Environmental Services for the Mining Industry

Protecting the Environment from ore to concentrate

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Lamor's Global Role

Lamor's Mission is to restore nature, enabling sustainable mining.
"We help our clients prevent, prepare for, and clean up environmental incidents in both marine and land-based operations."

Mining's Environmental Impact

Mining operations – especially open-pit, underground, side stone piles and processing sites-pose significant environmental risks, particularly from hydrocarbon spills, leakage of toxic chemicals, and contaminated runoff. These contaminants can leach into groundwater, causing long-term pollution, and persist in the environment, requiring continuous remediation efforts, including soil contamination.

Key Environmental Hazards

Hydrocarbon Contamination: Oils, fuels, flotation and process chemicals and lubricants used in mining processes / equipment can spill, leading to soil and water contamination. These hydrocarbons often persist in the environment, presenting long-term risks to ecosystems.

Contaminated Soil: Oil, fuel, and chemical spills can result in soil contamination, which can affect vegetation, aquatic habitats, and potentially harm human health. Remediation is necessary to restore the soil to safe conditions.

Fire and Inhalation Risks: Explosion residuals like ANFO (Ammonium Nitrate Fuel Oil) can pose fire hazards when improperly handled, and the presence of volatile organic compounds (VOCs) in the air can cause inhalation risks for workers.

Contamination of surface- and groundwater: In cases of poorly managed storage tanks or spills from operational equipment, chemicals and oils can leach into water ways and aquafers, contaminating drinking water sources and harming aquatic ecosystems.

Lamor's 40+ year legacy in oil, water, and waste solutions

Lamor's services are tailored to address these risks by providing preventative measures, emergency response plans, and sustainable remediation technologies that ensure safe and responsible mining operations.

"We help the environment, and our clients restore contaminated sites, allowing life to return to affected areas."

Mining Environmental Risks & Response Needs

Environmental Hazards in Mining

Mining operations, whether open pit, underground, or involving waste rock dumps, pose significant environmental risks. These risks include hydrocarbon spills, chemical leaks, and contaminated runoff, which can pollute groundwater and require ongoing remediation. The most common hydrocarbons used in mining operations are Diesel, hydraulic oil, lubricants, fuel and explosive residues (ANFO).

Open-Pit Mining

Open-pit mining involves removing plants and soil to reach ore. Drilling, blasting, and heavy machinery use can lead to surface runoff contaminated with hydrocarbons, fuel spills, dust, and groundwater pollution. Common causes of spills include fuelling on unlined ground, equipment leaks, hydraulic hose failures, and weather exposure. Lamor provides solutions like spill kits, containment berms, and filtration systems.

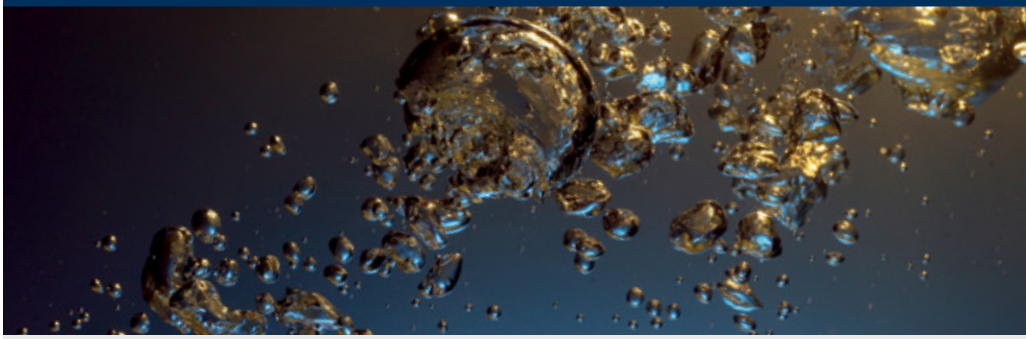
Underground Mining

Underground mining is used for deep ore bodies or when open-pit mining is too environmentally damaging. It involves drilling, blasting, ore hauling, and dewatering, which can cause machinery leaks, explosive residues, oily water, and groundwater pollution. Common causes of spills include leaks from machinery, explosive residues (ANFO), and oily dewatering water.

Waste Rock Dumps

Waste rock dumps, or side stone piles, are created by stacking excavated waste rock. Spills can occur from leachate runoff and equipment residuals. Common causes of spills include leachate with hydrocarbon pollutants and residual hydrocarbons from nearby facilities.

Common mining related topics



- Leaks from machinery
- Leachate with hydrocarbon pollutants
- Surface runoff contaminated with hydrocarbons
- Explosive residues (ANFO)
- Fuel spills during mobile equipment refuelling
- Oily dewatering water
- Groundwater pollution
- Dust and chemical residues

Lamor solutions

- Spill kits
- Containment berms
- Filtration systems
- Submersible pumps
- Mobile treatment units
- Drainage control
- Geotextiles
- Remediation

Processing Plants

In the centre of any mining process lies the processing plant that extracts the valuable minerals from the surround unvaluable rocks many times with different hydrocarbons. Beside the main process hydrocarbons are used to power the plant and for heating proposes.

Concentrator Plant

A concentrator plant is primarily focused on the physical separation of valuable minerals from the ore. This process involves crushing, grinding, and various separation techniques such as flotation to concentrate on the desired minerals. Hydrocarbons used in concentrator plants include kerosene and diesel, which are used as collectors in the flotation process. Spills typically occur in thickener overflows and during the handling of these hydrocarbons in chemical areas.

Hydrometallurgical Plant

A hydrometallurgical plant uses aqueous solutions to extract metals from ores, concentrates, and recycled materials. This process involves leaching, solution concentration and purification, and metal recovery. Common hydrocarbons used in hydrometallurgical plants include kerosene-based reagents for solvent extraction (SX) and oils and lubricants for pumps and motors. Spills can occur in solvent extraction systems, thickening/filtering units, maintenance zones and storage areas.

Metallurgical Plant

A metallurgical plant involves the extraction of metals from their ores through various chemical, thermal, and electrochemical processes. This includes pyrometallurgy (high-temperature processes) and electrometallurgy. Hydrocarbons used in metallurgical plants include lubricants, greases, process oils, and anti-wear oils. Spills typically occur in areas where these hydrocarbons are used, such as in lubrication systems, hydraulic systems, and during maintenance activities leading to waste waters where these increases the effluent loads.

Lamor provides comprehensive solutions for Processing Plants

- Overflow and backwash from thickening/filtering units containing emulsified oils
- Lubricant leaks in flotation units and pump stations
- Maintenance zones generating oily rags and sludges
- Refining ponds accumulating hydrocarbons used in extraction and flotation
- Solvent Extraction (SX) Services
  - Recovery of organic oils
  - Containment barriers & pumping systems
- Specialized Oil Pumping Systems
  - Sludge-heavy liquid handling from excavations
- Wastewater & Potable Water Solutions
  - Treatment for reuse or discharge compliance
- Chemical and tank storage areas.
- Sludges generated in refining and extraction processes may contain hydrocarbons, which, if improperly managed, can contaminate soil and surrounding areas and cause water pollution.

Lithium Brine Mining Solutions

Accelerate lithium production with Lamor's Manta Ray system that quickly and efficiently removes brine solutions, speeding up your lithium extraction operations and maximizing output.

Our system ensures responsible brine management, preserving ecosystems and minimizing environmental impact. Lamor provides comprehensive solutions for Lithium brine mining solutions

- Custom Pumping Oil/ Brine Solutions are tailored to your needs, the Manta Ray handles sludge, salt-rich brine, and other challenges with ease.
- Mobile and Modular: Ideal for remote sites, our system adapts to various environments and operational requirements.

Legacy Tailings, Abandonment Mines & Processing Site Remediation

Legacy tailings and abandoned mining sites pose significant challenges for environmental authorities and mining operators. Governments often bear the cost and responsibility for addressing contamination and community concerns, impacting the reputation of the mining industry. Effective management of these sites is crucial to demonstrating the industry's commitment to responsible environmental practices. Innovative approaches are now being employed to sustainably manage legacy mine sites and tailings-storage facilities, aiming to safeguard human health and the environment while supporting communities and stakeholders for future generations.

Lamor's extensive experience

Lamor brings extensive experience in the sustainable management of soils containing hazardous waste, offering comprehensive solutions for used oils, sludge, chemicals, and other hazardous liquid and solid wastes. Whether in design, construction, or operation, Lamor ensures the use of innovative technology and a commitment to the circular economy. Lamor provides comprehensive solutions for site remediation, including

- Post-closure environmental liabilities
- Contaminated legacy tailings impoundments and seepage
- Historical fuel storage tanks, mobile equipment footprints, abandoned chemicals
- Tailings ponds and legacy mining sites often contain hydrocarbons and other hazardous chemicals, which can seep into the surrounding soil, requiring thorough remediation.

Lamor service

- Phase 1 & 2 environmental studies
- Bioremediation, ISCO, soil washing
- Thermal desorption and water pumping
- Design-build-operate remediation plants
- Wastewater & hazardous sludge treatment
- Potable water for mining camps & field crews
- Hazardous oil waste treatment and recycling options

Maritime & Port-Side Mining Spill Response

Maritime and port-side mining spill response is crucial for managing environmental hazards associated with bulk mineral export and import terminals. These operations can lead to hydrocarbon spills during barge loading, pipe transfer, and storage, as well as leaks from port-side concentration filtration plants. Contaminated runoff from the concentration filtration plant can affect marine life and local communities, necessitating rapid and effective emergency response.

Lamor provides comprehensive solutions for maritime and port-side mining spill response

- Skimmers, DGTM-approved absorbents
- PVC/neoprene booms, powerpacks
- Emergency response teams & contingency planning
- Risk at bulk mineral export/import terminals
- Spill during barge loading, pipe transfer, storage

Comprehensive Waste & Water Services

Lamor offers a range of comprehensive waste and water services tailored to the mining industry in South America. These services address both environmental and operational needs, ensuring sustainable and efficient mining practices.

Wastewater & Hazardous Sludge Treatment

Lamor provides modular purification systems for treating limited wastewater and hazardous sludge generated in mining operations. These systems help in reducing contaminants and ensuring compliance with environmental regulations. The treatment process includes the removal of hydrocarbons, heavy metals, and other pollutants, making the water safe for discharge or reuse.

Potable Water for Mining Camps & Field Crews

Lamor supports the production of high-quality potable water for mining camps and field crews. By utilizing challenging water sources for process water production, Lamor helps preserve underground aquifers for human consumption. This includes the use of ultrafiltration (UF) membranes and reverse osmosis (RO) plants, which are designed for efficient and sustainable water treatment.

Hazardous Oil Waste Treatment and Recycling Options

Lamor offers certified waste handling protocols for the treatment and recycling of hazardous oil waste. This includes the recovery and reuse of used oils, sludge, chemicals, and other hazardous liquid and solid wastes. Lamor's solutions promote long-term sustainability by minimizing waste and transforming it into valuable resources.

Mobile Remediation for Isolated Mining Camps

Lamor provides mobile remediation services for isolated mining camps, ensuring that even remote sites have access to effective sewage treatment solutions. These services include the design, construction, and operation of remediation plants, tailored to the specific needs of each site.

LAMOR

Let's clean the world

Lamor in brief

Lamor is one of the world's leading providers of environmental solutions. For four decades, we have worked to clean up and prevent environmental incidents on land and at sea.

Environmental protection, soil remediation and material recycling: Our innovative technologies, services and tailored solutions, ranging from oil spill response, waste management and water treatment to soil remediation and plastic recycling, benefit customers and environments all over the world.

We are capable of vast and fast operations thanks to our connected ecosystem of local partners, steered by our experts. Lamor's share is listed on the Nasdaq Helsinki (ticker: LAMOR). Further information: www.lamor.com

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