Areas of Practice: Environment

An Environmental Scientist or Environmental Engineer is a professional who undertakes activities which aim to minimize environmental harm being caused by single or multiple mining or mineral processing operations.

This work can include preparation and implementation of environmental management plans; development, implementation and analysis of environmental monitoring programs; preparation and implementation of project closure and/or repurposing plans, rehabilitation and remediation programs; preparation of environmental impact assessments; and community consultation and liaison in relation to environmental matters. These professionals prepare regulatory documents from an industry as well as a government perspective, undertaking review and approval processes for regulatory documents as well as developing related policy. Research environmental scientists/engineers may be engaged in a range of disciplines which support the application of sustainable development principles for all phases of the mining life cycle.

The following 'Areas of Practice' (AoP) descriptors and listed examples of competency indicators are intended to support Environment professional development that provides a pathway and indication of AusIMM Chartered Professional (Environment) status. The 'Areas of Practice' are not all relevant everywhere, nor in their entirety to everyone in Environment roles considering Chartered Professional pathway and status. They are updated regularly in response to evolving industry needs. Some AoP's are systemic to the minerals sector, hence apply to both the Environment and Social Performance disciplines and are identified accordingly.

1. _Environmental science_. Collecting, interpreting and applying environmental science data relevant to exploration, mining, mineral processing and closure of operations. Competency indicators include technical understanding of:

    1.1.   water, land, air, ecology, ecotoxicology, agronomy, geochemistry or other relevant environmental disciplines;

    1.2.   research techniques, experimental design and data analysis;

    1.3.   the application of environmental science to the prevention, mitigation and management of development impacts on water, land, air and ecosystems;

    1.4.   contamination sources and impacts, and remediation methods;

    1.5.   plant-soil-water interactions as applied to revegetation;

    1.6.   design of biodiversity offsets; and

    1.7.   scientific and technical report writing.

2. _Environmental engineering_. Designing, constructing and operating civil, mechanical or chemical engineering facilities related to environmental management of mining and mineral processing operations. Competency indicators include:

    2.1.   design, construction and operation of water treatment and recycling plants

    2.2.   design, construction and operation of facilities to treat contaminated soils, wastes and air emissions

    2.3.   design, construction and operation of facilities to suppress noise and vibration

2.4. understanding the waste hierarchy;

2.5. preparing and implementing programs to maximize the efficiency of water use and energy use;

2.6. developing and implementing programs to abate greenhouse gas emissions; and

2.7. developing and implementing cleaner production methods.

3. *Rehabilitation, remediation, closure and repurposing.* Designing and implementing programs to remediate and rehabilitate disturbed areas to achieve defined criteria and repurposing and closure objectives. Competency indicators include:

3.1. knowledge of methods to characterise soil, waste rock, tailings and residues;

3.2. knowledge of how material properties influence plant growth;

3.3. contamination sources and impacts;

3.4. design and construction of landforms, cover systems and water management structures;

3.5. design and implementation of methods for remediating contaminated materials;

3.6. species selection and plant establishment techniques;

3.7. engaging with internal and external stakeholders;

3.8. contributing to multi-disciplinary teams (environment, social, economic, engineering) to develop and evaluate post-closure and/or repurposing land use options;

3.9. determining closure objectives and completion criteria for facilities, structures and rehabilitated land;

3.10. preparation of closure management plans and closure/repurposing cost estimates;

3.11. assessment of closure and post-closure/repurposing (residual) risks; and

3.12. implementation of decommissioning, demolition, rehabilitation and repurposing projects

4. *Environmental impact assessment.* Collecting and interpreting data relevant to impacts on the environment resulting from exploration, development, operations and closure activities. Competency indicators include:

4.1. describing the existing biophysical and socio-economic environment;

4.2. designing and implementing baseline studies;

4.3. describing the proposed project and associated environmental mitigation measures;

4.4. predicting environmental effects under proposed operational scenarios and under abnormal conditions;

4.5. preparing environmental impact assessment documentation;

4.6. coordination of multi-disciplinary teams and integrating environmental impact assessments with engineering, social, economic and project feasibility studies; and

4.7. designing and implementing engagement programs with affected communities and other stakeholders in relation to environmental impacts.

5. *Environmental monitoring.* Designing and implementing environmental monitoring programs and recording data relevant to exploration, mining and mineral processing. Competency indicators include:

5.1. identification of environmental indicators;

5.2. knowledge of monitoring methods and equipment;

5.3. design and implementation of monitoring programs;

5.4. knowledge of databases, statistical analysis and interpretation of environmental data; and

5.5. presentation of technical data and preparation of monitoring reports.

6. *Environmental planning and management.* Using environmental knowledge to minimize adverse impacts over the entire life cycle of mining and mineral processing operations. Competency indicators include:

6.1. integration and coordination of environmental, engineering and financial knowledge to design and plan operations;

6.2. undertaking environmental risk assessments;

6.3. understanding of Geographical Information Systems;

6.4. identifying, documenting and interpreting legal and organizational environmental obligations;

6.5. preparation and implementation of environmental management systems, plans and procedures;

6.6. undertaking environmental auditing;

6.7. reviewing performance and implementing performance improvement and corrective action programs;

6.8. investigation of environmental incidents; and

6.9.   preparation of emergency procedures.

7.   *Stakeholder engagement relating to the environment.* Undertaking and/or participating in effective communication and engagement regarding environmental matters with affected communities and other stakeholders. Competency indicators include:

7.1.   knowledge of organizational structure and permitting, approval and compliance processes of environmental regulators;

7.2.   designing and implementing effective communication, consultation and engagement with affected communities and other stakeholders as part of regulatory approvals processes;

7.3.   preparing technical and non-technical environmental information for communication with affected persons, groups and the general public;

7.4.   understanding that different customs, norms and values of different groups influence the effectiveness of stakeholder engagement; and/or

7.5.   engagement with landholders, non-government organisations, special interest groups or academic institutions.

8.   *Environmental policy and advice.* Understanding and influencing internal and external environmental policy making. Competency indicators include:

8.1.   formulation and implementation of environmental policies with due consideration of economic and environmental factors for business, industry associations and government;

8.2.   provision of strategic environmental advice; and

8.3.   preparation of guidelines for good environmental management and monitoring practices.

The following Areas of Practice descriptors relate to systemic requirements in the minerals sector and can apply to Environment and Social Performance (ESP) and other professional disciplines.

9.   *Mining enterprise management systems.* Familiarity with enterprise governance and management systems and using these in the course of ESP work to create business value. Competency indicators include:

9.1.   understanding overarching business context, needs and strategies, and positioning ESP accordingly;

9.2.   using risk and materiality assessments to appropriately position ESP factors in risk registers;

9.3.   managing ESP matters in a way that considers why and how external stakeholders interact with mining enterprises and ensures that interactions add value to them and the enterprises;

9.4.   positioning ESP in an organisational context, particularly within the Health, Safety and Environment, Human Resources, Finance, Operations, Risk, Internal Audit, Communication, Government and Public Relations functions.

9.5. managing ESP through an enterprise's existing systems and tools, such as change management approaches, budgeting tools and lean boards;

9.6. establishing ESP accountability in enterprise management frameworks and business practice;

9.7. ensuring ESP compliance and performance consequences are accurately understood and appropriately factored into enterprise internal audit/assurance processes; and

9.8. developing and embedding ESP metrics into business improvement, compliance and reporting.

10. *Multi-lateral and financial institutions standards.* Managing ESP matters to achieve business compliance with government and other external ESP policies, standards and guidelines. Competency indicators include working knowledge and application of:

10.1. context-specific jurisdictional statutory, regulatory and policy requirements;

10.2. relevant United Nations (UN) and International Labour Organisation (ILO) and other declarations, such as the UN Guiding Principles on Business and Human Rights, the UN Declaration on the Rights of Indigenous Peoples and the Voluntary Principles on Security and Human Rights;

10.3. International Finance Corporation (IFC) and similar Performance Standards;

10.4. Equator Bank and other relevant principles, codes of conduct and good practice;

10.5. Extractive Industries Transparency Initiative (EITI) and the Global Reporting Initiative (GRI);

10.6. OECD Due Diligence Guidance for Responsible Business Conduct;

10.7. relevant management certification standards (e.g. ISO 14001 and ISO 26000); and

10.8. adequately positioning and managing ESP practice, governance and reporting to help secure financing.

11. *Sustainable Development principles.* Understanding the history of Sustainable Development (SD), evolving Sustainability expectations and how this relates to business Environment-Social-Governance (ESG) performance, metrics and reporting. Competency indicators include working knowledge and application of:

11.1. the economic, social, environmental and governance aspects of Sustainable Development;

11.2. concepts like intergenerational equity, materiality and natural and social capital fungibility;

11.3. ESP in Sustainability Standards Accounting Board approaches;

11.4. sustainable supply chain assessments;

11.5. extractive sector ESP alignment with the UN Sustainable Development Goals (SDGs);

11.6. International Council for Mining and Metals (ICMM) 10 Principles;

11.7. ICMM Sustainable Development Framework and Assurance Standard

11.8. ESP factors in stock exchange sustainability indices and reporting; and

11.9. ESP in annual sustainability reporting consistent with the Global Reporting Initiative (GRI).

12. *Workplace and community health, safety and security.* Aligning and managing ESP work within a safety-oriented culture and enterprise health, safety and security systems, including mental health considerations. Competency indicators include:

12.1. contributing to workplace, supply chain and community health, safety and security risk assessments;

12.2. contributing to workplace, supply chain and community hazard identification and mitigation;

12.3. familiarity and compliance with health, safety and security controls;

12.4. effectively monitoring of ESP-related health, safety and security matters; and

12.5. ability to participate in root cause analysis of ESP-related health and safety incidents.