glance the performance of some of the groups that we judged to be *starters* does not really appear very different from resisters. This is where a subjective analysis is unavoidable. A tone of openness or commitment was apparent in the material presented by these companies that hinted that more was to

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Australia has been much more focused on comparability – the lack of an NPI, and the diversity of the companies operating in the South East Asian area may have contributed strongly to this.

18 According to ERM in their report - *Corporate Reputation and the Internet – An ERM Survey*, ERM UK. http://www.erm.com/ERM/website.nsf/pages/ermworldwide Accessed 9 September, 2000, The language of protest web sites indicates the perception of a 'corporate big brother' image that damages credibility, they claim that comparisons with performance of other companies could even be counter-productive as it might engender this image.

19 A lack of report generating resources, especially for web site management, was highlighted by the (then) Vice President Environment of Boliden AB, Sweden. Personal communication, Lars-Åke Lindahl, August 2000.

come. There is also the link to circumstance. These are not organisations that have been subject to TRI or tough regulatory regimes, but now for various reasons they are choosing to move. There appears to be a desire to follow the leaders (as opposed to leading). Given their size and traditional role in society, mining groups such as CVRD and Codelco found in this group, are likely to remain acutely aware of their social role.

In contrast, it seems like some of the groups that fall into our broad group of *resisters* do not feel the need to share information about environmental performance with the general public. Among these firms we find mainly those with their core operations in either the United States or South Africa. It is likely here that local institutional arrangements influence the extent and scope of reporting. For example, all of the US firms report emissions to the Toxic Release Inventory. Having done so they make no further attempt to communicate their environmental or social performance. An additional explanation may be that firms active in a highly litigious environment, with most of their operations subject to this, are reluctant to disclose any information that may later be used in legal proceedings against them.

Concluding remarks

This paper set out to analyse the way in which mining groups present their environmental and social performance using materials available on the web sites of individual companies. The basis for comparing groups was a suite of indicators defined on the basis of what is actually in the published reports representing a cross-section of the industry based on 1999 environmental reports. By design, no normative judgements have been made, except to the extent that we introduce comparability of performance as an overall theme.

The outcome of the analysis is that four categories of mining groups can be discerned: Reporters, starters, resisters and hoarders. The significant overlap between firms in each category and the geographical location of their home base

and major operations suggests to us that specific cultural and institutional preferences play a strong role in determining the extent of reporting.

Reports are voluntary and we believe that the pressure leading mining groups to report can be explained as either a resource dependency pressure or an institutional pressure. Resource dependency is predicated on the notion that firms will undertake whatever actions are required to ensure that they have access to the resources they need at the lowest possible prices. Institutional pressures may ultimately have the same rationale, but in the sense that some groups observe what others are doing and conclude that this is an attractive approach worth copying.

When seen in the broader perspective of general environmental reporting by industry, many mining groups have a long way to go if the objective is full and verified and comparable reporting of actual impacts on a site-by-site basis. In this, overall trends are not encouraging. KPMG, the accounting firm, has reported that the number of environmental policies including explicit reference to discharges to the environment (one of the most tangible and measurable impact areas) decreased from 64 to 46% between 1996 and 1999 (KPMG, 1999). Similarly, when John Elkington says that "Even as pilot companies wrestled with the GRI 'exposure guidelines for sustainability reporting'. Progress has even been reversed in some companies" he strengthens the hesitation seen in the KPMG report (Elkington and Wheeler, 2001). For mining this is in part borne out by the relative scarcity of groups scoring high on both of our identified dimensions.

Closer examination of the reporting observed here raises a number of questions for future research. The first is the relationship between firms and their hosts. Hosts have traditionally been concerned with mineral rent taxation and with the export earnings generated by mineral activities. However, although sustainability requires much of individual mining firms in terms of legal compliance and the environmental impacts they create, a very large part of the responsibility for ensuring sustainability rests with sovereign governments. Governments are re-

sponsible for the institutional and regulatory set-up under which mining takes place and they are also fully responsible for conducting macro-economic policy in such a way that it meets the criteria for sustainable development. However, even if the government is formally responsible, the world of mining is familiar with many instances where governments take their responsibilities less seriously than they should. That raises the question of how mining groups might themselves demonstrate that they behave in a responsible way. Here, one approach could be to commission independent assessments of the externalities caused by a specific operation as seen with different eyes than those of the mining group.

The second matter that deserves attention, both from a research and an applied perspective, is the degree to which reporting strategies produce the expected results. Here several avenues are open. One dimension is the temporal distribution of reporting and the degree to which the scope of reports change over time. This would require first a mapping out of how reporting, as a whole, takes place every year over a longer period and then analysis of how individual groups are placed in relation to this field. With the proviso that our resource dependency rationale is correct, the idea that mining groups are constantly trying to approach the leaders in the field in order to eliminate their first mover advantage underlies such an approach. A very different, and much more difficult dimension, involves measurement of success for a reporting strategy. Rare is the case where reporting can be directly linked to a single outcome variable such as the cost of capital. If we are to follow some of the reasoning for engaging in reporting cited in the first section, then access to land is a major driving force behind reporting initiatives. However, evaluation of the success in terms of land obtained is made extremely difficult by the structure of land allocation institutions in many countries.

A final matter that could bear further analysis is the link from reporting to mineral products and life cycle assessments. Although still a highly academic proposition, the idea that firms can differentiate their normally homogenous mineral and metal products along environmental lines is quite feasible if de-

mand exists. Under such circumstances those firms with the ability to produce the "greenest" metals (naturally at a price premium that will not choke off demand) will need the type of data found in some of the better reports examined here to prove that their claims about environmental and social impacts are in fact true.

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Appendix: List of Companies Included in Graphical Comparison 22 May 2001

	Company name	Web address
1	Anglo American	http://www.angloamerican.co.uk
2	AngloGold	http://www.anglogold.com/
3	Barrick Gold	http://www.barrick.com/
4	Billiton	http://www.billiton.com/
5	Boliden	http://www.boliden.se/
6	Falconbridge	http://www.falconbridge.com/
7	Freeport	http://www.fcx.com/
8	Inco	http://www.incoltd.com/
9	Noranda	http://www.noranda.com/
10	Outokumpu	http://www.outokumpu.fi/index1.htm
11	Pasminco	http://www.pasminco.com.au/
12	Phelps Dodge	http://www.phelpsdodge.com/
13	Placer Dome Inc	http://www.placerdome.com/
14	PT Timah	http://www.pttimah.com/
15	Rio Algom	http://www.rioalgom.com/
16	Rio Tinto Plc	http://www.riotinto.co.uk
17	BHP	http://www.bhp.com.au/
18	Western Mining Corp.	http://www.wmc.com.au/
19	Cambior	http://www.cambior.com
20	CVRD	http://www.cvrd.com
21	Codelco	http://www.codelco.com
22	Homestake	http://www.homestake.com
23	Newmont	http://www.newmont.com
24	North Limited	http://www.north.com.au
25	Gold Fields Ltd.	http://www.goldfields.co.za
26	Teck Corporation	http://www.teck.com
27	Iscor	http://www.iscor.com
28	Gencor Ltd. South	http://www.gencor.com
29	MIM Holdings Ltd.	http://www.mim.com
30	Normandy Mining	http://www.normandy.com
31	USX Corp.	http://www.usx.com
32	Asarco	http://www.asarco.com

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