

## Submission to the Resources 2030 Task Force

One of the key questions provided to guide stake-holder consultation to this review was:

**What do we need for Australia's education institutions and research organisations to develop a workforce with the required skills to 2030 and beyond?**

### Our Recommendation:

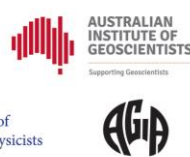
**Institute micro-credentialed professional training, as a pre-requisite for working as a Mineral Exploration Geologist, possibly administered by the relevant professional bodies (e.g. AusIMM and AIG), that provides the required bridging competencies not currently provided by the tertiary education system.**

### Background and Discussion

Our submission in response to this question is that we need to develop a structured program of training for geoscientists to work in mineral exploration that provides them, in the most effective way possible, with the skills and competencies required to be successful mineral explorers.

Our current model for turning geoscientists into mineral explorers essentially relies on the “on-the-job” mentoring and training opportunities provided by their early employers. This is an *ad hoc* and inefficient process. If an analogy is made with the medical profession, it would be the equivalent of giving young doctors a degree in human anatomy and then expecting them to learn on the job by a process of example and trial-and-error. Clearly, as a society we do not think this is acceptable. In the same way that there is a large gap between knowledge of human anatomy and competence in medical practice, there is also a large gap between knowledge of geoscience and competence in mineral exploration.

Furthermore, the non-technical challenges (ie interacting with local communities) of the mineral exploration business have increased significantly in recently years and become central to the day to day work of mineral explorers.



Some of the knowledge, skills and competencies required to be an effective mineral explorer that are typically either not covered, or inadequately covered, in a typical geoscience degree include the following:

#### Compliance and Licence to Operate

- Safety and environmental management issues
- Dealing with community and stakeholder expectations; Social Licence To Operate issues (the young exploration geologist is often the first point of contact in the engagement process for many communities)
- Legislative and compliance issues that govern the exploration process, including Land Access and Indigenous Heritage
- Public reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code) including Exploration Targets, the VALMIN Code

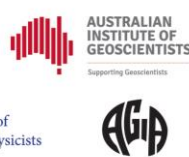
#### Technology

- Geophysics, geochemistry (including *in situ* analysers), drilling, logging and remote sensing and how best to deploy these
- Data management and database principles
- Sampling theory and assaying techniques
- Statistics, geostatistics and estimation principles

#### Exploration Theory

- Effective exploration planning from the strategic to the tactical scales
- The exploration targeting process and how to organise this across multiple scales, and to synthesise information from multiple data sources
- The relationship between Mineral System understanding and targeting criteria
- The basic nature of the exploration process and its critical business dynamics (base-rates, importance of false-positive rates, embedded option value)
- Orebody signatures and their manifestations, at multiple scales, in available data; relating to this, effective links with available direct detection technologies
- How to best access relevant available public domain data

#### People



- Leadership of multi-disciplinary teams
- The impacts of heuristics and biases on exploration decision making

### Commercial

- Mineral economics including market supply and demand, cut-off grade theory, and the difference between a discovery and a mining proposition
- The broader business environment for mineral exploration
- Commercial aspects of mineral exploration (including, in the more advanced course, capital raising processes).

It is considered that this training would be best delivered in at least two stages; a first course, after initial graduation followed by a more advanced exploration management course after about 10 years. Four to six weeks would probably suffice for the first course and one to two weeks for the later, more advanced course.

These courses do not need to be formal academic qualifications (eg Graduate Diplomas) and might be considered an example of the modern trend to “micro-credentialing”. This may be best administered through professional organisations such as AusIMM or AIG, and be incorporated into their ongoing schemes for tracking and encouraging professional development.

We consider government support will be required and we call upon the task force to establish a mechanism to champion this important endeavour. It is also important that the curriculum for these courses, their delivery and assessment of learning outcomes be approved by an expert consultative body with significant exploration industry experience.

This submission has been produced by the following officers of the AGC:

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