

Formula 1

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Formula 2

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Formula 3

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Related Content

Title	Type	Slug
Blast Design Excel Template v4.2	resource	blast-design-excel-template
Drill Rig Maintenance Inspection Checklist	resource	drill-rig-maintenance-checklist
Rock Mass Rating (RMR) Field Survey Sheet	resource	rmr-field-survey-sheet
Drilling Energy Benchmarking Dashboard (Power BI)	resource	drilling-energy-dashboard
TBM Advance Rate Prediction Curve Library	resource	tbm-advance-rate-library

Detailed Explanation

The ARD/ML Regulatory Decision Tree is grounded in the principle that not all mine waste materials pose equivalent environmental risk, and thus regulatory scrutiny and technical effort should be proportionate to predicted geochemical behavior. It begins with initial field screening (e.g., pH, sulfate, sulfide content, net acid generation potential) and progresses through tiered laboratory testing—including Net Acid Generation (NAG), Acid Base Accounting (ABA), kinetic column tests, and

leachate chemistry—based on pass/fail outcomes at each node. GEST v3.1 (Geochemical Evaluation Screening Tool) is embedded as the computational engine for interpreting test data, applying empirically calibrated thresholds (e.g., NAG pH < 4.5 and NAG acidity > 20 kg H₂SO₄/tonne indicates ARD potential), and assigning material categories (e.g., Non-ARD, Potential ARD, ARD). The decision tree explicitly links classification outcomes to statutory obligations: e.g., Potential ARD materials may trigger requirement for long-term water quality modeling using PHREEQC or MINTEQA2, while ARD materials mandate engineered cover design and post-closure water treatment planning. Crucially, the integrated version harmonizes GEST's quantitative outputs with regulatory triggers from instruments such as the Canadian Environmental Protection Act (CEPA), provincial Mines Acts, and the Metal and Diamond Mining Effluent Regulations (MDMER), ensuring defensible, auditable, and legally compliant pathways for permitting and closure planning.

Key Components

#	Component
1	Tiered Geochemical Testing Protocol
2	GEST v3.1 Computational Engine
3	Regulatory Threshold Mapping Matrix

Applications

#	Application
1	Mine permit application support (e.g., EA submissions, B.C. Mines Act permits)
2	Waste rock and tailings classification for disposal facility design
3	Closure planning and long-term liability assessment

Related Concepts

#	Concept
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1	Acid Base Accounting (ABA)
2	Kinetic Weathering Modeling
3	Mine Waste Geochemical Characterization Protocol (MWGCP)

Tags

mining regulation, geochemical modeling, acid rock drainage, waste characterization, environmental compliance

ARD/ML Regulatory Decision Tree (GEST v3.1 Integrated)