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Expert Consulting at the Intersection of Mining and AI

THE GLOBAL AI GOVERNANCE CHECKLIST FOR MINING OPERATORS

A practical, source-cited framework for deploying AI responsibly —
from resource estimation to autonomous haulage — across every major mining jurisdiction

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Why This Checklist Exists

Mining operators are deploying AI faster than the rules can keep up: geological and grade-estimation models built on machine learning, autonomous haulage fleets running unsupervised across open pits, predictive-maintenance systems watching every bearing and conveyor, and workforce-analytics tools shaping hiring, scheduling, and safety interventions. Meanwhile, the regulatory and standards landscape is fragmented, moving, and — critically — almost never written with mining in mind.

Across every jurisdiction we researched, one pattern held: **no regulator anywhere in the world has an AI law that names "mining" specifically.** Exposure instead comes sideways — through horizontal AI regulation that happens to catch workforce and employment decisions, through existing data-privacy law, and through mine-safety codes that were written for machinery long before anyone called it "AI." Mining also has strong *adjacent* standards — ISO 17757 for autonomous machine safety, the Global Industry Standard on Tailings Management, NI 43-101/JORC/SK-1300 resource-disclosure codes, IEC 62443 for operational-technology security — but almost none of them yet contain an explicit AI-governance clause.

That gap is exactly what this checklist is built to close. It combines three layers of research: (1) the global AI governance frameworks that set the methodology every serious organization is converging on — NIST's AI Risk Management Framework, ISO/IEC 42001, the OECD Principles, the G7 Hiroshima Process, and the IEEE 7000 series; (2) the jurisdiction-by-jurisdiction regulatory reality across the world's major mining regions — the EU, UK, US, Canada, Australia, China, Chile, Peru, Brazil, South Africa, and Indonesia; and (3) the mining-specific technical, safety, and disclosure context that general-purpose AI checklists miss entirely.

Use it as a working document. Tick the boxes that already reflect your practice, flag the ones that don't, and treat the gaps as your governance roadmap — not a compliance burden, but a competitive advantage as clients, insurers, lenders, and joint-venture partners begin asking harder questions about how AI decisions get made on your sites.

HOW TO USE THIS DOCUMENT

- ☐ Work through Sections A–C with your leadership team, technical leads, and HSE/legal counsel — this is a cross-functional exercise, not an IT checklist.
- ☐ Use Section D to identify which jurisdictions' rules actually bind your operations today versus which are still pending — don't over-invest in compliance with proposed law.
- ☐ Use Section E to sequence your governance build-out by maturity stage rather than trying to do everything at once.

Every claim in this document is sourced — see the numbered references throughout and the full source list at the end. Where no authoritative source could confirm a requirement, we say so explicitly rather than guessing, because in a fast-moving regulatory environment, a false sense of compliance is worse than no compliance program at all.

Section A — Foundational AI Governance

These are the organization-wide building blocks that recur across every major global framework — NIST, ISO/IEC, the OECD, the G7, UNESCO, and IEEE. None of them was written for mining, but all of them are the methodology mining operators are increasingly expected to demonstrate to lenders, insurers, JV partners, and regulators.

A1. GOVERNANCE STRUCTURE & ACCOUNTABILITY

☐ A named executive owns AI risk (an "AI Risk Owner") with a direct reporting line to the board or CEO.[1]

☐ A cross-functional AI governance committee exists, spanning technical, HSE, legal, and workforce/HR representation.[2]

☐ A documented, board-approved AI policy exists, grounded in a risk-based approach rather than blanket rules.[3][4]

☐ Legal and regulatory requirements relevant to each jurisdiction of operation are documented and reviewed at least annually.[5]

A2. AI SYSTEM INVENTORY

☐ A complete inventory exists of every AI system in use — including "shadow" generative-AI tools adopted informally by teams.[6][7]

☐ Each inventoried system records: purpose, business owner, technical owner, data sources, vendor/provider, and risk classification.[8]

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[1]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[2]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[3]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[4]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026
[5]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[6]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[7]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026
[8]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026

☐ Resource-estimation models, autonomous-equipment systems, predictive-maintenance tools, safety-monitoring AI, environmental-monitoring AI, and workforce-analytics tools are each separately catalogued.[9]

A3. RISK & IMPACT ASSESSMENT

☐ Every AI system undergoes a documented risk assessment before deployment, covering safety, environmental, financial-disclosure, and workforce impacts.[10][11]

☐ High-consequence use cases — autonomous haulage, tailings monitoring, resource/reserve estimation, safety alerting — receive a formal impact assessment, not just a risk score.[12][13]

☐ Impact assessments are refreshed when the system, its training data, or its operating environment materially changes.[14]

A4. DATA GOVERNANCE

☐ Data provenance and lineage are documented for every model — especially geological/drillhole data feeding resource-estimation models and sensor data feeding haulage and maintenance systems.[15]

☐ Data-quality controls (QA/QC) are enforced upstream of any model, since errors in source data propagate directly into AI outputs.[16]

☐ Personal and worker data used in AI systems (location, biometric, fatigue, productivity) is governed under a documented privacy policy aligned with applicable law.[17][18]

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[9]NIST, Concept Note: AI RMF Profile on Trustworthy AI in Critical Infrastructure (7 April 2026), https://www.nist.gov/programs-projects/concept-note-ai-rmf-profile-trustworthy-ai-critical-infrastructure
[10]ISO/IEC 23894:2023 — Guidance on AI Risk Management, https://www.iso.org/standard/77304.html
[11]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[12]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026
[13]UNESCO, Recommendation on the Ethics of Artificial Intelligence, https://www.unesco.org/en/artificial-intelligence/recommendation-ethics
[14]ISO/IEC 23894:2023 — Guidance on AI Risk Management, https://www.iso.org/standard/77304.html
[15]ANSI Standards News, NIST to Develop Profile for Trustworthy AI in Critical Infrastructure, https://www.ansi.org/standards-news/all-news/4-13-26-nist-to-develop-of-profile-for-trustworthy-ai-in-critical-infrastructure
[16]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[17]OECD.AI, OECD AI Principles, https://oecd.ai/en/ai-principles
[18]UNESCO, Recommendation on the Ethics of Artificial Intelligence, https://www.unesco.org/en/artificial-intelligence/recommendation-ethics

A5. MODEL RISK MANAGEMENT, TESTING & VALIDATION

☐ Every model is tested for validity and reliability before production use, with documented test sets and metrics (TEVV: test, evaluation, verification, validation).[19]

☐ Models are evaluated for safe failure modes, security/resilience against adversarial input, explainability, and bias — not just accuracy.[20]

☐ A defined re-validation cadence exists as ore bodies, site conditions, weather, or workforce composition change.[21]

A6. HUMAN OVERSIGHT & FAIL-SAFE DESIGN

☐ Every safety-critical or consequential AI system has a documented human-oversight process with named, trained, and authorized personnel.[22][23]

☐ A mechanism exists to supersede, disengage, or deactivate any AI system that is misbehaving — verified through drills, not just design documents.[24][25]

☐ Autonomous equipment has deterministic fail-safe controllers consistent with IEEE 7009 fail-safe design principles.[26]

A7. BIAS, FAIRNESS & TRANSPARENCY

☐ Workforce-analytics and safety-monitoring models are tested for disparate impact across worker demographics before and after deployment.[27][28]

[19]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[20]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[21]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[22]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[23]UNESCO, Recommendation on the Ethics of Artificial Intelligence, https://www.unesco.org/en/artificial-intelligence/recommendation-ethics
[24]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[25]IEEE Standards Association, Autonomous and Intelligent Systems Standards (IEEE 7000 series), https://standards.ieee.org/initiatives/autonomous-intelligence-systems/standards/
[26]IEEE Standards Association, Autonomous and Intelligent Systems Standards (IEEE 7000 series), https://standards.ieee.org/initiatives/autonomous-intelligence-systems/standards/
[27]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[28]IEEE Standards Association, Autonomous and Intelligent Systems Standards (IEEE 7000 series), https://standards.ieee.org/initiatives/autonomous-intelligence-systems/standards/

☐ Explainability requirements are defined per use case — a resource-estimation model and a chat-based assistant do not need the same level of explainability, but both need a defined standard.[29]

☐ Where practical, transparency reporting is published or made available to regulators, workers, and affected communities on AI use and its limitations.[30]

A8. VENDOR & THIRD-PARTY AI RISK

☐ Nearly all mining AI is vendor-supplied — OEM autonomous-haulage stacks, SaaS analytics, foundation-model copilots. A vendor due-diligence process exists covering security, data handling, and governance maturity before procurement.[31]

☐ Contracts with AI vendors specify incident-notification timelines, audit rights, and contingency plans for vendor or model failure.[32]

☐ Vendors are checked against public transparency commitments (e.g., the G7/OECD Hiroshima AI Process Reporting Framework) where relevant, especially for foundation-model-based tools.[33]

A9. INCIDENT RESPONSE, MONITORING & DOCUMENTATION

☐ An AI-specific incident-response plan exists, integrated with existing safety and cybersecurity incident processes.[34]

☐ Production AI systems are continuously monitored for drift, with alert thresholds and an owner responsible for acting on them.[35]

☐ Documentation is maintained to a standard a non-specialist regulator, auditor, or board member could review and understand.[36]

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[29]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[30]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[31]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[32]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[33]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[34]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[35]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[36]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026

☐ A safe-decommissioning procedure exists for retiring AI systems, including data retention and model archival.[37]

A10. TRAINING & CULTURE

☐ Personnel who operate, supervise, or are affected by AI systems receive role-specific training on the system's purpose, limitations, and escalation paths.[38,39]

☐ Executive and board-level AI literacy training occurs at least annually.[40]

[37]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[38]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[39]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[40]World Economic Forum, AI in Manufacturing (2022), https://www3.weforum.org/docs/WEF_AI_in_Manufacturing_2022.pdf

Standards to know

NIST AI RMF 1.0 (voluntary methodology: Govern, Map, Measure, Manage) is the most widely referenced framework and the basis for a forthcoming Critical Infrastructure Profile (concept note released April 2026) that speaks directly to physics-informed AI, autonomous vehicles with fail-safe controllers, and plant-monitoring systems. [41,42,43]

ISO/IEC 42001:2023 is the world's first certifiable AI management-system standard — increasingly cited in enterprise procurement and RFPs, with certification typically taking 5–18 months and $15,000–$60,000+ in audit fees. [44,45]

The OECD AI Principles, the G7 Hiroshima Code of Conduct, and the UNESCO Recommendation on the Ethics of AI provide the values layer — human-centric, transparent, accountable AI — that underpins national law in every jurisdiction covered in Section D. [46,47,48]

[41]NIST AI Risk Management Framework — Core Functions, https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Core_And_Profiles/5-sec-core
[42]NIST, Concept Note: AI RMF Profile on Trustworthy AI in Critical Infrastructure (7 April 2026), https://www.nist.gov/programs-projects/concept-note-ai-rmf-profile-trustworthy-ai-critical-infrastructure
[43]ANSI Standards News, NIST to Develop Profile for Trustworthy AI in Critical Infrastructure, https://www.ansi.org/standards-news/all-news/4-13-26-nist-to-develop-of-profile-for-trustworthy-ai-in-critical-infrastructure
[44]ISO/IEC 42001:2023 — Artificial Intelligence Management System, https://www.iso.org/standard/81230.html
[45]Tranquility Cybersecurity, ISO 42001 Certification Guide 2026, https://www.tcsa.in/resources/iso-42001-certification-guide-2026
[46]OECD.AI, OECD AI Principles, https://oecd.ai/en/ai-principles
[47]G7 Hiroshima Process International Code of Conduct for Advanced AI Systems, https://g7g20-documents.org/database/document/2023-g7-japan-leaders-leaders-annex-hiroshima-process-international-code-of-conduct-for-organizations-developing-advanced-ai-systems
[48]UNESCO, Recommendation on the Ethics of Artificial Intelligence, https://www.unesco.org/en/artificial-intelligence/recommendation-ethics

Section B — Mining-Specific Technical & Safety Governance

> *Mining already has robust safety, tailings, disclosure, and cybersecurity standards. Almost none of them mention AI by name — which means AI-specific controls are, for now, voluntary best practice layered on top of existing codes. That is precisely the gap this section is built to close.*

B1. AUTONOMOUS HAULAGE & EQUIPMENT

☐ Autonomous and semi-autonomous machine systems (haulage trucks, drills, loaders) comply with ISO 17757 across the full software, system, and infrastructure lifecycle — not just at commissioning.[49]

☐ Any jurisdiction-specific autonomous-mining code (e.g., Western Australia's Safe Mobile Autonomous Mining Code of Practice) is formally adopted, with a competent person accountable for the hazard-management process.[50]

☐ Change management for the autonomous control system (road/route changes, geofencing updates) requires the same rigor as a physical mine-plan change, including ground delineation and communication to manned traffic before go-live.[51]

☐ Mixed manned/autonomous traffic zones have documented, drilled emergency procedures — real incidents show this is the leading governance failure point, not the algorithm itself.[52]

B2. TAILINGS MANAGEMENT & AI-ASSISTED MONITORING

☐ Where AI supports Global Industry Standard on Tailings Management (GISTM) compliance — anomaly detection, trigger-action-response-plan alerting, conceptual-model updating — the Engineer of Record retains final decision authority; AI supports, never replaces, human judgment.[53]

☐ AI-generated tailings recommendations are explainable, with the source data and rationale cited alongside the output.[54]

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[49]ISO 17757:2019 — Earth-moving machinery and mining: Autonomous and semi-autonomous machine system safety, https://www.iso.org/standard/60473.html
[50]WorkSafe WA, Safe Mobile Autonomous Mining in Western Australia: Code of Practice, https://www.worksafe.wa.gov.au/publications/safe-mobile-autonomous-mining-western-australia-code-practice
[51]WorkSafe WA, Mines Safety Significant Incident Report No. 226, https://www.worksafe.wa.gov.au/publications/mines-safety-significant-incident-report-no-226-collision-between-autonomous-haul
[52]WorkSafe WA, Mines Safety Significant Incident Report No. 226, https://www.worksafe.wa.gov.au/publications/mines-safety-significant-incident-report-no-226-collision-between-autonomous-haul
[53]Tomlin et al., AI Applications Supporting GISTM Implementation (ACG/UWA), https://papers.acg.uwa.edu.au/d/2515_66_Tomlin/66_Tomlin.pdf
[54]Tomlin et al., AI Applications Supporting GISTM Implementation (ACG/UWA), https://papers.acg.uwa.edu.au/d/2515_66_Tomlin/66_Tomlin.pdf

☐ AI models used for tailings monitoring are deployed in secure environments with role-based access controls and are evaluated for algorithmic bias — models trained mostly on large, well-documented facilities can underperform on smaller or atypical sites.[55]

☐ AI-driven monitoring imagery/sensor classifiers (piezometer trends, seepage CCTV, InSAR displacement, freeboard cameras) are assessed for adversarial robustness, not just nominal accuracy — an emerging gap not yet addressed by GISTM itself.[56]

B3. RESOURCE & RESERVE ESTIMATION

☐ Where machine-learning tools inform a Mineral Resource or Mineral Reserve estimate, the Qualified Person / Competent Person understands, validates, and takes documented responsibility for the model's outputs — current disclosure codes (NI 43-101, JORC, SK-1300, PERC/SAMREC) contain no AI-specific exemption from this accountability.[57,58]

☐ "Black-box" ML estimation tools are reconciled against conventional geostatistical methods before reporting, with material differences investigated and documented rather than silently adopted.[59]

☐ Input-data QA/QC precedes any ML-assisted estimate — errors in drillhole and assay data propagate directly into ML models just as they do into conventional ones.[60]

☐ Estimation governance treats a resource-model error with the same severity as a financial-disclosure risk: the 2022 Gatos Silver case, where a technical-report error triggered a 30–50% reserve restatement and a 69% single-day stock decline, illustrates the stakes of estimation-model governance regardless of the tooling used.[61]

B4. PREDICTIVE MAINTENANCE & SAFETY MONITORING

[55]Tomlin et al., AI Applications Supporting GISTM Implementation (ACG/UWA), https://papers.acg.uwa.edu.au/d/2515_66_Tomlin/66_Tomlin.pdf
[56]Tomlin et al., AI Applications Supporting GISTM Implementation (ACG/UWA), https://papers.acg.uwa.edu.au/d/2515_66_Tomlin/66_Tomlin.pdf
[57]CIM Mineral Resource and Mineral Reserve Estimation Best Practice Guidelines, https://mrmr.cim.org/media/1146/cim-mrmr-bp-guidelines_2019_may2022.pdf
[58]CSA Staff Notice 43-311, Review of Mineral Resource Estimates, https://www.osc.ca/sites/default/files/2020-11/csa_20200604_43-311_review-mineral-resource-estimates-technical.pdf
[59]Pym et al. (Maptek), Machine Learning in Resource Geology — Why Data Quality Is Critical, https://www.maptek.com/pdf/insight/machine_learning_in_resource_geology%E2%80%93why_data_quality_is_critical_Pym_et_al.pdf
[60]Pym et al. (Maptek), Machine Learning in Resource Geology — Why Data Quality Is Critical, https://www.maptek.com/pdf/insight/machine_learning_in_resource_geology%E2%80%93why_data_quality_is_critical_Pym_et_al.pdf
[61]Robbins LLP, Gatos Silver Investigation Notice, https://robbinsllp.com/gatos-silver-inc-feb-24/

☐ Predictive-maintenance and safety-monitoring AI (proximity detection, PPE/behavior detection) is evaluated for safe-failure behavior, real-time monitoring, and appropriate response times before deployment.[62]

☐ Where AI-enabled proximity or collision-avoidance systems are used, they meet or exceed existing regulatory requirements such as 30 CFR §75.1732 for underground continuous-mining machines.[63]

☐ Operators maintain a written safety program — with input from workers and their representatives — that evaluates newly emerging AI-enabled safety technologies for adoption, consistent with MSHA's technology-neutral, risk-based approach.[64]

B5. OT/IT CYBERSECURITY FOR AI SYSTEMS

☐ AI-enabled operational-technology systems (haulage control, plant monitoring, ERP-linked optimization) are secured under IEC 62443, including defined security zones, conduits, and target security levels.[65]

☐ Vendors of AI-enabled mining equipment are assessed for secure product-development-lifecycle certification (e.g., IEC 62443-4-1) as part of procurement due diligence.[66]

☐ Third-party and supply-chain access to AI/ERP systems is tightly controlled and monitored — a single compromised supplier or cloud connection can be a pathway from office systems into haul trucks, crushers, and concentrators.[67]

B6. ESG & SUSTAINABILITY REPORTING

☐ AI's role in safety, tailings, and environmental performance is captured in existing ESG disclosures (GRI 14 Mining Sector Standard, Towards Sustainable Mining protocols), even though neither framework yet contains an AI-specific disclosure line.[68,69]

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[62]MSHA, Final Rule: Safety Program for Surface Mobile Equipment, https://www.msha.gov/final-rule-safety-program-surface-mobile-equipment
[63]30 CFR §75.1732, Proximity Detection Systems (Cornell LII), https://www.law.cornell.edu/cfr/text/30/75.1732
[64]MSHA, Final Rule: Safety Program for Surface Mobile Equipment, https://www.msha.gov/final-rule-safety-program-surface-mobile-equipment
[65]ISA/IEC 62443 Series of Standards Overview, https://www.isa.org/standards-and-publications/isa-standards/isa-iec-62443-series-of-standards
[66]Global Mining Review, Sandvik Earns IEC 62443-4-1 Cybersecurity Certification, https://www.globalminingreview.com/mining/23062025/sandvik-earns-cybersecurity-certification-for-secure-product-development/
[67]Mining.com, What the Scope Systems Cyber Attack Reveals About Mining's Digital Fragility, https://www.mining.com/op-ed-what-the-scope-systems-cyber-attack-reveals-about-minings-digital-fragility
[68]GRI 14: Mining Sector 2024, https://incp.org.co/wp-content/uploads/2024/02/GRI-14-Sector-minero-2024.pdf
[69]Mining Association of Canada, Towards Sustainable Mining — Safety, Health and Respect Protocol, https://mining.ca/towards-sustainable-mining/protocols-guides/safety-and-health/

☐ Automation's workforce and community impacts are tracked through existing workplace and psychosocial-safety indicators pending the emergence of AI-specific ESG metrics.[70]

[70]Mining Association of Canada, Towards Sustainable Mining — Safety, Health and Respect Protocol, https://mining.ca/towards-sustainable-mining/protocols-guides/safety-and-health/

Section C — People, Workforce & Community Governance

> *Across every jurisdiction surveyed, AI used in employment and workforce decisions is the single most consistently regulated mining AI use case in the world — more than autonomous haulage, more than resource estimation. This section treats it accordingly.*

C1. WORKFORCE ANALYTICS & EMPLOYMENT DECISIONS

☐ AI used in hiring, task allocation, scheduling, performance monitoring, promotion, or termination is treated as high-risk by default, regardless of jurisdiction — this is the clearest, most consistent regulatory trigger globally (explicitly high-risk under the EU AI Act and Colorado's amended AI Act, and a likely category under pending Chilean and Brazilian bills).[71,72]

☐ Workers and their representatives are informed before AI-driven workforce tools are deployed, with a documented right to meaningful human review of adverse outcomes.[73,74]

☐ Where control rooms or remote operations centres relocate roles away from the mine site, the workforce and community impact is assessed and consulted on — not just the technical risk.[75]

☐ Collective-agreement "technological change" clauses (where they exist) are reviewed before AI/automation rollouts, and retraining commitments are honoured in practice, not just on paper.[76]

C2. INDIGENOUS RIGHTS & COMMUNITY CONSULTATION

☐ Where AI tools inform land-use, siting, or environmental-permitting decisions with potential Indigenous impacts, the inputs, assumptions, and outputs are made transparent and disclosable as part of Free, Prior and Informed Consent (FPIC) engagement.[77,78]

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[71]EU AI Act, Annex III — High-Risk AI Systems, https://artificialintelligenceact.eu/annex/3/
[72]Ogletree, Colorado's New AI Act Targets Automated Decision-Making for Consequential Decisions, https://ogletree.com/insights-resources/blog-posts/colorados-new-ai-act-targets-automated-decision-making-for-consequential-decisions/
[73]EU AI Act, Annex III — High-Risk AI Systems, https://artificialintelligenceact.eu/annex/3/
[74]Ogletree, Colorado's New AI Act Targets Automated Decision-Making for Consequential Decisions, https://ogletree.com/insights-resources/blog-posts/colorados-new-ai-act-targets-automated-decision-making-for-consequential-decisions/
[75]ABC News, Mine Site Automation Growing at Boddington, https://www.abc.net.au/news/2026-04-19/mine-site-automation-growing-boddington/106525996
[76]CBC, Mining Companies Betting on Autonomous Technology to Make Dangerous Jobs Safer, https://www.cbc.ca/news/canada/calgary/mining-companies-betting-on-autonomous-technology-to-make-dangerous-jobs-safer-1.6888075
[77]Allens, ICMM 2024 Update: A New Benchmark for Indigenous Rights in Mining, https://www.allens.com.au/insights-news/insights/2024/10/icmm-2024-update-a-new-benchmark-for-indigenous-rights-in-mining/
[78]IFC Performance Standard 7 — Indigenous Peoples, https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-7-en.pdf

☐ Affected communities receive relevant information about AI-informed decisions before those decisions are finalized, consistent with ICMM's Indigenous Peoples Position Statement and IFC Performance Standard 7 — even though neither yet contains AI-specific language.[79,80]

☐ A decision to proceed without a demonstrated consent agreement is preceded by documented human-rights due diligence and expert consultation.[81]

C3. CHANGE MANAGEMENT & SOCIAL LICENSE

☐ Automation and AI rollouts affecting jobs or communities are sequenced with a change-management plan that includes retraining pathways, timelines, and honest communication about workforce impact.[82]

☐ Union and worker-representative engagement on AI/automation is tracked as a social-license indicator, not just a labour-relations formality.[83]

[79]Allens, ICMM 2024 Update: A New Benchmark for Indigenous Rights in Mining, https://www.allens.com.au/insights-news/insights/2024/10/icmm-2024-update-a-new-benchmark-for-indigenous-rights-in-mining/
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Section D — Jurisdictional Radar

No jurisdiction regulates "mining AI" by name. Exposure comes through horizontal risk triggers — above all, employment and workforce-management AI — and through the data-privacy law that fills the gap wherever AI-specific legislation is still pending. This radar summarizes the state of play as of mid-2026; treat pending bills as directional, not binding, until enacted.

Jurisdiction	Governing Instrument	Status (mid-2026)	What It Means for Your Mine
European Union	EU AI Act (Reg. 2024/1689) + Digital Omnibus	High-risk (Annex III) duties delayed to 2 Dec 2027	Workforce/employment AI is high-risk now; human oversight, 6-month log retention, and worker notice required for deployers.
United Kingdom	Sector-led; no horizontal AI statute; ICO AI/ADM code in progress	No AI Act planned near-term	Comply via existing HSE duties + UK GDPR Art. 22 for worker-data decisions; watch the forthcoming ICO code.
United States (Federal)	Dec 2025 EO on national AI policy; NIST AI RMF (voluntary)	Federal deregulation / pre-emption push underway	No binding federal AI statute; existing civil-rights law still applies to AI-driven hiring.
US — Colorado	Colorado AI Act (SB 24-205, amended by SB 26-189)	Effective 1 Jan 2027	Covers "covered ADMT" incl. employment: pre-use notice, adverse-outcome disclosure, meaningful human review.
US — Texas	Responsible AI Governance Act (TRAIGA)	In force since 1 Jan 2026	Intent-based prohibitions on discriminatory or manipulative AI use; biometric-use limits.
Canada (Federal)	AIDA is dead (Bill C-27 died Jan 2025); "AI for All" strategy	No federal AI statute	Rely on PIPEDA; Directive on Automated Decision-Making binds government only, not private mining companies.
Canada — Quebec	Law 25, s. 12.1 (automated decisions)	In force since 22 Sep 2023	Exclusively-automated decisions on individuals require disclosure and a right to human review — directly relevant to workforce analytics.
Australia	Voluntary AI Safety Standard / Guidance for AI Adoption; WA autonomous-mining code	No dedicated AI Act (confirmed April 2026)	AI standard is voluntary; WA's Safe Mobile Autonomous Mining Code and WHS (Mines) Regulations are binding for autonomous equipment.
China	CAC algorithm-filing, Generative AI Measures, AI-labelling rules; DSL; PIPL	In force (layered, binding)	Internal mining AI is mainly caught by data-localisation and PIPL cross-border transfer rules, not the public-facing algorithm-filing regime.
Chile	AI Bill (Boletín 16.821-19), EU-style risk tiers	Pending — passed Chamber in general Aug 2025	Not yet binding; once enacted, high-risk triggers (safety, environment, worker impact) would likely catch mine-site AI.

Peru	Law 31814 + Regulation DS 115-2025-PCM	Regulation published Sept 2025	Framework applies to public and private sectors; specific deployer duties require full-text legal review before reliance.
Brazil	AI Bill PL 2338/2023, EU-style risk tiers	Pending — passed Senate Dec 2024	Not yet binding; proposed algorithmic-impact assessments for high-risk applications once enacted.
South Africa	Draft National AI Policy (2026); POPIA (binding)	Policy is draft/non-binding; POPIA in force	POPIA already requires human oversight for automated decisions affecting workers; AI policy signals future high-risk regime.
Indonesia	UU PDP (binding); draft AI Perpres pending	UU PDP in force; AI Perpres unsigned as of mid-2026	Data Protection Law already requires a lawful basis and DPIAs for high-risk AI; binding AI-specific rules are still pending.

Five Cross-Cutting Takeaways

☐ Workforce/employment AI is the most consistently regulated mining AI use case worldwide — treat it as high-risk by default in every jurisdiction, enacted or pending.[84,85]

☐ "Critical infrastructure" classifications rarely capture mining directly — the EU's version is limited to digital infrastructure, road traffic, and utility supply.[86]

☐ Autonomous haulage and equipment are governed by mine-safety codes, not AI law — Western Australia's autonomous-mining code is the most developed example globally.[87]

☐ Where AI-specific law is silent, data-privacy law is the universal backstop — GDPR, PIPEDA/Quebec Law 25, POPIA, and China's PIPL all require human oversight for automated decisions affecting people.[88,89]

☐ The regulatory direction diverges sharply by region: the EU delayed enforcement, the US federal government is pursuing deregulation while states move independently, Australia and the UK stay sector-

[84]EU AI Act, Annex III — High-Risk AI Systems, https://artificialintelligenceact.eu/annex/3/
[85]Ogletree, Colorado's New AI Act Targets Automated Decision-Making for Consequential Decisions, https://ogletree.com/insights-resources/blog-posts/colorados-new-ai-act-targets-automated-decision-making-for-consequential-decisions/
[86]EU AI Act, Annex III — High-Risk AI Systems, https://artificialintelligenceact.eu/annex/3/
[87]Australian Government, Response to the Senate Select Committee on Adopting AI (1 April 2026), https://www.industry.gov.au/publications/australian-government-response-senate-select-committee-adopting-artificial-intelligence-ai-report
[88]SiLaw, Quebec Law 25 — Automated Decision Disclosure, https://silaws.com/2026/05/31/automated-decision-ai-disclosure-loi25/
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led, Canada abandoned its federal AI bill, and Chile, Brazil, Peru, South Africa, and Indonesia are all building EU-style risk regimes at different speeds.[90,91,92]

[90]DLA Piper, Canadian Privacy and AI Horizon Shifts Again (Jan 2025), https://www.dlapiper.com/en/insights/publications/2025/01/canadian-privacy-and-ai-horizon-shifts-again
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Section E — Building Your AI Governance Program

> *You do not need to do everything in this checklist at once. Most operators are somewhere between Stage 1 and Stage 3. The goal is deliberate progress, not perfection on day one.*

Stage	Focus	Typical Activities
1. Baseline	Visibility	Build the AI inventory (Section A2); identify every model, tool, and vendor already in use, including informal/shadow AI.
2. Foundation	Accountability	Name an AI Risk Owner; draft the board-approved AI policy; stand up the cross-functional governance committee.
3. Risk-Based Controls	Prioritization	Run risk and impact assessments across the inventory; prioritize autonomous equipment, resource estimation, tailings AI, and workforce analytics first.
4. Operational Rigor	Depth	Implement human-oversight protocols, model validation cadences, vendor due diligence, and incident-response integration.
5. External Assurance	Credibility	Pursue ISO/IEC 42001 certification or an equivalent audit; publish transparency commitments for lenders, insurers, and JV partners.

Where Most Mining Operators Are Today

Based on the research behind this checklist, the majority of mining operators are strong on physical-safety governance (ISO 17757, mine-safety codes) and weak on AI-specific governance layered on top of it. The most common gaps we see are: no formal AI inventory beyond the obviously large systems (autonomous haulage, major SaaS platforms); no documented human-oversight process for AI-assisted resource estimation; and no vendor due-diligence process specific to AI procurement, even though nearly all mining AI is vendor-supplied.

Where to Start

If you only do three things this quarter: build the AI inventory (A2), name an accountable executive (A1), and formally document human-oversight authority for your highest-consequence AI use case — whether that's autonomous haulage, tailings monitoring, or resource estimation. Everything else in this checklist builds from there.

About This Checklist & LOMexcel

LOMexcel is a boutique consultancy led by Francisca Lombard, working at the intersection of mining and AI. We combine deep mineral-resource-sector experience — project and study management, project controls, and scheduling — with hands-on AI implementation experience, including building MineGPT, an agentic intelligence system trained on thousands of NI 43-101, JORC, and SK-1300 technical reports.

This checklist reflects the same standard we bring to client work: source-cited, jurisdiction-aware, and built for people who have to defend their decisions to a board, a regulator, or a technical review panel — not just tick a box.

READY TO BUILD YOUR AI GOVERNANCE PROGRAM?

If you'd like help turning this checklist into an operating program — risk assessments, vendor due diligence, board-level policy, or a jurisdiction-specific compliance roadmap — LOMexcel offers a complimentary discovery call to discuss where your organization stands and whether our advisory services are the right fit.

Visit lomexcel.com to book a call or explore our services.

Sources

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