

To: Department of Industry, Science and Resources

Re: Diversity in STEM Review

12 May 2023

Introduction

AMEC appreciates the opportunity to provide a submission to the Australian Government's consultation to develop a pathway to increasing diversity in Science, Technology, Engineering and Mathematics (STEM). STEM will play an increasingly important role in Australia's mineral exploration and mining industry, as we rapidly transition towards net zero. Ensuring there is a steady stream of representative, STEM-qualified employees and jobs, will underpin the success of this transition.

About AMEC

The Association of Mining and Exploration Companies (AMEC) is a national industry association representing over 540 member companies across Australia. Our members are mineral explorers, emerging miners, producers, and a wide range of businesses working in and for the industry. Collectively, AMEC's member companies account for over \$100 billion of the mineral exploration and mining sector's capital value.

Mineral exploration and mining make a critical contribution to Australia's economy, directly employing over 274,000 people. In 2020/21 Industry generated a record high \$301 billion in mining exports, invested \$3.2 billion in exploration expenditure to discover the mines of the future, and collectively paid over \$43.2 billion in royalties and taxes.

Australia's Diversity in STEM Review

General Comments

AMEC welcomes the review of pathways to diversity via STEM, as an important acknowledgement of the necessity of both diversity and inclusion, and STEM, in the current and future minerals industry.

Recommendations and findings outlined in the recent Commonwealth Respect at Work¹, and WA Parliament Enough is Enough Report², have highlighted the importance of diversity in our workforces, and particularly, in leadership roles. There is, and will continue to be, a notable shift in the management and composition of the current and future workforce, as more diversity and innovation practices are implemented across industry. Increasing flexibility and innovative approaches to the future workforce, will serve as a key determinant of the success of these practices.

¹ <https://humanrights.gov.au/our-work/sex-discrimination/publications/respectwork-sexual-harassment-national-inquiry-report-2020>

²

[https://www.parliament.wa.gov.au/Parliament/commit.nsf/\(Report+Lookup+by+Com+ID\)/EF1DF1A3F5DF74A848258869000E6B32/\\$file/20220621%20-Report%20No%202.pdf](https://www.parliament.wa.gov.au/Parliament/commit.nsf/(Report+Lookup+by+Com+ID)/EF1DF1A3F5DF74A848258869000E6B32/$file/20220621%20-Report%20No%202.pdf)

Global and domestic environments have undergone recent significant shifts which the Commonwealth is seeking to rapidly address; the need for a swift transition to a decarbonised economy, and the need for supply chain security. The role of Australia's minerals sector in supporting the ongoing delivery and maintenance of these objectives, cannot be understated.

In order to achieve net zero targets and capture supply chain opportunities, there must be a concerted effort to develop a steady career pipeline of STEM professionals, starting from an early high-school age.

Diversity in Australia's mineral exploration and mining sector

Across Australia's mining sector, it is estimated approximately 20% of roles are held by women. In a 2021 survey conducted by AMEC³ to inform our submission to the WA Parliament Select Committee's 'Standing Inquiry into sexual harassment against women in the FIFO mining industry', a further analysis of those figures identified approximately 5% of on-site leadership roles were held by women and / or under-represented groups.

This analysis was undertaken at short notice across AMEC's membership. There is opportunity to gain a more transparent understanding of the actual figures of representation across our workforce, both in head offices and in leadership positions onsite, through increased data collection and analyses. These statistics are not typically collected in Workplace Gender Equality Agency (WGEA) reports unless there are over 100 employees. However, State / Territory Safety Regulators collect workforce and incident safety data. There is ample opportunity to enhance their data collection and analyses, without duplicating reporting requirements or frameworks.

The findings and recommendations from the Enough is Enough Report will continue to be addressed and progressed by AMEC, our members, and other industry members. The provision of safe workplaces for our workers, is the top priority. Culture emerged as a strong theme across the Inquiry, and can influence attraction, retention, and overall employee satisfaction. There was recognition across Government and industry of the need to develop strong leadership programs to empower frontline leaders to effectively lead and manage teams.

A range of initiatives to increase physical and psychosocial safety, reporting, leadership and training development, access to safety and human resources staff, and work models, have continued to be introduced across the sector to ensure women and diverse groups continue to welcome opportunities to work in this sector. The combination of historically standalone Human Resources (HR) and Safety (WHS) functions to an amalgamated function, is a positive shift experienced in the mining industry, to inform the current and future workplace's addressing of psychosocial risks and hazards, with the same level of prominence as physical safety risks. Ongoing recognition has and will be given to the need to create an atmosphere that reinforces a culture of safety, beginning with more representation across decision-making roles both in head office and onsite. These are changes which can be considered across other STEM disciplines, to provide a more balanced approach to safety.

³ <https://amec.org.au/wp-content/uploads/2021/08/0817-Submission-to-WA-Parliamentary-Inquiry-into-sexual-harassment-against-women-in-the-FIFO-mining-industry.pdf>

There are lifelong career development opportunities on offer across mineral exploration and mining, and the service providers associated with the industry. Clear pathways to development should be demonstrated to employees as well as school aged children, to ensure they are aware of possible career avenues well ahead of selecting their subjects for VET or university pathways. A wide range of companies offer school visits, tours, graduate programs, career fairs, and open days. However, resourcing constraints in industry and at schools, are often a barrier to participation. Coordinated approaches facilitated by Government to ensure interested participants can be connected with industry opportunities, will garner greater participation and awareness.

There is also a substantial role for mentorship, sponsorship, and network building, to support the growth and retention of STEM cohorts. A network of likeminded professionals who can share similar experiences or discuss challenges and opportunities, can create a sense of community, which has long been recognised as a key contributor to inclusion. STEM networks are particularly important as we embrace new opportunities across the supply chain, and will continuously require innovation and collaboration. Ensuring barriers to communication and idea sharing can be front-ended, will serve as a long-term development initiative to the benefit of those in the network.

These combined, ongoing efforts from Government and industry, will foster attraction and retention to the sector, to support a well-developed STEM workforce, that is more diverse and inclusive.

Challenges that increased focus via STEM could help address

The role of the mining industry in meeting decarbonisation targets, is a message that is consistently spruiked by State, Territory and Commonwealth Governments across the world. Yet there is still a negative public perception that needs urgent addressing, that mining leads to negative environmental outcomes. Together, Government and industry must continue debunking this myth.

Australia's mineral exploration and mining sector is one of the most stringently regulated jurisdictions internationally, with robust environmental, social and governance (ESG) standards at a State, Territory and Commonwealth level. Prior to any mineral exploration commencing, proponents undergo extensive consultation and studies to ensure legislative and regulatory frameworks have been complied with, and risk management principles will be adhered with. There is a strong need to bolster this messaging, as global competition for limited investment becomes more challenging to secure, and potential workers look for career pathways that align with stronger community expectations. The industry has and continues to shift, as we rapidly progress towards net zero targets.

Every single mine began with mineral exploration. The discovery of the mines of the future, at a rate that is faster than existing resources are being depleted, and at an optimal cost, is a challenging balancing act. With discoveries being made at greater depth, the cost to discover these mineral resources, and associated costs to extract and process the minerals, increase the cost and risk profile. These ongoing challenges will require continuous innovation and STEM expertise, to ensure Australia's base and critical minerals supplies continue to provide the world with the vital minerals and economic resources needed.

There are two, ultimately scientific, challenges for modern mineral exploration: find economic deposits that are deeper and under thicker cover; and do so with the least amount of ground disturbance possible.

There is ample opportunity for scientific developments to streamline the rate of discovery, and the timeframes to develop minerals projects into producing mines. Automation, cyber technologies and data are expected to play an even greater role in the geological, chemical and metallurgical aspects of the minerals sector. Understanding the opportunities, uses for, and how we can more rapidly implement these advancements into our operations, will undoubtedly better-position Australia's mineral explorers to be more cost-competitive, as existing mineral resources are being depleted at a faster rate than new discoveries are being made.

The role of STEM in driving these opportunities forward, cannot be understated. The roles will continue to develop scientific and automation expertise, increasing workforce flexibility and adaptability, which has typically been a barrier to participation and development.

Breaking down barriers via STEM

There is opportunity to increase the promotion of the career paths STEM can open, that are not typically promoted. When marketing STEM careers or study paths, there is typically imagery of a laboratory or traditional engineering role. There is an abundance of roles available across the mineral exploration and mining industry, from entry level, to apprentice, diploma, graduate and post-graduate level, that are not typically known, outside of the mining industry. These can include roles such as Environmental Scientists, Mining Engineers, Metallurgists, Chemical Analysts, Assayers, Mechanical Engineers, and Hydrogeologists. The career paths are limitless, across the public and private sectors.

A greater scientific knowledge across regulatory agencies, from environmental, to climate, to geological, to hydrogeological, can inform and enable timely and efficient risk-based regulatory processes. Streamlined approvals functions are a significant opportunity for scientific excellence to address. Increased expertise can enable a more agile response to emerging opportunities in the critical minerals sector, to align with the objectives of Government's Critical Minerals focus.

There is also a significant role for science and research to inform decarbonisation technologies and a transition to net zero, that enables the minerals industry to continue exploring opportunities across the value chain, both upstream and downstream. With increasing need for battery minerals, critical and base minerals, the processing of these mineral components, their tailings and waste functions, must be understood, to enable compliance with legal requirements, as well as the upkeep of best practice environmental standards.

Australia has a renowned minerals excellence, and hosts the mineral reserves the world needs to meet decarbonisation targets. There is and will continue to be, a plethora of research and untapped scientific

knowledge that is yet to be explored, to capture the maximum value that can be derived from the uses, application and extraction methodologies of these minerals.

Across the mining sector, there is a renowned history of innovation and technological developments. STEM strategies should align with the Scientific and Research priorities consultation currently underway by the Commonwealth Government, the Critical Minerals Strategy consultation being led by the Commonwealth Government, and each State / Territory's STEM strategy. A concerted, Commonwealth Government approach, working in tandem with State and Territory counterparts, will minimise the risk of duplication and enhance opportunities for cross-border collaboration and resource sharing.

As demand for these minerals continues to increase, academic excellence will also be required to consider new and alternative uses, geological anomalies, scientific developments, and education of emerging entrants. There is a strong need for a pragmatic relationship between academia and industry, to deliver optimal, real-time and forward-looking outcomes to maximise benefits.

A commercial understanding of key decision points relevant to the mineral exploration to mining development cycle can inform a strategic view of current and emerging market trends, presenting opportunities for Australia's minerals sector, to inform research and scientific priority reviews at regular intervals.

There is an opportunity to increase the diversity and representation of under-represented cohorts in the sector, by promoting opportunities in STEM, as we continue to embrace technological and scientific developments. A refreshed national science and research priority strategy can attract more entrants to leading STEM sectors, and provide long-term career and development opportunities.

Final Comment

AMEC appreciates the opportunity to contribute to the consultation to increase diversity and inclusion in STEM pathways across Australia. As a key industry reliant on a vibrant STEM workforce, AMEC welcomes continued collaboration between the Commonwealth, State and Territory Governments, with industry, to explore and develop opportunities for continued excellence across STEM.

STEM presents a significant pathway to develop more diverse and inclusive workforces, to ensure Australia can remain at the forefront of technical and academic excellence across our minerals supply chain. AMEC welcomes continued opportunities to pursue and support these developments.

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