

# Response to Discussion Paper: Maximising our Mineral Potential: Stocktake of Schedule 4 of the Crown Minerals Act and beyond

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## Introduction

This document contains the responses of the Branch to the Discussion Paper “Maximising our Mineral Potential: Stocktake of Schedule 4 of the Crown Minerals Act and beyond”, which was released jointly by the Ministry of Economic Development and the Department of Conservation on 22 March 2010.

Schedule 4 was added to the Crown Minerals Act by an amendment to the Act in 1997. The changes were superimposed on the existing system of management and environmental regulation comprising the Resource Management Act and the requirement to obtain the consent of the Minister of Conservation on Crown Land. The existing system has a number of failings and the discussion document proposes some quite minor changes to tackle them.

A number of estimates have been made of the value New Zealand’s mineral potential over the last decade (Christie and Brathwaite, 1999; Barker, 2008; McDouall Stuart, 2009). These indicate mineral potential with a value exceeding \$100 billion, just for onshore metals. Unfortunately this has led some to conclude that the resources are there for the taking, and there is a general failure to recognise the challenge we face in exploration, discovery and development if this potential is to be realised.

We need to lift our game in management and government policy, and this review is a welcome step towards achieving that. Success will also require advances in education, research and development, and above all, investment in exploration.

Current mine output is dominated by just 3 mines – the Martha gold-silver mine at Waihi, the Stockton coal mine on the west coast, and the Macraes gold mine in Otago. These have all been operating for more than 20 years, and the only new development in the pipeline is the Pike River coal mine. It is based on resources delineated in the 1980s. Recent significant gold discoveries have

been confined to extensions of known deposits and nearby discoveries at Martha, Macraes and the Reef ton gold mine, and expansion of coal mining of known resources.

A quantum increase in exploration is required, and the potential is there to dramatically increase the value of the minerals that we produce.

By way of introduction to our organisation, the Australasian Institute of Mining and Metallurgy ('The AusIMM') is the pre-eminent organization representing professionals in the minerals sector in the Australasian region. The New Zealand Branch itself represents some 250 members, all of whom are involved in the minerals industry in some capacity - in R&D, through GNS, Universities or consultancies, and in mining and exploration, through private and public companies and service providers. Our members have first hand experience of the application of policy measures that impact on minerals R&D, exploration, and production. Consequently they have insight into the measures that have proven successful, understand what is needed to maintain the competitiveness of the minerals sector, and therefore agree with the Government's position that the minerals sector has the potential to enhance New Zealand's economy in the medium to long term.

The AusIMM agrees that a balanced discussion on the issue gives an unparalleled opportunity for New Zealanders to understand the potential value of our mineral resources and to discuss the use and constraints applying to them. We fully support these initiatives, and welcome the chance to comment on them from an industry perspective.

Our responses to the stated questions are as follows:

## **Q1 On the areas proposed for removal from Schedule 4**

*Section 7 of this document sets out the areas proposed for removal from Schedule 4. Do you think these areas should be removed from Schedule 4 so that applications for exploration and mining activity can be considered on a case-by-case basis? Yes or No? And why?*

The AusIMM strongly supports the removal of the proposed areas from Schedule 4.

We accept that the Discussion Document clearly describes the mineral potential in each area, which is high. Additional exploration in these areas, which we encourage, may well lead to the discovery of new orebodies.

Furthermore, we recommend the Government considers excluding the rest of the DoC land on the mainland Coromandel Peninsula from Schedule 4. The Ministry of Economic Development, the New Zealand Minerals Industry Association, the Thames Coromandel District Council and several locally based environmental groups have spent several years getting the District Plan mining provisions formulated, with hearings by the Council and the Environment Court, and appeals to the High Court and Court of Appeal. The Plan's mining provisions were finally resolved by agreement among the parties mid-2009. The resource management regime for mining is now in place, which acts to protect these areas from adverse environmental effects.

## **Q2 On the areas proposed for addition to Schedule 4**

*Section 8 of this document sets out the areas proposed for addition to Schedule 4. Do you agree with the proposal to add these areas to Schedule 4? Yes or No? And why?*

The Branch is not aware of the mineral potential of these areas, so cannot comment on the potential loss of opportunity should these areas be included in Schedule 4.

## **Q3 On the assessment of areas:**

*The assessment of areas covered by Schedule 4 and those proposed for addition is outlined in sections 7 and 8 of this document and Appendices 1 and 2.*

*(a) What are your views on the assessment of the various values (conservation, cultural, tourism and recreation, mineral, other) of the land areas discussed?*

*(b) Do you have any additional information that may be important for Ministers to make their decisions?*

The Branch commends the Ministers for assembling a document that is balanced and informative. Given the research available to date, the document accurately portrays the known mineral potential of these areas. However, we consider that assessments of the mineral potential of some of these areas could be improved by further desktop studies involving analysis of existing geological, geophysical and exploration data. Note that we accept that “mineral potential” in no way implies “mineability” in terms of economics, engineering or environmental considerations.

We are not in a position to comment on the other values of the areas mentioned.

## **Q4 On the proposal to further investigate the mineral potential of some areas:**

*The Government is carrying out a research and investigation programme on the mineral potential of areas with significant mineral potential over the next nine months, including the Coromandel, parts of Paparoa National Park and Rakiura National Park, and a number of non-Schedule 4 areas.*

*(a) Do you have any comments on the type of information that would be the most useful to mineral investors?*

*(b) Are there any particular areas that the Government should consider including in its investigation programme?*

The Branch commends the Government for this initiative. It is an important step in helping to define the mineral potential of New Zealand.

- (a) For the areas listed in the North Island, the most useful techniques would be airborne geophysical surveys, including magnetic, radiometric, electromagnetic, and gravity (Christie et al., 2001, 2008). Epithermal mineral deposits in the Hauraki Goldfield have pronounced geophysical signatures that result from hydrothermal alteration of their host rocks. The outer limit of hydrothermal alteration is closely approximated by destruction of magnetite in the host rocks, and this can be effectively mapped by aeromagnetic surveys (e.g. Harris et

al., 2005; Morrell et al., 2010). The core of hydrothermal alteration haloes is defined by potassium metasomatism, and this can be detected by airborne radiometric surveys (e.g. Mauk and Simpson, 2007; Warren et al., 2007; Morrell et al., 2010).

Some of the largest epithermal deposits in the Hauraki Goldfield are associated with distinct gravity anomalies, including the Waihi vein system, Karangahake, and Golden Cross (Locke and de Ronde, 1987; Harris et al., 2005; Morrell et al., 2010). Airborne gravity surveys could rapidly acquire data over large tracts, which would be useful for basic geological mapping, and also may enhance mineral prospectivity.

Aeromagnetic, radiometric and gravity surveys over the South Island's intrusive terranes would also be useful in aiding geological mapping, and importantly identifying areas of hydrothermal alteration and structural features that are potentially associated with mineralisation.

Ground-based electromagnetic surveys can be useful in exploration for a variety of metallic mineral deposits, and airborne electromagnetic surveys may yield useful results in the North Island (Allis, 1990). Airborne geophysical surveys have the added advantage of allowing close line spacing and acquisition of very closely spaced measurements (commonly <5 m apart). The resultant data is useful not just for mineral exploration, but also for basic geological mapping, and the recognition and definition of geological hazards.

Some areas in the North Island with high mineral potential have not yet been mapped in detail. High-quality geological maps, at a scale of 1:50,000 would greatly enhance mineral exploration by providing an appropriate geological framework for understanding regional mineral belts and local mineral deposits.

We agree that geochemical surveys would greatly enhance mineral prospectivity in New Zealand (Christie et al., 2001). Although MMI is indeed an exciting technique (e.g. Mann, 2010), its use in soil surveys is necessarily concentrated in smaller areas where more closely spaced samples are required. Given the nature of the proposed programme, its large scale, and its importance in providing baseline data, we believe that stream sediment surveys over large areas with high prospectivity would be a far more effective way to delineate geochemical background values in different geological terranes, and also to identify geochemical anomalies that warrant additional exploration (c.f. Coker, 2010).

At the right scale, soil geochemistry surveys may be an excellent choice, and we would support acquisition of soil geochemical data from the A/B and C horizons on a nominal 1 km spacing, using either aqua regia or four-acid digestion. This type of sampling would provide (a) much needed baseline data over large areas that would serve local exploration programmes by defining "background" concentrations of metals and pathfinder elements; (b) data on shallow and deep soils that would be useful for agricultural purposes, and also to assess possible anthropogenic contamination of soils (e.g. Taylor and Kim, 2009); and (c) these surveys may identify large areas of anomalous mineralisation that may envelop smaller concentrations of higher-grade mineralisation.

We advocate the consistent use of low level, multi-element analyses of these regional soil and drainage sediment geochemical samples. Modern analytical methods can determine very low levels of pathfinder elements potentially associated with poorly-exposed or blind ore mineralisation.

As a final comment, the allocation of \$4M and a nine-month time frame over the many areas described in the Discussion Document seems to the Branch to be too little money over too short a time frame. Detailed geological maps, for example, take years to produce, and yet these are the cornerstone of any exploration programme, whether for metallic mineral deposits, or coal, or hydrocarbons. Regional geochemical surveys would likely take 1-2+ years to complete and interpret. Seasonal weather restrictions, especially in the high country, would need to be factored in, as would availability of geophysical contractors. As a way forward, we strongly encourage the government to consider increasing the budget and time allocation for this work, and for overall funding increases for ongoing Earth Science research in New Zealand.

- (b) We concur with the recommendations in the report that Northland, the entire Hauraki Goldfield of the Coromandel Peninsula, and strategic parts of the central North Island are key areas to highlight for this work. We also agree that the South Island areas mentioned in the report are important, highly prospective, and underexplored. We also contend that, additionally, parts of the Paparoa Wilderness Area (currently within Schedule 4) are prospective for detachment fault-related precious metal mineralisation (e.g. Tulloch, 1988).

## **Q5 On a new contestable conservation fund**

*Section 9 describes a proposed contestable conservation fund the Government proposes to establish, which would be made up of a percentage of the money the Crown receives from minerals (except petroleum) from public conservation areas.*

*(a) A broad objective, to enhance conservation outcomes for New Zealand, is proposed for the fund. Do you agree with the proposed objective?*

*(b) What do you think the fund should be used for? What should its priorities be?*

*(c) An independent panel appointed by the Minister of Energy and Resources and the Minister of Conservation is proposed to run the fund. Do you think this is a good idea?*

*(d) It is proposed that half of royalties from public conservation areas are contributed to the fund, with a minimum of \$2 million per year for the first four years, and a maximum of \$10 million per year. Do you think the amounts proposed for the fund are appropriate?*

*(e) Do you have any other comments that might help the Government to make decisions on a new conservation fund?*

The Branch supports this initiative, and agrees with the proposed objectives, administration and quantum. We attach the proviso that the fund is used for projects that are likely to benefit communities affected by mining, and is not hijacked by other interests.

## Q6 On approval of access arrangements

*In section 6 it is proposed that the joint approval of the land-holding Minister and the Minister of Energy and Resources be required for an access arrangement on Crown land for mineral exploration or development. Do you think this is appropriate? Why or why not?*

Whilst we feel some concern about potentially complicating the access process by requiring approvals from an additional ministerial source, we support in general terms the concept of introducing the requirement to take mineral potential into account in determining access. We agree such a system would be appropriate, and could result in better recognition of the potential economic value of New Zealand's underexplored mineral resources.

## Q7 On any other issues

*Do you have any further suggestions or comments on what has been said in this document?*

The Branch commends the Government for releasing this document. It is based on available data that constrain the mineral potential, and conservation and other values of land, in Schedule 4. We fully support the initiatives to expand New Zealand's geological, geophysical and geochemical database in other prospective areas, and strongly urge the Government to consider additional funding and increased timelines to achieve this. Thank you for the opportunity to comment.

Finally, the AusIMM concurs with and endorses the submission made by the New Zealand Minerals Industry Association.



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