

Kickstarting Culture Change

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ABSTRACT

In the dynamic and challenging modern industry landscape, understanding and unleashing the true role and contribution of technical teams is crucial to business success. The cyclical nature of industries has led to shifts in the technical professional's place within the organization and the technical skills that are desired most. This paper reframes the pivotal role that technical professionals play within complex operating assets to maximize value and realize full potential. This investigation focuses on the Rio Tinto Kennecott Technical group's cultural journey, which is underpinned by an investment in its people. The conflict between legacy industry beliefs and the necessity for cultural change emerges. This is illustrated by a deep dive into the evolving case study of Kennecott's Bingham Canyon Open Pit Mine Technical team. Here, a multi-faceted approach to cultural change is helping to unlock the team's contribution to the life extension of an aging asset. Guided by a vision and strategic roadmap, this approach is part way through a 5-year implementation period and is yielding encouraging business outcomes.

INTRODUCTION

In the struggle for top technical talent, the importance of cultivating company culture cannot be overstated. This foundational aspect is intrinsically linked to productivity

and innovation, which drive business performance. Like the metaphorical wilting garden that struggles in changing conditions, organizational culture can be transformed into a landscaped paradise through a clear vision and a nurturing hand. Shaping growth mindsets and fostering effective engagement become easier with a thriving organizational culture. These benefits serve as the catalyst for improving team efficiency and pioneering solutions to complex problems for maximized personal and business outcomes.

Becoming a great workplace with a thriving culture is a transition that is neither quick nor simple. It takes sustained effort and time to cultivate manicured lawns and vibrant gardens. It requires building on the cumulative gains of each year and taking small setbacks in stride. This paper embarks on an insightful exploration of the transformative journey of the Rio Tinto Kennecott Technical group as a common and relatable case study. The seeds are sown for articulating a vision and landscape design for cultural transformation to maturity. A specific case study for the Open Pit Mine Technical team within the Kennecott Technical group demonstrates the systematic yet iterative process of culture change for sustained organizational success.

FOREWORD—AN IMPERATIVE FOR CULTURAL CHANGE

Personal reflections of Geraldine Lyons (formerly Rio Tinto Kennecott Technical General Manager):

During the decade that saw two significant commodity prices shocks (i.e., the Global Financial Crisis of 2008-9 and the commodity price crisis of 2015–16), the business adopted a strong cost focus and went through multiple re-organizations, which is not uncommon within the industry. Following time in Operations, I rejoined the Kennecott Technical group in mid-2020, amid the COVID-19 pandemic. The Kennecott Technical group, who supports the full value stream, saw multiple changes during this time. The impact left what appeared to be a mixed remit and balance of supporting day-to-day operations and the medium to long-term strategic planning aspects of the business. During this same time, there was also a loss of technical talent, both in capacity and expertise, depth, and breadth. COVID-19 had its own impacts, one of which put a hold on what is a core part of a professional's development: participating in conferences, site visits and ongoing education. By 2021, there was definite frustration within the team. Work-life balance, long to-do lists, sense of helplessness, a perceived shift in the organization's commitment to the personal development of the team and an ultimate sense that they were not heard or valued and cared for. The role of the technical organization is vital and the need for change was clear.

It is said that key attributes of a 'healthy' organizational culture is one where everyone knows how they contribute to the mission, where there is transparent and open communication, shared goals, a commitment to the well-being and personal growth and development of employees. There is also a multitude of papers, books and data that speaks to the benefits and value to businesses with a healthy organizational culture. Up to 84% of the value of an S&P 500 company rests in the talent, skills, knowledge, work ethic and even the health of employees (Gallup, 2023). Here was an incredibly talented team, people who came to work to contribute, who were hungry to learn and who really cared for one another and the business. A team that had much more to offer. Having had boots in Operations and Technical teams (I saw

there were times when that tension that exists left missed opportunities or had negative consequences and often, a felt experience to individuals and teams of not being valued. It wasn't hard to imagine the potential at hand.

Change starts at the top, and having the right leadership team was an important next step for the journey we were to undertake. Creating a vision with a shared purpose: taking the time to re-think and reassess our role in the organization. As a support team or a partner, we began to challenge and shape what would become our anchors to move us forward. What was getting in our way? What could we do to start the journey whilst we took the time to develop the vision and strategy for the team. We often neglect the leadership development of technical professionals, professionals who lead others. We introduced some core fundamental development elements focused on communications, giving, and receiving feedback, critical thinking and project management combined with basic routines to start.

What is organizational culture to a team of technical mining professionals who typically deal in numbers and logic? In the book *Walking the Talk*, culture is defined as accepted practices and ways of working in a community of people (Taylor, 2015). Underpinning this are the values that are important to this community of people. These values manifest as behaviors, symbols, and systems that the team employs. A technical team employs its own unique behaviors, symbols, and systems to effectively function. They are partners with the execution of plans and have a challenging role of simplifying complex technical content to a way anyone can understand for the shop floor to a senior leader in the business to facilitate meaningful discussions and decisions.

In this context, why is organizational culture worthy of discussion to technical mining professionals? Good organizational culture is conducive to the retention of a more engaged and effective workforce that delivers increased productivity (Morgan, 2022). The relevance of organizational culture transformation is underscored by empirical data at Rio Tinto. Employee engagement, captured through bi-annual people surveys, shows a direct correlation between employee satisfaction and retention. Approximately 71% of mining leaders acknowledge that a talent shortage hampers their ability to meet production targets and strategic objectives (McKinsey). Moreover, the work of McKinsey and Company and Harvard Business Review accentuates the significance of culture in daily operations and

workforce retention. Compensation alone is insufficient to retain talent. Instead, factors like workplace flexibility, meaningful work, and positive colleague interactions have taken precedence.

DEFINING A VISION AND ROAD MAP FOR THE KENNECOTT TECHNICAL TEAM

To grasp the essence of Rio Tinto Kennecott Utah Copper’s people strategy, it’s crucial to acknowledge the asset’s uninterrupted 120-year operational history. Much like a resilient garden enduring changing climates and various caretakers, Rio Tinto Kennecott’s organizational culture has undergone significant evolution in response to shifting societal and economic dynamics. With a workforce of approximately 2,100 full-time employees based in Salt Lake City, Rio Tinto Kennecott aspires to cultivate an environment that serves as both an operational and technical talent incubator, fostering the growth and prosperity of its team members. The goal is to develop nurtured talent that not only contributes to the expansion of the Rio Tinto Copper business but also operates it. This overarching vision involves enhancing capabilities in critical disciplines, including geotechnical engineering for open pit slope stability and pyrometallurgy for smelting. Furthermore, the

vision encompasses fostering a workplace that is more diverse, inclusive, and respectful, allowing individuals to bring their best selves, and ensuring that team members are recognized and valued for their contributions.

The Kennecott Technical group plays a vital role in supporting the delivery of the Kennecott Utah Copper business plan. Figure 1 depicts how the Kennecott Technical group fits in with other key Rio Tinto stakeholder groups to support the organization. Specifically for the Bingham Canyon Open Pit Mine, the Kennecott Technical group is highlighted as yellow and works closely with the Mine Operations group (in red). The vision for organization culture is provided by the Culture and Everyday Respect group (in blue). Second line technical assurance is provided by the Central Copper Technical group (in green) and third line technical assurance is provided by the Surface Mining Center of Excellence (in purple). The stakeholder landscape resembles a large and complex matrix.

Comprising approximately 150 professionals ranging from Geologists and Engineers at the mine to Scientists and Metallurgists at the laboratories and processing facilities, the Kennecott Technical group influences every part of the business value chain. The Bingham Canyon Open Pit Mine and Copperton Concentrator source from a deep and geologically complex ore body to send processed copper

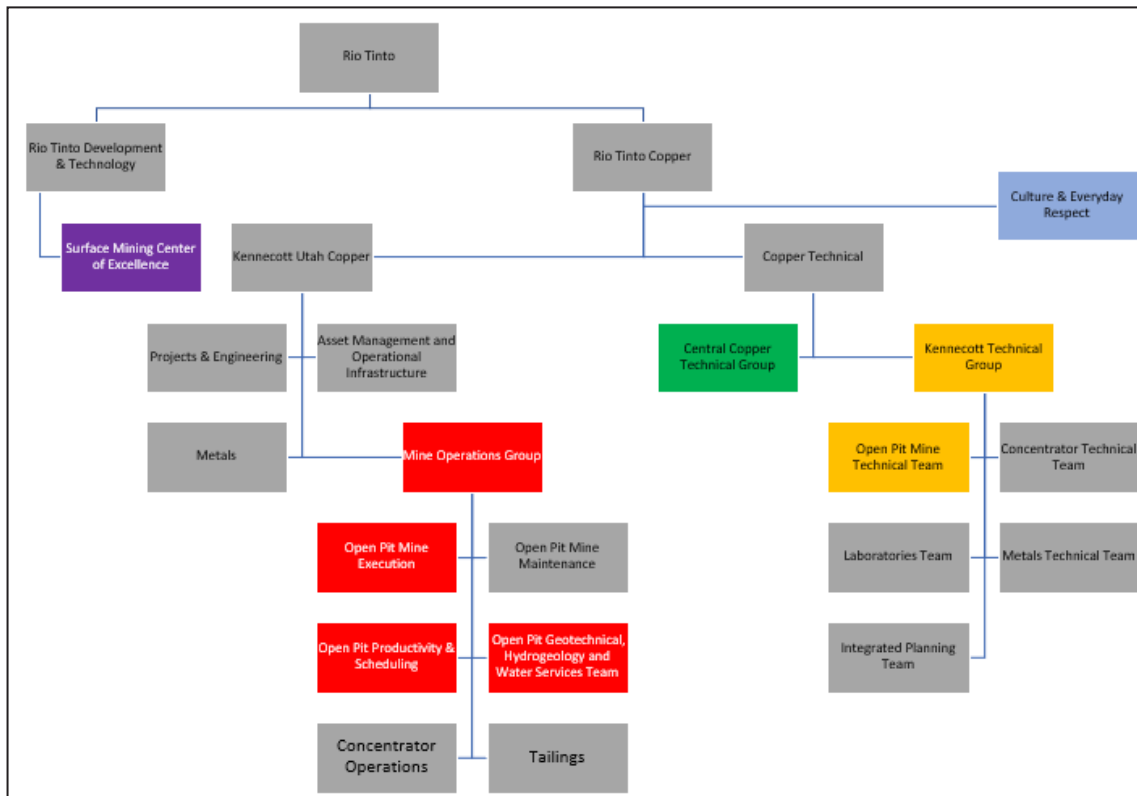


Figure 1. Stakeholder Map

concentrate to the downstream Smelter and Refinery. The Kennecott Technical group provides the designs, schedules, centerline oversight and assurance to support safe and stable operations.

In partnership with Kepner Tregoe, the Kennecott Technical group developed a functional level strategy in late 2021. As opposed to the corporate and business level strategies, the functional level strategy seeks, “management of relatively narrow areas of activities which are of vital, pervasive or continuing importance to the total organization.” (Kepner-Tregoe, 2021) A strategic horizon was established spanning 2022 to 2027. This 5-year duration provides opportunity for longer-term initiatives to be included. The workshop session was attended by the Technical General Manager and Technical Managers representing the Open Pit Mine, Concentrator, Integrated Planning, Laboratories and Metals (i.e., Smelter and Refinery). The first and most critical step in the functional strategy was asking the Kennecott Technical group and its stakeholders why the group exists. Responses ranged from being the best at what they do to delivering plans and designs for the customer. Through this exercise, it became clear that personality differences, competing egos, lack of role clarity and legacy frustrations were clouding an aligned purpose.

Transitioning from here, the functional strategy delved into a thorough examination of the current state of the Kennecott Technical group. This pivotal stage’s success hinged on participants’ honesty and accountability. Creating a secure environment for sharing perspectives and addressing key issues took precedence.

There were identifiable frustrations and misalignments among personnel, stemming from:

- A perceived lack of commitment and timely delivery.
- Technical personnel’s inclination to react adversely to operational pressure, either by acquiescing or becoming combative.
- Overly detailed and disconnected communication of technical work to key stakeholders.
- A sense of stagnation due to a perceived lack of career pathways and professional development opportunities.

Moreover, a tendency towards prioritizing short-term reactive decision-making over long-term holistic measures was observed. This manifested as:

- Technical work being perceived as an obstacle rather than playing a pivotal role by operational teams.
- Technical personnel frequently getting entangled in a cycle of fixing reactive short-term issues, thereby

compromising the ability to address future challenges proactively and sustainably.

Additionally, it was noted that technical teams operated within firmly ingrained silos, displaying an unwillingness to share, leading to a lack of connection and integration among teams.

In summary, participants acknowledged that with deep technical expertise comes deep pride. Overplayed, this pride and ego fed the omnipresent and, at times, destructive tension between teams. The Kennecott Technical group was seen by stakeholders as an auditor and consultant rather than a valued contributor with skin in the game. For the future, the functional strategy imagined an ideal state for the Kennecott Technical group, with a significant focus on reaffirming the group’s purpose and self-belief. The diagnostic process resulted in key statements outlining this envisioned future state.

Envisioned was the formation of one unified technical team characterized by a robust sense of belonging, partnership, and alignment, manifesting in:

- Open sharing and support among team members.
- The ability for all technical team members to fulfill their professional aspirations.

Recognition of the pivotal and enabling role played by the Kennecott Technical group was a central theme, including:

- Empowering team members to spend more time in the medium to long-range space, proactively addressing future risks and opportunities.
- Ensuring timely, effective, and committed delivery.
- Fostering influential communication that resonates strongly with stakeholders.

Moreover, the ideal future state encouraged the cultivation of constructive tension and debate, featuring:

- Embracing radical candor.
- Facilitating open conveyance of insights by team members to contribute to an aligned path forward.

Ultimately, the Kennecott Technical group’s desire was for team members to be recognized as valued partners. There was a strong desire to draw the proverbial line in the sand so ego and past may be set aside to strive for collective objectives.

From this future state diagnosis, the Kennecott Technical group’s purpose statement was created as a common rallying cry. In *Start with Why – How Great Leaders Inspire Action*, Sinek (2009) concludes that, “...people don’t buy what you do, they buy why you do it.” So why

would stakeholders not believe in what the technical team are doing? The earlier adopters and most influential stakeholders did not understand and believe in the work of the technical team. A simple, aligned and commonly believed purpose statement was absent. From the functional strategy workshop, the Kennecott Technical group's purpose statement is detailed as follows:

We are the Custodians of the Ore Body and its effectiveness. We are responsible for developing and supporting the delivery of the Value Stream Plan to unlock the optimal value for the short and long term.

This purpose statement highlights the importance of each technical role in defining and handling the ore body across the different lifecycle stages to maximize value. Be it the Geologists interpreting drilled core or the Metallurgists refining copper cathode, technical professionals play a pivotal role in Kennecott's decision-making.

A method statement articulates how the team will deliver on its purpose. The Kennecott Technical group's method statement is detailed as follows:

- • Investing and Retaining World Class Technical capability of the value stream
- • Conducting exploration and evaluation of new development opportunities.
- • Identifying, Defining, and Delivering Improvement Projects
- • Establishing and ensuring adherence to Operating and Technical limits
- • Quantifying threats and opportunities and developing actions to optimize the integrated plan
- • Establishing and ensuring the integrity of critical data and systems
- • Safely managing major hazard risks to the business (i.e., open pit wall stability and molten metal)

The stated actions are broad but encompass key value chain touchpoints. With a pre-disposition for risk aversion, focus was placed on value creation in addition to risk mitigation.

The true essence of the workshop came back to aligning the values of Kennecott Technical group to Rio Tinto's core values of Care, Courage, and Curiosity. The Kennecott Technical group's fundamental beliefs are detailed below:

- • We have a seat at the table and a voice that is heard and respected – **Care and Courage**
- • We value diversity and inclusion - **Curiosity**
- • We challenge, learn, and grow with humility - **Care**

- • We collaborate within and across teams to develop effective partnerships - **Care**
- • We give and receive constructive feedback - **Courage**
- • We deliver timely solutions (find the “How to”) - **Curiosity**
- • We are always present in our behaviors and actions – **Care**

These simple fundamental beliefs serve as the glue that keeps the team together and centered on aspired behaviors.

With the current and future states of the garden understood and the plant types selected, a landscaping plan was prepared to support and accelerate sustainable change. The landscaping plan is akin to the functional strategy road map. Routines were assessed and reset via the Management Operating System, which comprised a calendar of non-negotiable technical deliverables and routines (e.g., resource and reserve statements, capital projects study deadlines, quarterly integrated plans for annual budgets, and plant centerline tracking for stability). Technical staffing was optimized by re-establishing clarity of role competencies and behaviors. Some technical roles were repurposed, some new technical roles were created, and some existing technical roles were resituated to other parts of the Kennecott Technical group. Organic growth of technical leadership capability was achieved through a balanced dose of promotions, sprinkling of new Rio Tinto talent from outside Kennecott and injection of new personnel from outside Rio Tinto. It is important for technical professionals to see different challenges and different ways of thinking to add to their experiences and perspectives.

Emphasis was also placed on building and celebrating technical capability. Fundamental skills to play the difficult line were delivered by way of formalized training programs on Project Management, Problem Solving, Decision Making, Crucial Conversations, Everyday Respect Upstander techniques, Media and Stakeholder Communications, and Unconscious Bias. Branding celebration of technical professionals was achieved through career profiles and work showcasing. Technical professionals recognized as being at the pinnacle of their chosen fields were appointed as RioExperts within the Rio Excel program. RioExcel was created by Rio Tinto to formally recognize technical professionals who seek to specialize in their chosen fields. Rio Experts are expected to continue sharing and communicating their knowledge to others within the business to aid capability development. There was also an uplift in the awarding of signature Copper, Silver, and Gold Coins by senior leaders for demonstrations of care, courage, and curiosity by technical professionals.

The importance of communication and collaboration were acknowledged through the reinvigoration of multiple feedback loops. Formalized touchpoints for communication, collaboration and understanding the big picture included quarterly technical group town hall sessions, bi-yearly Technical Leadership workshops, and quarterly technical newsletters that have since merged to the creation of a centralized Technical SharePoint site. Regular group pulse checks for two-way feedback were promoted through bi-yearly people survey pulse checks, retention analysis and regular team member check-in's (i.e., regular one on one meetings between direct leaders and team members and quarterly to annual manager once removed meetings) and partnered quality safety interactions.

The bi-yearly Rio Tinto people survey shows the sentiment of the changes that have been made. The people surveys serve as way point markers to the strategic destination. People surveys measure employee satisfaction, likelihood of recommending Rio Tinto, response rate (i.e., as a function of participation percentage), and 18 culture drivers. Figure 2 shows that through the wider lens, it is important to note that there has been a sizeable upward shift in employee engagement and satisfaction since people surveys commenced in Quarter 2 2019 and the function strategy workshop in Quarter 4 2021.

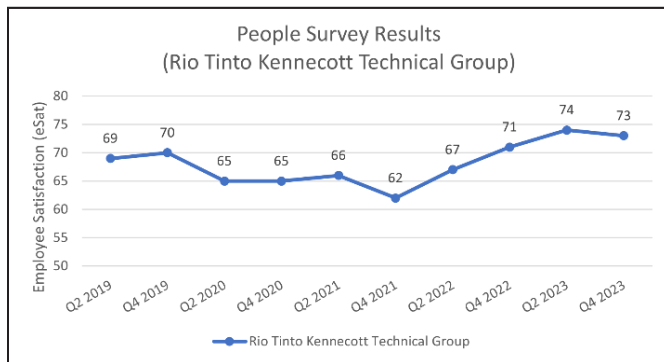


Figure 2. Rio Tinto Kennecott Technical Group Employee Satisfaction

Figure 3 shows the continued and generally upward trend of engagement measures for the Kennecott Technical group. However, in the most recent Quarter 4 2023 results, there was a regression in employee satisfaction and 16 of the culture drivers. Large drops in Action Taking, Innovation and Collaboration may indicate that despite ongoing efforts, the low hanging fruit is picked, and the thornier issues remain to be tackled.

DEEP DIVING INTO THE KENNECOTT OPEN PIT MINE TECHNICAL TEAM

The Bingham Canyon Open Pit Mine has endured much in its proud 120-year history. Be it fluctuating commodity prices or open pit wall instability, the business has made many difficult but necessary decisions to overcome these existential challenges. Following the Manefay slope failure in 2013, the largest mining induced high wall failure ever recorded (Ross, 2017), organizational changes were made over subsequent years to insulate the business against lower profit margins. Although necessary to keep the business running, the impact of these changes was lasting and has influenced the present-day team culture.

With a currently approved mine life to 2032, the Open Pit Mine Technical team is focused on near-term plan performance and life extension opportunities. There are approximately 65 members within the Open Pit Mine Technical team comprising Geologists, Technicians, Mining Engineers, and Geotechnical Engineers. This makes it the largest and most functionally diverse team within the Kennecott Technical group. Mining the structurally controlled and adversely bedded south wall has presented many slope stability challenges that consume the team's capacity. The recent departure of key personnel after many years with the Open Pit Mine Technical team exposed gaps that had to be filled.

A clear leadership mandate was established. The Open Pit Mine Technical team's leadership focus was to:

- • Elevate authentic and people-centric team culture
- • Build empowered leadership
- • Adapt from a reactive to a proactive way of working

Many of the following opportunities are available to all Kennecott personnel. What is unique about the Open Pit Mine Technical team has been the widespread and successful incorporation of these development initiatives across a relatively large technical team.

As a work in progress, re-investment in capability building has been paramount to achieving the Open Pit Mine Technical team's leadership mandate. Most of the professional development has been through experience, that is honing skills on the job. Enhanced experience was offered through internal secondments, transfers, and promotions to encourage "...discomfort for growth. Big changes and big risks bring greatest development and growth." (B. Andrew, personal communication, June 14, 2023). Team members were also given more opportunities to present their work to the most senior leaders. Acting leadership opportunities

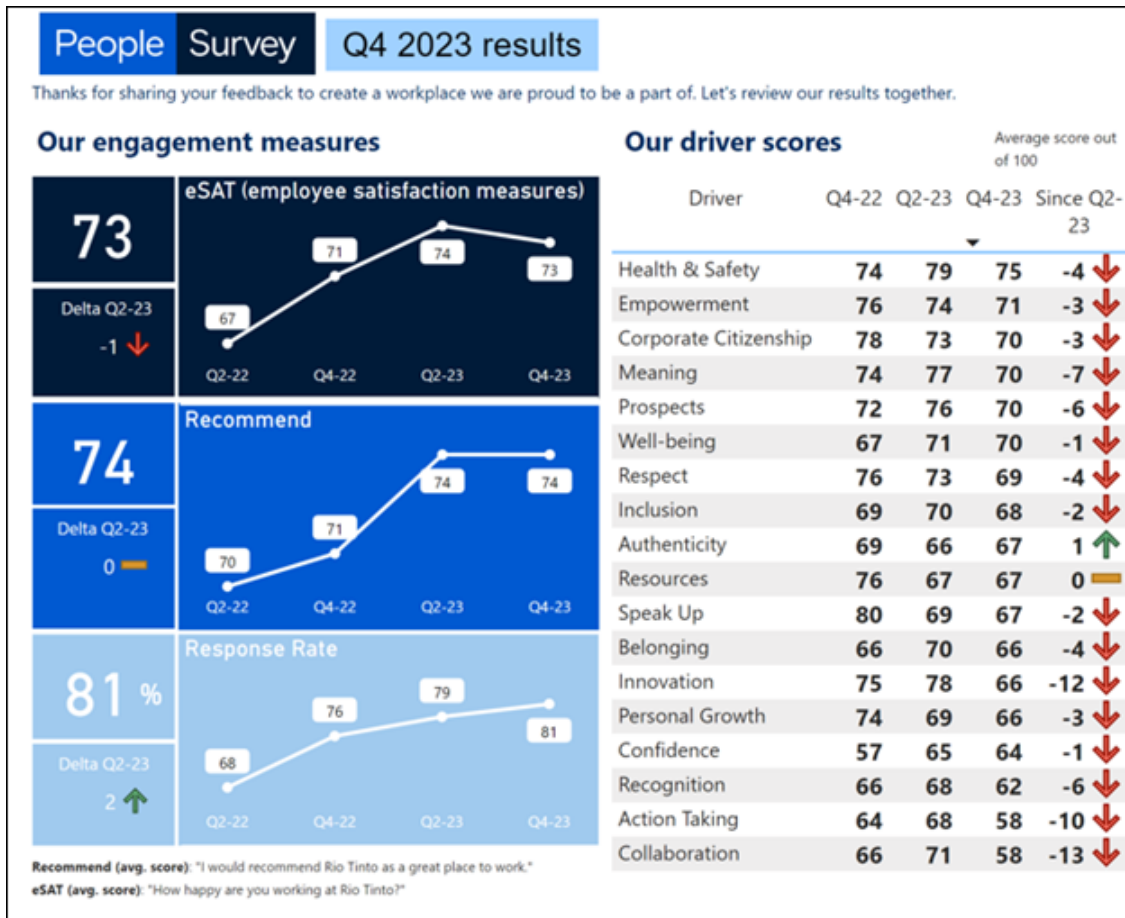


Figure 3. Kennecott Technical Group People Survey Results (Quarter 4 2023)

were encouraged with an emphasis on full delegation of responsibilities for empowerment. Formal career development pathways were created and distributed for different technical professions. This includes establishing expectations for time in role. It became apparent that each team member will choose their own path depending on career and lifestyle preferences.

“At 3 years with challenging technical roles, you’re just getting to know what you should be doing. Understand your lifestyle and career guard rails. Answer work/life harmony questions then career path questions.” (R. Sorensen, personal communication, June 14, 2023)

A program was implemented to self and leader assess standard technical skills by discipline biennially. A targeted program of empowered leadership development through the phased group delivery and facilitation of Myers-Briggs Type Indicator (MBTI) for self-awareness, DiSC assessment for workplace preferences, and 360-degree leadership survey for anonymous feedback and perceptions. Work

resources were improved, and flexible work rosters were proactively adopted (e.g., 4- or 5-day 40 hour working weeks or 9-day 80 hour working fortnights)

The next element of professional development was achieved through exposure, that is learning from others through networks and coaching. Open Pit Mine Technical team members have benefited from external executive coaching sessions, Technical Subject Matter Expert and Leader discussion panels to share career stories and tips, and career mentorship outside direct line management.

“Find your career champion to help support you and your career growth.” (B. Andrew, personal communication, June 14, 2023)

Team members were encouraged and supported to actively participation in industry conferences and visit similar domestic and international mine sites. In terms of cultivating stronger industry partnerships and giving back to society, team members co-delivered university courses (e.g., Senior Design Project in the University of Utah’s Mining

Engineering degree and Geotechnical Monitoring of Rock Slopes at the University of Arizona) and presented at various School Science Technology Engineering and Mathematics (STEM) events. Team cohesion and sense of belonging were fostered through regular offsite team building events. Exposure provided the formal and informal opportunities for team members to bond.

The third element of professional development was a focus on education, that is formal and structured learning. Although there were less examples of this, team members were supported to undertake justified and applicable educational opportunities that both benefited the individual and their current work role requirements. In the past two years, two Open Pit Mine Technical team members have commenced master's degrees, one has completed their doctoral degree, and another has embarked on Project Management Professional certification.

The Open Pit Mine Technical team's people survey results closely reflect the trends over the same period for the Kennecott Technical group. The results are depicted in Figure 4 and Figure 5. The impacts of COVID-19 and

remote working are evident in the sustained drop between Quarter 2 2020 and Quarter 2 2022. A positive employee satisfaction trend occurred as initial Technical functional strategy actions were converted. There is a slight dip in Quarter 4 2023 results associated with drops in Action Taking, Collaboration and Recognition (i.e., Confidence is a measure of the team's confidence in Rio Tinto Executive Committee). As with the Kennecott Technical group, the

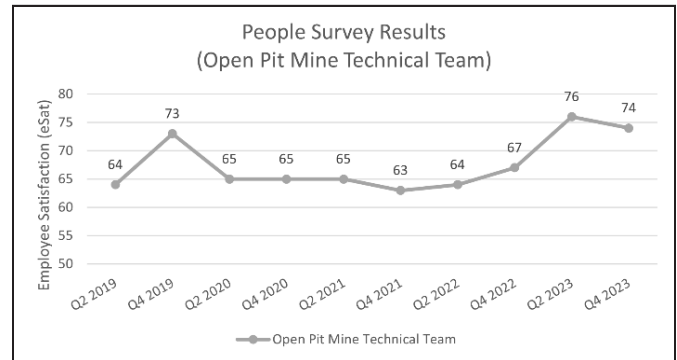


Figure 4. Open Pit Mine Technical Employee Satisfaction

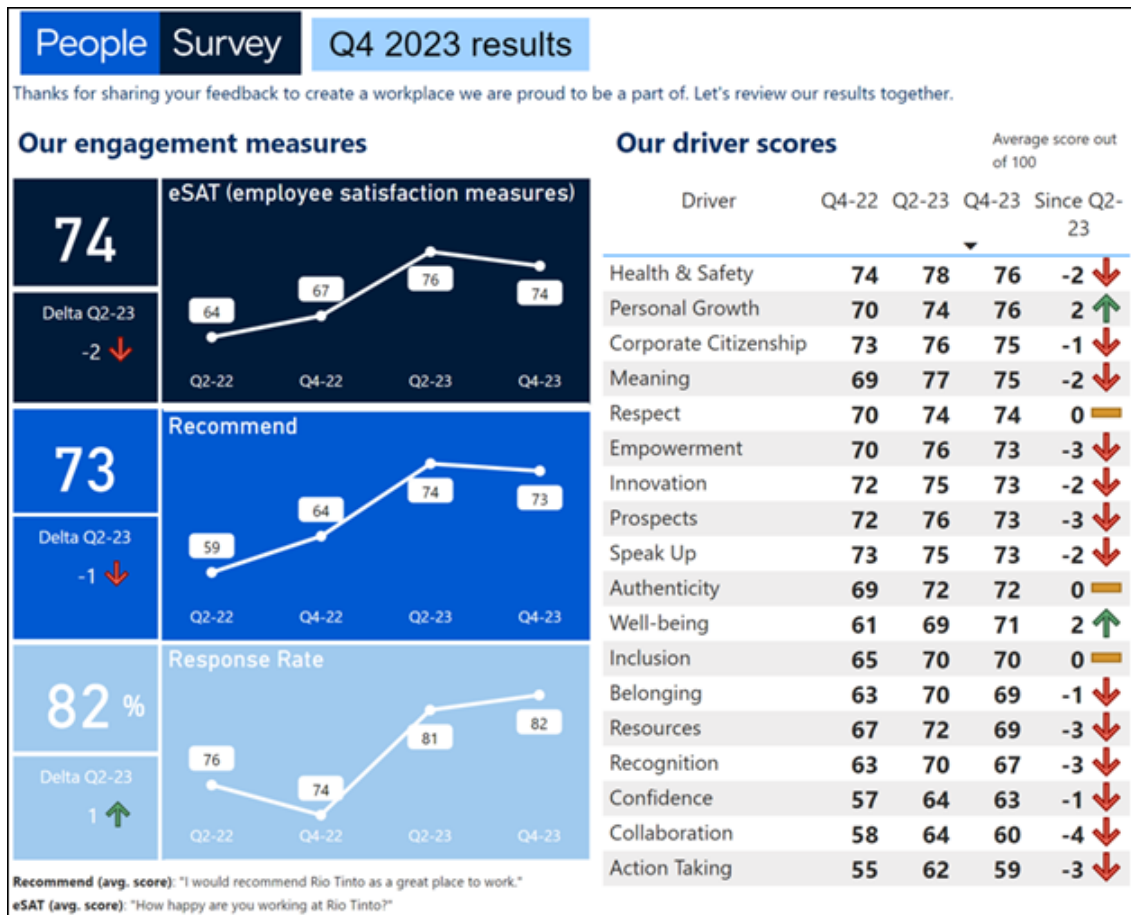


Figure 5. Open Pit Mine Technical Team People Survey Results (Quarter 4 2023)

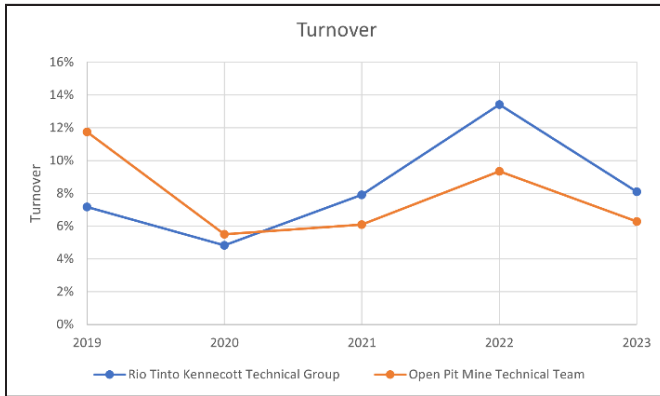


Figure 6. Employee turnover rates at Kennecott

felt experience of the team is regressing. This result demonstrates the importance of exercising continued vigilance on organizational culture.

Turnover provides another data source to measure organizational culture. Randall (2022) suggests that people typically leave their jobs because of weak company culture. Multi-faceted retention strategies help retain and attract good people because they want to work for companies where they benefit from flexibility, professional development, meaningful work, and leader support. The Kennecott Technical group and Open Pit Mine Technical team turnover rates are shown in Figure 6. The Open Pit Mine Technical team's turnover rate closely follows the Kennecott Technical group's because its population accounts for approximately 33% of the group. In contrast to people leaving the business, the upward trend in average annual turnover from 2020 to 2021 are believed to be a combination of easing COVID-19 restrictions, creation of new technical role vacancies to accomplish an increased work scope, and the promotion of internal transfers. In 2023, the turnover rates appear to be settling as the functional strategy matures.

CONCLUSION

So how is the garden going? It is a work in progress and, despite many mistakes being made along the way, there are many green shoots. There is a clear realization that organizational culture change requires disciplined and continuous

tending. There has been no magic fertilizer for this most recent organizational culture transformation. However, a key theme has been investing in people. As the Bingham Canyon mine deepens and widens, the established plants will be enhanced by the introduction of new plants and techniques to enhance the beauty and value of the Kennecott Garden. Attracting, retaining, and fully activating top technical talent will give organizations the competitive edge in the race to find and extract materials that societies need to advance. It is hoped that this paper has presented one team's journey to uplift the status and contribution of technical professionals in a complex environment.

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Lessons Learned From Near-Miss Events: Use of the Critical Decision Method to Identify Strategies to Improve Haul Truck Safety in Mining

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DISCLAIMER

The findings and conclusions in this paper are those of the authors and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. Mention of any company name or product does not constitute endorsement by NIOSH.

ABSTRACT

Accidents involving powered haulage and mobile equipment such as haul trucks often account for the greatest number of fatalities in the mining industry each year. Despite previous analyses that have identified root causes and other contributing factors, there is still a need to better understand the events leading up to these types of accidents, what lessons may be learned, and what strategies can be employed to prevent fatal accidents from occurring. This study examines Naturalistic Decision Making (NDM) using the critical decision method (CDM). The CDM is a retrospective interview approach used to explore time-limited, high-stakes, decision-making. In this study the CDM is used to obtain more information about what happens prior to, during, and after a potentially fatal situation such as a near-miss event, loss of control, or minor accident

involving equipment damage. Researchers captured first-hand accounts from 21 haul truck operators involved in near-miss events from mine sites of various sizes and commodities throughout the United States. These accounts provide rich and detailed narratives from the perspective of haul truck operators themselves and reveal insights into what decisions haul truck operators make, what sensory cues they perceive, and what strategies they employ during challenging and non-routine situations. Decision-related themes that emerged from the data are presented and discussed. These results, along with potential solutions offered by study participants, can help to inform future research, raise awareness about hidden hazards, and build more creative interventions and realistic training scenarios for use by the industry to address haul truck safety issues.

INTRODUCTION

Accidents involving powered haulage and mobile equipment continue to be one of the most significant safety concerns for mine workers in the United States and often account for more than 50 percent of the fatal injuries at surface mines each year [1]. These accidents typically involve equipment such as front-end loaders, skid-steers, service trucks, and haul trucks [2, 3]. Given the persistence and