Catastrophic Release to Surface Waters

Catastrophic or Chronic Release to Groundwater

Air Releases

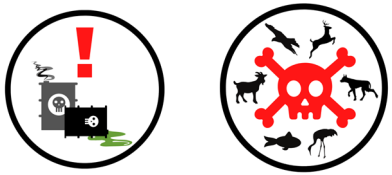
Improper Material/ Waste Management

Wildlife Mortalities

FREEPORT-MCMORAN

Environmental Significant Risks

Reference Guide



Environmental Significant Risks Management

Why Environmental Significant Risks?

Background

Freeport-McMoRan Inc. (FCX) minimizes the impacts of its operations on the environment using risk management strategies based on valid data and sound science. Management of risks involves evaluating activities to identify appropriate controls for mitigation. Identification and implementation of appropriate critical controls minimizes impacts and helps the Company to maintain good stakeholder relations for long-term success.

Annual risk assessment processes are completed at FCX operations and are reflective of the risks relevant to respective sites. While risks vary across the Company portfolio, certain risks are consistently identified as significant in nature. These risks require additional focus for their broad applicability and are the emphasis of this Environmental Significant Risk (ESR) program.

This program charges sites to manage their ESRs by inventorying and maintaining the critical controls that prevent the most serious environmental consequences threatening FCX.

Critical Control	Am I Managing the Risk Effectively?
Substitution	• Avoidance—modify project location or configuration to avoid impacting habitat • Alternative habitat—creation of habitat off-site to reduce on-site interaction • Minimize footprint—optimize project footprint to limit disturbance of wildlife.
Engineering	• Avian hazing or deterrent measures • Barricading and fencing of potentially impactful process facilities • Containment systems for chemical, petroleum, and waste storage • Stormwater Protection and Pollution Prevention BMPs and facilities • Process Solution or impacted water facility design and management
Administrative	• Management of Change (MOC) • Facility inspections • Institution of wildlife protection measures on infrastructure • Proper communication and training to FCX/Site wildlife and biodiversity policies • Internal and external audits • Spill Response Notification and procedures • Mitigation—replace or relocate affected resources • Site policies—Speed limits, etc.
Resources	• FCX Corporate Media Managers (Wildlife/ Biodiversity) • FCX Permitting Manager • FCX Environmental Steering Team • FCX Corporate Legal • FCX Lifecycle and Technology Teams • FCX Environmental Management Practices (EMP)

Wildlife Mortalities

Description

Freeport-McMoRan Inc. (FCX) sites have the potential to impact wildlife resources. While wildlife mortalities refer all wildlife, those impacts with the greatest risk to FCX include avian, aquatic/fishery, and terrestrial. Impacts to these environments are generally captured by existing environmental significant risks. The Wildlife Mortalities significant risk is specific to mortalities caused by FCX through release, environmental degradation, or improper management of processes. This risk exists both off-site and on-site at our operations. Conditions of on-site process areas may be detrimental to the health of wildlife, resulting in mortalities. Therefore, proper controls are required to prevent wildlife interaction or mortality associated with onsite materials, processes, or operations.

Potential Impacts

- Damage to social license and/or organized community opposition
- Regulatory and/or civil penalties due to wildlife mortalities
- Curtailment or reduction in operation
- Negative impacts to relations with federal and state agencies and resulting impact to approval of future operations
- Legal action brought on by outside groups in relation to wildlife impacts

Trigger Events

- Avian or terrestrial interaction with process solution or lined ponds due to inadequate engineering control including barricading, fencing, or protection of process facilities.
- Avian interaction with process solution or lined ponds due to inadequate administrative or engineering management (Inspections and hazing efforts).
- Avian or terrestrial interaction with facility infrastructure (Mechanical/ Electrical).
- Improper human interaction with terrestrial, avian, or aquatic wildlife.
- Terrestrial habitat impacts caused by operation or processes, that may result in mortality.
- Release of chemicals, process fluids, untreated water, petroleum products, hazardous waste or other process materials resulting in mortality.
- Interaction with heavy equipment and light vehicle traffic.

Environmental Significant Risks

Definition

Any activity or occurrence that may exist at multiple FCX operations, including active, inactive and future sites, that has the potential to affect the Company's ability to bring products to market and/ or social license to operate. These may exhibit substantial hazards to air, land, water, biodiversity and communal resources.

Potential Impacts

• Degradation to air, land, water, or biodiversity resources
• Permanent damage to reputation and social license
• Organized stakeholder opposition
• Regulatory restrictions and/or enforcement actions
• Civil penalties and/or class-action lawsuits
• Delay in production, including temporary/ permanent shutdown of operations
• Inability to develop expansion projects or greenfield sites
• Increase in financial liability, both long-term or short-term

Environmental Significant Risks

1. Catastrophic Releases to Surface Water
2. Catastrophic or Chronic Release to Groundwater
3. Air Releases
4. Improper Material/Waste Management
5. Wildlife Mortalities

Catastrophic Release to Surface Waters

Description

The potential to impact surface water quality exists at all Freeport-McMoRan (FCX) operations. Water quality can be impacted through releases of process solutions, the intentional or unintentional introduction of other contaminants, the flow of water over areas of poor soil quality and where water has the potential to negatively affect stability of engineered systems, potentially resulting in surface releases. Proper management and routing of runoff is paramount to ensure receiving waters are protected. Facilities may present different levels of risk based upon proximity to site boundaries and different drainages.

Potential Impacts

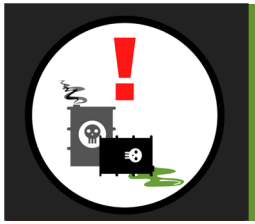
- Contamination of surface water resources through the unintentional release of chemicals, process fluids, untreated water, petroleum products, or tailings.
- Partially treated or inadequate quality water that is discharged to waters of the U.S. through a permitted or unpermitted facility.
- Unintentional release of impacted storm water as a result of inadequate containment infrastructure or implementation of best management practices (BMPs).
- Degradation to biodiversity resources caused by releases to receiving waters.
- Long term water treatment obligations.
- Regulatory and/or civil penalizes based on permit deviations, notice of violations or administrative orders.

Trigger Events

- Failure of pipelines, pumps, pump-back systems, tanks, or valves
- Upsets in water treatment processes
- Containment or diversion (BMP) structure failures
- Excess process water
- Chemical/material transport release
- Stockpile failure or release (ROM, crushed leach, waste rock, overburden)
- Tailings Impoundment failure or release
- Unexpected ARD (Acid Rock Drainage) contribution
- Instrumentation failure
- Human error

Critical Control	Am I Managing the Risk Effectively?
Substitution	• Avoidance—modify project location or configuration to avoid impacting resources • Substitution of materials resulting in potential hazardous wastes • Use of eco-friendly alternatives to more toxic process chemicals
Engineering	• Containment systems for process material and wastes • Process material facility design and management • Liner systems instituted in material storage facilities • Properly designed equipment utilized in transport and management of materials
Administrative	• Management of Change (MOC) • Waste and material characterizations • Adequate communication and training to policies and regulatory requirements • Internal and external audits • Spill Response Notification and procedures • Inspections • Operating and Maintenance Plans and Practices, material management SOPs • Biological and cultural Resources surveys

Resources	• FCX Corporate Media Managers (Waste)
	• FCX Permitting Manager
	• FCX Environmental Steering Team
	• FCX Lifecycle and Technology Teams
	• FCX Environmental Management Practices (EMP)
	  • Land Management Planning EMP
	  • Spill/Release Prevention and Control EMP



Improper Material/Waste Management

Description

Freeport-McMoRan Inc. (FCX) operations take part in many activities including, but not limited to, mining, mineral processing, construction/expansion, exploration and legacy. If not managed properly, these activities can result in significant environmental consequence through release to land, or mismanagement of process material or waste. Placement, through mismanagement or release, of material to an improper process unit may have severe consequences, including changes to designations of materials, loss of regulatory exemption, or loss of potentially beneficial material. FCX's impacts to land, both industrial and mining, include, but are not limited to, soil contamination from spills/releases, release of potentially hazardous materials and community/biodiversity impacts. Minimizing the impacts to land by our operations is crucial for FCX operations through the implementation and proper usage of Critical Controls.

Potential Impacts

- Loss of regulatory exemptions
- Reclassification of material designation due to comingling
- Loss of potentially beneficial process material
- Catastrophic offsite and onsite degradation to land, community, cultural resources and/or biodiversity caused by trigger events
- Damage to social license and/or organized community opposition
- Regulatory and/or civil penalties based on permit deviations, notice of violations or administrative orders
- Measurable delay in site production incurred from cleanup efforts, infrastructure repairs, etc.
- Increase in long-term remediation liability including potential Superfund designation

Trigger Events

- Containment failure of beneficial process material or waste, including hazardous waste or other waste streams
- Process upsets resulting in release or improper placement of material
- Releases of process materials or waste to improper process units
- Comingling of wastes resulting in loss of regulatory exemption(Bevill). May occur through process change or human error associated with material management.
- Improper characterization of waste
- Improper placement of material

Critical Control	Am I Managing the Risk Effectively?
Substitution	• Water reuse and industrial treatment/ recycling systems • Use of eco-friendly alternatives to more toxic process chemicals
Engineering	• Stormwater protection and pollution prevention facilities • Water treatment facilities • Water conveyance, collection, and pump-back systems • Containment systems for chemical, petroleum and waste storage facilities • Process solution facility design and management
Administrative	• Management of Change including review of expansion or maintenance projects • Surface water quality monitoring activities • Inspections • Stormwater pollution and Spill Prevention, Control, and Countermeasure plans • Operating and maintenance plans and practices • Spill response notifications and procedures • Internal and external audits
Resources	• FCX Land and Water Resources Management Team • FCX Tailings, Crushed Leach, and Water Team • FCX Environmental Technology Team • FCX Sustainable Development Team • FCX Legal Department • Site level water management and technical services teams

Catastrophic or Chronic Release to Groundwater

Description

The potential to impact groundwater quality exists at all Freeport-McMoRan (FCX) operations. Water quality can be impacted through subgrade releases of process solutions, the intentional or unintentional introduction of other contaminants and the introduction or flow of water through areas of poor soil quality. Release may be acute or chronic in nature. For example, a catastrophic spill may introduce groundwater contamination, while ongoing seepage from a storage, stockpile, or tailings facility may do the same. Controls to prevent groundwater contamination vary by facility. Facilities may present different levels of risk based upon process and potential contributors to groundwater contamination.

Potential Impacts

- Contamination of groundwater resources through the unintentional release of chemicals, process fluids, untreated water, or petroleum products.
- Inability to maintain compliance at onsite monitoring locations or POCs.
- Impacts to offsite groundwater resources
- Long term water treatment obligations.
- Regulatory and/or civil penalties based on permit deviations, notice of violations or administrative orders.

Trigger Events

- Loss of capture/containment zone at pits
- Incomplete capture at pump-back locations (various facility types)
- Pond, stockpile, or storage facility liner failure (also includes migration through bedrock)
- Loss of sump integrity
- Leaking underground tanks or piping
- Infiltration due to exceedance of pond level BMPs
- Instrumentation failure
- Human error

Critical Control	Am I Managing the Risk Effectively?
Substitution	• Using reduced VOC raw materials • Installation of upgraded more efficient process equipment (Evaluate for potential de-bottle necking)
Engineering	• Emissions Control Equipment • Continuous Emission Monitor/Continuous Opacity Monitor • Appropriate process automation and monitoring • Replace water with chemical dust suppressant for control of fugitive dust (May provide better dust control and reduce consumption of water)
Administrative	• Management of Change including review of expansion or maintenance projects • Ambient Impact Analyses • Operating and Maintenance Plans and Practices • General Duty Clause • Risk Management Plan • Emergency Response Plan • Routine Inspections and Monitoring • Fugitive Dust Control Plan • Internal and External Audits
Resources	• FXC Environmental Permitting Manager • FCX Air Quality Lead Environmental Specialist • FCX Legal Department • FCX Environmental Technology Team • Site Level Air Quality and Technical Services Teams • Outside Consulting and Technical Services

Air Releases

Description

Freeport-McMoRan (FCX) operates various facilities and industrial processes that emit regulated criteria and hazardous air pollutants into the atmosphere. The Clean Air Act requires the USEPA to set National Ambient Air Quality Standards for maximum allowable concentrations of six "criteria" pollutants in outdoor air. These criteria pollutants, including CO, NOx, SO2, Particulate Matter, Ozone, and Lead, can cause adverse impacts to human health and environmental degradation. Hazardous air pollutants (HAPs) are included as pollutants that may create human health or environmental impacts. Environmental impacts from air release may be realized from incidental releases and/or chronic deposition of air pollutants during normal operations. Air pollutant emissions should be managed in a way that is compliant with regulatory requirements and protective of human health and the environment.

Potential Impacts

- Degradation to local and regional air quality and biodiversity resources
- Permanent damage to social license
- Organized community opposition
- Regulatory restrictions and/or enforcement actions
- Civil / Criminal penalties and/or class-action lawsuits
- Delay in site production, including temporary or permanent shutdown of operations
- Inability to develop expansion projects or greenfield sites
- Increase in financial liability, both long-term or short-term

Trigger Events

- Excess Emissions during normal operations or during Startup, Shutdown, or Malfunction events.
- Failure to properly maintain emissions/pollution control equipment
- Malfunction or failure of process equipment, or emissions control equipment
- Weather related events resulting in excess wind blown fugitive dust or other emissions
- Instrumentation failure
- Intentional pollution control equipment shutdown
- Not obtaining proper permits or appropriately modifying existing permits for facility changes.
- Improper operation/management of process or water treatment systems (H2S)

Critical Control	Am I Managing the Risk Effectively?
Substitution	• Water reuse and industrial treatment/ recycling systems • Use of eco-friendly alternatives to more toxic process chemicals
Engineering	• Groundwater protection and pollution prevention facilities • Water treatment facilities • Water conveyance, collection, and pump-back systems • Containment systems for chemical, petroleum and waste storage facilities • Process solution facility design and management • Facility liner design and management
Administrative	• Management of Change including review of expansion or maintenance projects • Groundwater quality monitoring activities • Water balance management • Inspections • Operating and maintenance plans and practices • Spill response notifications and procedures • Internal and external audits
Resources	• FCX Land and Water Resources Management Team • FCX Tailings, Crushed Leach, and Water Team • FCX Environmental Technology Team • FCX Sustainable Development Team • FCX Legal Department • Site level water management and technical services teams