Chemical Management Plan for Sierra Rutile Limited, Sierra Leone

Sierra Rutile Limited

Sierra Rutile Limited

March 2018

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List of abbreviations

AST	Above ground storage tank
CEO	Chief Executive Officer
CMP	Chemical Management Plan
COO	Chief Operating Officer
EHS	Environmental, Health and Safety
EHS Guideline	Environmental, Health and Safety Guidelines
EIA	Environmental Impact Assessment
EP	Equator Principles
EPA Act	Environment Protection Agency (EPA) Act, 2008
EPA-SL	Environmental Protection Agency of Sierra Leone
EPFIs	Equator Principles Financial Institutions
ESHIA	Environmental, Social and Health Impact Assessment
ESHMP	Environmental, Social and Health Management Plan
ERCP	Emergency Response and Contingency Plan
GIIP	Good International Industry Practice
H&S	Health and Safety
HR	Human Resources
IFC	International Finance Corporation
ILO-CIS	International Occupational Safety and Health Information Centre
MLCPE	Ministry of Lands, Country Planning and the Environment
MSDS	Material Safety Data Sheet
NMA	National Minerals Agency
OHS	Occupational Health and Safety
OHSAS 18000	Occupational Health Safety Assessment Series (OHSAS) 18000
OHSP	Occupational Health and Safety Plan
PPE	Personal Protective Equipment
PS	Performance Standards
SDS	Safety Data Sheet
SLEP (MM) Reg. 2013	Environmental and Social Regulations for Mining, 2013
SOP	Standard Operating Procedure
SR Area 1	Sierra Rutile Area 1
SRK	SRK Consulting (South Africa) (Pty) Limited
SRL	Sierra Rutile Limited
SWI	Safe Work Instructions
UN	United Nations
UNGP	United Nations Guiding Principles on Business and Human Rights
US	United States
WHO	World Health Organization

1 Introduction

Sierra Rutile Limited (SRL) is an existing mining operation located in the Bonthe and Moyamba Districts of the Southern Province of Sierra Leone. The mine has been in operation for over 50 years and produces rutile, ilmenite and zircon rich concentrate.

In 2015, the Environmental Protection Agency of Sierra Leone (EPA-SL) issued a notification to SRL (reference number EPA-SUHA.96/214/a/HNRM), instructing them to undertake an Environmental, Social and Health Impact Assessment (ESHIA) and develop an Environmental, Social and Health Management Plan (ESHMP) for their current and proposed mining activities including the proposed expansion areas within Area 1. This included the Gangama and Lanti deposits and other deposits within SRL's current operations in Sierra Rutile Area 1 (SR Area 1).

SRK Consulting (South Africa) (Pty) Ltd (SRK) was appointed by SRL to undertake the ESHIA / ESHMP process to meet Sierra Leonean legal requirements as well as SRL's corporate policies, which are aligned with Good International Industry Practice (GIIP). The Draft ESHIA / ESHMP Report was submitted to the EPA-SL in March 2018.

As part of the process of implementing the outcomes of the ESHIA / ESHMP, a Chemical Management Plan (CMP) is required. This document constitutes the CMP which is appended to the ESHIA / ESHMP Report and will form part of SRL's Health, Safety, Environmental and Community (HSEC) Management System.

1.1 Purpose of this Plan

SRL has developed this CMP to provide guidance associated with the management of chemicals at the SR Area 1 operations.

This CMP was developed to ensure the safe and proper use of hazardous chemicals and to comply with applicable governmental regulations addressing the procurement, use, storage, management, transportation and disposal of both hazardous and non-hazardous chemicals. It was additionally developed to provide SRL with a management program to reduce the potential for accidents involving hazardous chemicals and/or wastes.

There may be other standards and legislation in addition to those outlined in this document that may need to be considered as applicable.

This CMP will be implemented as part of SRL's HSEC Management System.

2 Definitions

Bund means an embankment or wall which may form part of or the entire perimeter of a bunded area.

Chemicals and hydrocarbons in this Management Plan refer to acids, alkalis or chemicals with the potential to cause pollution or environmental harm when discharged into the environment.

Checklists assist in assessing the implementation of a Safe Operating Procedure (SOP). Checklists contain a list of key items required, things to be done or points to be considered and are a tool to assess compliance with a Procedure.

Bunded area is an area bounded by ground contours or by a bund, and intended to retain spillage or leakage. This is inclusive of the floor of the bunded area.

Dangerous goods are materials or items with hazardous properties which, if not properly controlled, present a potential hazard to human health and safety, infrastructure and/ or their means of transport.

Environmentally Hazardous Materials as defined in the Licence issued under Part V of the EP Act means: material (either solid or liquid) which if discharged into the environment from within the premises may cause pollution or environmental harm.

Hazard is a source of potential harm to the environment or to health and safety of personnel.

Hazardous substances are those that, following exposure, can have an adverse effect on health and/or the environment.

Procedures are designed to assist in the implementation of the CMP by prescribing a series of processes and actions for a specific topic.

Safety Data Sheet (SDS), also referred to as a Material Safety Data Sheet (MSDS), is a document that provides information on the properties of chemicals; their hazard classification; how they affect health and safety in the workplace; and how to manage the chemicals in the workplace.

3 Governance Framework

This CMP has been developed in accordance with national and international regulations and guidelines. The regulations and guidelines are discussed in the following sections.

3.1 National Standards and Guidelines

The following Acts and Regulations are applicable to this project and are further discussed in the subsections that follow:

- *Environment Protection Agency Act, 2008* (EPA Act);
- *Mines and Minerals Act, 2009*; and
- *Environmental and Social (Mines and Mining) Regulations, 2013* (SLEP (MM) Reg. 2013).

3.1.1 Environment Protection Agency Act of 2008, Sierra Leone

The *Environment Protection Agency Act, 2008*, establishes general guidelines for toxic and hazardous substances. These guidelines include the following:

- The Environmental Board may prescribe activities or substances that shall be considered hazardous;
- The Director will take the necessary and appropriate measures to monitor, control, and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes;
- The introduction or importation of toxic or hazardous wastes into Sierra Leone for storage or disposal by any means whatsoever is prohibited;
- The possession, introduction, or importation into Sierra Leone of internationally banned chemicals or substances is prohibited;
- The uncontrolled discharge of any toxic or hazardous substances into the air or in, on, or under the land and waters of Sierra Leone is prohibited; and the EPA-SL may take investigative and enforcement actions in instances where it has reasonable grounds to believe an offence has been committed against the Act; and
- Part V – Ozone depleting substances, provides guidance on the control and use of ozone depleting substances. This section also makes provisions should an individual or entity contravene this Act. SRL also takes cognisance of the Ozone Depleting Substances Regulations, 2010.

3.1.2 Mines and Minerals Act, 2009

The key provisions of the Mines and Minerals Act relate to mineral rights and access to surface rights (including compensation for land owners), radioactive materials, protection of the environment, community development, health and safety, and transparency in the extractives industry. The Minister for Mineral Resources and the National Minerals Agency (NMA) are the current relevant authorities for enforcing the Act.

Part XV – Protection of the Environment

General and specific provisions for varying mining activities are provided in Part XV – Protection of the Environment of the Act (§131 – 137). The majority of this part in the Act is applicable for mining licence holders seeking a small or large-scale mining licence. There are however certain sections that apply to all mining licence holders. The relevant sections are as follows:

- §132 (1), which requires the mining licence holder to exercise duty of care to protect the environment and minimise pollution, and states "a holder of a mineral right is subject to all laws of Sierra Leone concerning the protection of the environment" (§132 (2)).

Part XVII - Health and safety

This section of the Mines and Minerals Act provides provisions for holders of mineral rights in terms of health and safety (§142 – 147). It addresses workplace health and safety requirements and provisions including a policy for compensation of injured workers.

In addition, Section 142 (d) states: "*Every holder of a mineral right shall ensure that persons who are not employees, but who may be directly affected by the activities at the mine are not exposed to any hazards to their health and safety*".

3.1.3 Mines and Minerals Operational Regulations, 2013

The *Mines and Minerals Act of 2009* have been supplemented by detailed regulations, which contain key provisions for mining projects. Specifically, the Mines and Minerals Operational Regulations of 11 July 2013, provide for requirements in relation to surface, open pit and underground mining operations, reporting of mineral resources, health and safety standards, waste disposal, as well as explosives and blasting.

Part V – Occupational Health and Safety

Sections 26 to 41 provide provisions for holders of mineral rights in terms of occupational health and safety. It addresses duties to protect worker safety, administrative requirements, training, safe work procedures and practices, emergency preparedness and is inclusive of contractors and site visitors.

3.2 International Standards and Guidelines

The international standards and guidelines as applicable to this project are presented in the subsections that follow.

3.2.1 United Nations

The United Nations (UN) has established the United Nations Guiding Principles on Business and Human Rights (UNGP), which in 2011 unanimously endorsed a global standard for preventing and addressing the risk of adverse impacts on human rights linked to business activity. UN agencies, including the International Labour Organization (ILO); the International Occupational Safety and Health Information Centre (ILO-CIS); and the World Health Organization (WHO) work in partnership with the ILO. Key instruments of the ILO include the following:

- Conventions: The ILO has a wide array of Fundamental, Governance (Priority) and Technical ILO Conventions, many of which are applicable to global OHS, notably C155, C161, and C187. A further relevant Convention is dealing with safety and health in mines (C176 Safety and Health in Mines Convention). While C155, C161, C187 and C176 are not ratified in Sierra Leone, as indicated in http://www.ilo.org/, their embodied principles may be implemented;
- Codes of Practice: The ILO Codes of Practice are non-binding and do not replace national law, but they provide guidance to entities including employers on protecting employees on specific hazards and health risks, including in the mining sector. They further provide guidance on the establishment of effective OHS management measures;
- Safe Work: The ILO runs the Programme on Safety and Health at Work and the Environment (Safe Work), which sets out to ensure, amongst other aspects preventive policies and programmes are developed to protect workers in hazardous occupations and sectors;
- Global Strategy to Improve OHS: In 2003 the ILO launched the Global Strategy to Improve OHS.

3.2.2 Occupational Health Safety Assessment Series (OHSAS) 18000

OHSAS 18000 is the internationally recognized assessment specification for occupational health and safety management systems. OHSAS 18000 comprises two parts, OHSAS 18001 and 18002 and embraces a number of other publications. This management system operates on the basis of policy, planning, implementation and operation, checking and corrective action, management review, and continual improvement.

3.2.3 International Finance Corporation (IFC) Performance Standards

The IFC 2012 Performance Standards (PS) are an international benchmark for identifying and managing environmental and social risk, and has been adopted by many organizations as a key component of their environmental and social risk management.

There are eight IFC PS's in total, as listed below, seven of which are relevant to the SR Area 1 operations.

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts;
- PS 2: Labour and Working Conditions;
- PS 3: Resource Efficiency and Pollution Prevention;
- PS 4: Community Health, Safety and Security;
- PS 5: Land Acquisition and Involuntary Resettlement;
- PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; and
- PS 8: Cultural Heritage.

The IFC PS, and the Equator Principles which generally follow the requirements of the IFC, have been adopted for this project. The PS's that have relevance to chemical management are PS 2 and PS 3 which are outlined below.

PS 2: Labour and Working Conditions

PS2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. This PS is guided by international conventions and instruments, including those of the ILO and the UN. OHS-focused objectives of PS2 set out:

- To promote compliance with national employment and labour laws;
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the clients supply chain; and
- To promote safe and healthy working conditions, and the health of workers.

In terms of PS2, SRL will provide a safe and healthy work environment, taking into account inherent risks and hazards. Steps will be taken to minimize accidents, injury and disease arising from; associated with; or occurring in the course of work. In line with international best practice, SRL will address the identification of hazards; preventative and protective measures; training; documentation and reporting; as well as emergency response.

PS3: Pollution Prevention and Abatement

PS3 outlines a project-level approach to resource efficiency and pollution prevention and promotes application of technologies and practices where feasible, based on commercially available skills and resources to achieve this.

PS3 places key emphasis on both non-hazardous and hazardous waste materials, and in respect of the latter is required to comply with GIIP alternatives for environmentally sound disposal while adhering to the limitations applicable to its transboundary movement. Hazardous waste disposal conducted by third parties requires use of reputable and licensed contractors implementing chain of custody documentation to the destination.

3.2.4 Other Requirements and Standards

Other international requirements and standards relevant to emergency reponses for the proposed SRL project include:

- Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises;
- Voluntary Principles on Security and Human Rights developed by the International Council on Mining and Metals (ICMM);
- Extractive Industry Transparency Initiative (EITI) is a voluntary, global initiative aimed at transparency and accountability in which extractives sector payments made by companies and received by governments are publicly disclosed and reconciled; and
- The African Development Bank (AfDB) requirements documented inter alia in its 2003 Integrated Environmental and Social Impact Assessment Guidelines.

3.3 Corporate Policies, Framework and Standards

In addition to complying with international and national Regulations and standards, Iluka, SRL's parent company, has its own set of policies, standards, procedures and guidelines. All Group standards and procedures provide auditable criteria, against which compliance can be measured. These structures define commitments, directions and intentions. They provide emphasis, set direction and are equivalent to organisational law; driving decision making within the business. Below is a description of the Iluka framework, policies, standards and procedures.

3.3.1 Iluka Health, Safety, Environment and Community Management System Framework

The HSEC Management System framework defines the requirements, processes and tools to assist with achieving Iluka's sustainability objectives which are:

- High levels of performance aimed at sustainable outcomes;
- Sound governance, planning, control and risk management systems; and
- Positive and enduring legacies with mutually beneficial outcomes.

The HSEC Management System Framework comprises of the following key areas:

- Health – identifying, assessing and monitoring health hazards;
- Safety – managing personal and operational safety risks;

- Environment – conducting activities such that adverse impacts on existing and potential environmental values are minimised. This includes the efficient use of resources, in particular energy, water and land, and effective plans for the cessation of operations and rehabilitation of disturbed areas; and
- Community – engaging our communities and ensure their views form part of our decision-making process.

The system covers the lifecycle of Iluka activities from exploration, planning and project development, through to operation, closure and rehabilitation.

3.3.2 Iluka Health, Safety, Environment and Community Policy 2017

The HSEC Policy provides a declaration on the importance Iluka places on conducting its business safely, without detrimental health effects and with regard to the community and the value of the natural environment. Iluka HSEC Policy commits the Company to operate in a sustainable manner by targeting high levels of performance and pursuing leading practice in the areas of health, safety, environment and community reflecting the Company's values of Commitment, Integrity and Responsibility. The main aspects of the HSEC Policy are to:

- Assess and manage environment, workforce and community risks associated with Iluka's activities;
- Comply with all legislative requirements, which are recognise as the minimum standard to achieve;
- Set clear, achievable and measurable performance targets;
- Seek to continuously improve performance;
- Maintain a HSEC management system covering all areas of the business;
- Provide appropriate training to staff; protect the health and safety of the people by identifying and taking appropriate action to mitigate workplace fatalities, injuries and illnesses;
- Acknowledge the cultures, customs and values of people in communities where we operate;
- Engage early in open, inclusive and meaningful communication and incorporate stakeholder views in the decision-making processes;
- Seek to make a positive difference to the social and economic development of the areas in which the Company operates;
- Develop effective plans for the cessation of operations and rehabilitation of disturbed areas;
- Use resources efficiently, in particular energy, water and land; and
- Maintain a product stewardship approach towards the use of the Company's products.

The HSEC Policy aligns with Iluka's overarching commitment to deliver high levels of health, safety, environment and communities performance while providing a commitment to ensure that health, safety, environment and communities standards reflect the relevant leading practise.

4 Key Environmental Activities

Many of the activities associated with SRL's operation and decommissioning activities have the potential to impact on the environment.

The key activities undertaken by SRL that involve the transport, storage, handling and disposal of chemicals and hydrocarbons that have the potential to impact on the environment include:

- Open cast wet and dry mining;
- Ore processing;
- Materials handling;
- Vehicle movement;
- Vehicle / equipment servicing and refuelling;
- Power generation;
- Construction / establishment of infrastructure/linear infrastructure;

- Waste management;
- Groundwater monitoring; and
- Transfer and distribution of bulk chemicals and hydrocarbons.

4.1 Preliminary List of Hazardous Chemicals

Below is a preliminary list of potentially hazardous materials/chemicals associated with the SR Area 1 Site activities:

- Waste water, including sewage;
- Paints (viz. antirust, primer, auto lacquer, synthetic, enamel, metal, spray, floor and wall paints);
- Degreasers;
- Hydraulic, transmission and engine oil (new and used);
- Assorted lubricants;
- Refrigerants;
- Petrol;
- Diesel;
- Chemicals used for the treatment of water (viz. sulphuric acid, bisulphite, antiscalant and chlorine);
- Drilling chemicals;
- Chemicals used for analytical requirements in the Chemical Laboratory;
- Sulphide flotation reagents (xanthate collector, frother and sodium carbonate for pH adjustment);

A number of chemicals, reagents, and hazardous materials will be stored or generated on site. In addition to process reagents, other potentially hazardous materials will also be stored on site. Hazardous substances will likely include, but are not limited to, engine coolant, transformer fluid, hydraulic fluid, paints, solvents, propane, acetylene, cleaners, cement and concrete additives, and other chemicals stored on site from past operations such as sodium fluoride.

5 Potential Environmental Impacts

The potential direct and indirect environmental impacts associated with chemical and hydrocarbon management which may arise from SRL's activities are presented in Table 5-1.

Table 5-1: Potential Environmental Impacts Arising from SRL's Activities

Potential Environmental Impacts	Details
Soil contamination	Soil contamination from chemical and hydrocarbon spills and the inappropriate use and disposal of hydrocarbons and chemicals.
Groundwater contamination	Contamination of groundwater and a reduction in water quality from spills and inappropriate use and disposal of hydrocarbons and chemicals.
Surface water contamination	Contamination of surface water and reduction in water quality from spills and inappropriate use and disposal of chemicals and hydrocarbons.
Effects on native vegetation	Reduction in water quality can impact on native vegetation. Spillage to ground or inappropriate use or disposal can cause direct impacts to native vegetation.
Loss of fauna / fauna habitat	Reduction in water quality can impact on fauna and fauna habitat. Spillage into water ways or inappropriate use or disposal of hydrocarbons and chemicals may cause direct impacts to fauna (i.e. hydrocarbon covered feathers or fur).

6 Environmental Management

The framework for managing chemical and hydrocarbon material is outlined in Figure 6-1.

Figure 6-1: Overview of chemical material management framework

A series of environmental management objectives have been developed to mitigate potential environmental impacts of chemical and hydrocarbon management. These are:

- As part of the procurement process, select the least harmful alternative available. Apply strict procurement controls in terms of what chemicals are allowed on site, as well as restricting the quantities held on site;
- Minimise environmental impacts associated with chemical and hydrocarbon transport;
- Minimise environmental impacts associated with chemical and hydrocarbon storage and handling practices;
- Minimise environmental impacts associated with chemical and hydrocarbon disposal; and
- Report greenhouse gas emissions associated with the use of chemical and hydrocarbons in an accurate, complete, transparent and auditable manner.

For each objective, management actions have been developed to ensure the impacts from SRL's activities are managed, and that appropriate monitoring, reporting and corrective actions are implemented to support the successful implementation of the management actions.

The key elements of the environmental management process associated with each objective are described in Table 6-1.

Table 6-1: Description of Key Elements of Environmental Management Process to Achieve Identified Objectives

Element	Definition / Description
Objective	What is intended to be achieved.
Management Action	Tasks undertaken to enable the objective to be met.
Performance Indicators	Metrics for evaluating the outcomes achieved by Management Actions.
Reporting Evidence	Demonstrates that the Management Action has been applied and the outcome evaluated.
Responsibility	Accountability for ensuring the Management Action is completed.

The key management actions, performance indicators, evidence, timing and responsibilities for each objective are provided in Table 6-2.

Table 6-2: Key Management Actions for Chemical and Hydrocarbon Management on SRL Site

Management Action	Performance Indicators	Reporting/Evidence	Responsibility
Objective 1: Minimise environmental impacts associated with chemical and hydrocarbon storage and handling practices			
Prior to acquisition, all relevant risk and compliance documentation, including training and procedures, must be in place.	• Acquisition of all chemicals must be according to the SOP. • A copy of the SDS shall be obtained from the manufacturer / supplier. • Risk assessment conducted. • Necessary approvals obtained.	• SDS received from manufacturer / supplier. • Risk assessment outcomes / report, including the implementation of appropriate controls. • Signed approval form.	• Mining and Processing Managers • EHS Manager
Ensure relevant personnel and contractors involved in chemical and hydrocarbon handling and storage activities are provided with the appropriate training and equipment as outlined in the Emergency Response and Contingency Plan (March 2018).	• Chemical and hydrocarbon management included in induction program (all employees, contractors and visitors to complete induction as appropriate). • Chemical and hydrocarbon management included in toolbox talks. • Specialist training programs conducted.	• Site inductions and toolbox talk records. • Specialist training records. • Site inspection / audit reports.	• Chief Operating Officer • Mining and Processing Managers • Environmental, Health and Safety (EHS) Manager • Emergency Response Team (ERT)
Conduct a risk assessment for each chemical or hydrocarbon product introduced for use on site.	• Risk assessment conducted.	• Risk assessment outcomes / report, including the definition and implementation of appropriate controls. • Site inspection / audit report.	• Mining and Processing Managers • EHS Manager
Maintain a stock register and site holdings for all stored chemicals and hydrocarbons.	• Stock register and site holdings maintained.	• Site inspection / audit report.	• Mining and Processing Managers • EHS Manager
Chemicals and hydrocarbons should be stored so as to minimise the potential for environmental harm. Storage should only be in designated areas and within the limits specified minimum legislated standards.	• Compliance with storage requirements within the specified minimum legislated standards. • Chemicals and hydrocarbons only stored in designated areas. • Safety Data Sheets (SDS) available for all stored goods.	• Site inspection / audit reports. • Available SDSs.	• Mining and Processing Managers • EHS Manager
Chemicals and hydrocarbons should be stored in bunded compounds with a capacity of 110% of the volume of the largest vessel and at least 25% of the total volume.	• Storage in a compliant, bunded facility. • Spills reported as an incident.	• Site inspection reports. • Incident reports.	• Mining and Processing Managers • EHS Manager

Management Action	Performance Indicators	Reporting/Evidence	Responsibility
Ensure appropriate types and quantities of spill response equipment are maintained and are proportionate to the volume of chemicals and hydrocarbons stored and the risks identified to improve spill response time and effort and minimise the potential for environmental harm in accordance with the Emergency Response and Contingency Plan (March 2018).	• Appropriate type and quantity of spill response equipment. • Spill response equipment is maintained according to Procedure.	• Site inspection / audit reports.	• Mining and Processing Managers • EHS Manager
Where a chemical or hydrocarbon spill has occurred, manage the spill including any contaminated material, in accordance with the Emergency Response and Contingency Plan (March 2018). Investigate and report the incident.	• Incident reported. • Incident investigated according to the SOP. • Spills and contaminated material managed according to the SOP. • Incident reported to Regulator per specified legislative condition, where required.	• Incident report completed, and actions closed out. • Correspondence with relevant Regulator (as needed).	• Mining and Processing Managers • EHS Manager
Conduct periodic inspections of chemical and hydrocarbon storage areas to confirm compliance.	• Periodic inspections conducted to confirm compliance.	• Site inspection / audit report.	• EHS Manager
Where required, monitor groundwater quality in potential high risk areas.	• Monitoring program developed and implemented. • Compliance with legislation.	• Monitoring reports. • Annual report to EPA-SL.	• EHS Manager
Where required, monitor surface water quality in potential high risk areas.	• Monitoring program developed and implemented. • Compliance with legislation.	• Monitoring reports. • Annual report to EPA-SL.	• EHS Manager
Objective 2: Minimise environmental impacts associated with chemical and hydrocarbon transport			
Ensure chemicals and hydrocarbons transported on roads open to or used by the public are in accordance with the applicable legislation. Ensure chemicals and hydrocarbons are appropriately stowed and restrained to prevent any movement which may result in a leak or spill.	• Chemicals and hydrocarbons stowed and restrained during transport. • Transport chemicals and hydrocarbons on roads open to or used by the public according to the applicable legislation.	• Vehicle inspection reports.	• EHS Manager
When transporting chemicals or hydrocarbons by road to be in line with the relevant transport regulation.	• A licensed contractor is used when required.	• Vehicle inspection reports.	• Mining and Processing Managers • EHS Manager

Management Action	Performance Indicators	Reporting/Evidence	Responsibility
Objective 3: Minimise environmental impacts associated with chemical and hydrocarbon disposal			
Divert potentially contaminated water, including storm water that has come into contact with potential sources of contamination, into an oil separator / other containment / treatment system as may be applicable. Sample treated water prior to reuse or discharge to confirm hydrocarbon concentrations meet specified Licence requirements.	• Inspect, and where necessary, sample treated water prior to reuse or discharge. • Water retained until reuse or discharge.	• Compliance assessment. • Inspection / laboratory results.	• Mining and Processing Managers • EHS Manager
Dispose of any waste materials contaminated with chemicals or hydrocarbons, including water contaminated with hydrocarbons, in accordance with the Licence requirements under the EP.	• Compliance with the Regulations. • Compliance with the SOP.	• Controlled waste tracking forms. • Site inspection / audit report.	• Mining and Processing Managers • EHS Manager
Remediate any area declared contaminated.	• Compliance with the Guideline and Management Plan.	• Inspection / laboratory results.	• EHS Manager
Objective 4: Report greenhouse gas emissions associated with chemical and hydrocarbon use in an accurate, complete, transparent and auditable manner			
Develop and implement a greenhouse gas reporting system to ensure emissions data associated with chemical and hydrocarbon use is accurate, complete, transparent and auditable in accordance with and to meet legislative reporting requirements.	• Reporting processes, controls and systems adopted. • Compliance with Management Plan.	• Site audit reports.	• Mining and Processing Managers • EHS Manager

7 Corrective Actions

Corrective actions will be triggered when monitoring indicates management objectives are not being achieved and/or when a spill incident has occurred.

An exceedance of a water quality trigger associated with chemical and hydrocarbon management should be recorded and investigated to identify the cause and to enable management measures to be implemented or changed, where necessary.

Monitoring programs will be consistent in approach and effort. Data management will be maintained to enable immediate identification of trigger exceedances for contingency measures to be effective.

Any incidents involving chemicals and hydrocarbons, including an exceedance of water quality trigger levels or a non-compliance with objectives, shall be investigated and reported. Causes of incidents will be determined and management procedures will be modified, with measures taken (as required) to prevent re-occurrence of incidents.

Outcomes of SRL's inspections, audits and monitoring programs may lead to ongoing refinements to this CMP and its management strategies to ensure an adaptive management approach is undertaken to improve environmental performance.

The EHS Manager will provide copies of the CMP with relevant Safety Data Sheets (SDS) for all chemicals, reagents, and hazardous materials in areas where those chemicals are used. All employees whose regular duties may involve handling or exposure to these materials will receive training in hazardous material safety and awareness and in the response protocols outlined in this document. The training program will include recognition of hazard symbols, precautions for handling, use and disposal, and emergency response to spills or exposure. Since spills, leaks, or other unplanned releases of chemicals, reagents, and hazardous substances are expected to be infrequent, special effort surveillance will not occur. Instead, these areas will be inspected by shift foremen as part of their normal duties.. Individuals who are responsible for handling these materials will be responsible for monitoring for leaks in areas where these chemicals are used. These employees will also be responsible for monitoring storage areas to ensure that adequate containment is provided.

8 Organizational and Management Responsibilities

Responsibility for sustainability management, in particular the implementation of the SRL HSEC Management System, will be the responsibility of numerous levels and functions within the organisation. As this CMP is a component of the HSEC Management System, responsibility for the CMP will follow the structures outlined in the ESHIA. Ultimate responsibility for the implementation of the CMP and the safe and environmentally sustainable operation in SR Area 1 is vested in the Chief Executive Officer (CEO) of Sierra Rutile. Operational implementation will be devolved to:

- Chief Operating Officer (COO) of Sierra Rutile;
- Mining and Processing Managers; and
- EHS Manager.

9 Chemical Management Action Plan

The CMP has been developed to provide guidance for developing site specific practices and procedures which will be developed and implemented. Key elements of the CMP are the development of the Standard Operating Procedures (SOPs) and guidelines, Safe Work Instructions (SWIs) and reference documents / training materials.

Standard Operating Procedures and Guidelines

SOPs identify specific, documented tasks or actions, which provide sequential detailed administrative instructions for implementing Corporate Directives and Policies. Guidelines identify specific, documented standards, which provide detailed administrative instructions to the delegated authority with the limits to which they are entitled to act on behalf of the corporation for implementing Corporate Directives. SOPs and Guidelines will be approved and issued by the EHS Manager. They will have mandatory applications to each employee, facility and operation of SR Area 1.

Safe Work Instructions

SWIs will identify specific, documented tasks or actions, and will provide sequential detailed administrative instructions for implementing SOPs and Guidelines with the objective of ensuring conformance and compliance. SWIs will be approved and issued by the EHS Manager, and will have mandatory applications to each employee, facility and operation of the SR Area 1 facilities.

Reference Documents / Training Materials

Reference documents, training materials and software systems will provide supporting information for the review by employees on specific issues of concern to the company and will be designed to assist in implementing the company Policy, Directives, SOPs and Guidelines and complying with the national legislation and international standards and guidelines. Training materials will be provided to employees to promote understanding and conformance with Policies, Directives, Procedures, Guidelines and compliance with the law. Reference documents and training materials will be approved and issued by the EHS Manager.

Table 9-1 SRL Chemical Management Action Plan

Issue	Management action	Progress indicators
Development of Policy and Guidelines		
Chemical management system	SRL to formally establish and adopt a Chemical management system standard based on the ISO Management System Standard format, to comply with: • Mines and Minerals Act; • The Mines and Minerals Operational Regulations, 2013; • IFC PSs; • World Bank / IFC: Environmental, Health, and Safety (EHS) Guidelines - General EHS Guidelines; and • World Bank / IFC: Environmental, Health, and Safety Guidelines – Mining.	Chemical management system in place
Management System Implementation		
Hazard Identification and Risk Assessment (HIRA)	• SRL to carry out EHS hazard identification, risk assessment and risk controls. This is to ensure that site representatives are aware of any hazards and control measures. Consideration must also be given to hazardous by-products such as fumes, dust, fugitive emissions; • The assessment must also take cognisance of materials on barges or boats; • Site register and current SDS to be maintained and readily available; • Procurement of materials must always be approved through this process; • Risk Assessment is documented for each substance/material and incorporated into standard operating procedures; and • Registry must be reviewed on an on-going basis as conditions may change which may require additional control measures.	Assessment complete and document available as part of the overall hazard registry
Legal and other requirements	SRL to carry out a detailed legal review of EHS requirements relating to labour practice and environmental legislation.	Legal review available
Objectives and program(s)	SRL to define and prioritize EHS program objectives.	Objectives and programs available
Resources, roles, responsibility, accountability and authority	SRL to: • Develop/ update a standard outlining the roles and responsibilities for all levels of management as it relates to EHS; • Communicate EHS roles and responsibilities to all affected employees; and • Ensure documented EHS roles and responsibilities are included in basic SRL safety awareness training.	Standard on resources, roles, responsibility, accountability and authority available Records of communications and meeting notes Training materials

Issue	Management action	Progress indicators
Competence, training and awareness	SRL to conduct basic safety awareness training that identifies the importance of EHS to all employees and their roles, responsibilities and accountabilities.	Training modules available Attendance registers
Communication, participation and consultation	SRL to ensure: • Clear terms of reference for combined EHS Committee structure; • Regular EHS Committee Meetings required in terms of the Sierra Leone legislation; • SRL EHS bulletin boards to be regularly updated with relevant information; and • Implementation of the EHS communication standard.	Attendance registers and minutes of meetings Up-to-date EHS bulletin boards
Chemical, biological and radiological hazards	SRL to: • Develop a SOP describing requirements and systems necessary for the classification and labelling of hazardous substances and dangerous goods to ensure their safe use, storage, transportation and disposal; • Develop a documented list of hazardous materials stored, handled or used at the SRL Project; • Implement system with hazard symbols and content name; • Develop and implement management system for chemical safety data sheets; and • Develop training program for chemical, biological and radiological hazards.	SOP on chemical, biological and radiological hazards in place List of hazardous materials handles, stored or used Labelling system in place Chemical safety data sheets Training materials for chemical, biological and radiological hazards available Course attendance registers
Chemical inventory	A chemical inventory and map showing storage locations will be prepared to identify all storage tanks located at the SRL site. The inventory will include the following information: • Location of storage tanks; • Type/make of the tank; • Tank storage capacity; and • Product contained in the tank. All above-ground storage tanks will be equipped with spill prevention equipment. Above-ground tank equipment will have adequate secondary containment. Regular inspections will be performed. Such inspection will occur on at least a monthly basis to evaluate the integrity of tanks, piping, and containment structures. Below-ground storage tanks will also be designed to limit the potential for accidental spills. All below-ground tanks will be equipped with overfill/spill buckets on the fill line, annual leak testing on all non-consumptive tanks, and regular reconciliation of volumes in both consumptive and non-consumptive tanks. SRL to develop a chemical storage SOP which will include, but not limited to: • The quantities of hazardous chemicals stored must be kept to a minimum, commensurate with their usage and shelf life; • Safe storage requirements (e.g. temperature or light sensitive chemicals);	Chemical inventory register SOP Chemical storage

Issue	Management action	Progress indicators
	• Segregation and incompatibility of chemicals; and • Storage of time sensitive chemicals.	
Fuel and bulk oil storage facilities	The Finance Manager is responsible for the fuel and oil storage facilities. The Finance Manager will assign personnel to inspect the fuel and oil storage facilities as part of their normal duties of dispensing and tracking fuel consumption. Above ground storage tanks will be visually inspected for leaks, damage, or unusual conditions. The Procurement and Logistics Manager will keep an inventory of inputs and outputs to each tank, and will reconcile the balance on a monthly basis to detect significant losses.	Fuel and bulk oil storage facilities register
Accidental spills or releases from barges or boats	SRL owns barges that are used to transport materials to and from the site using the network of streams and rivers that provide access to the site. Contractors who ship materials to and/or from the site will be responsible for developing their own emergency response and contingency procedures as part of their contractual agreements. Emergency response procedures for accidental spills or releases on barges include procedures for both preventative/preparatory measures and action procedures. Preventative measures include the provision of safety equipment, development of chemical inventories, performance of inspections, provision of training, development of contingency plans, and maintenance of records.	• Contractors Emergency Response And Contingency Plan Register • Emergency Response And Contingency Plan for accidental spills or releases from barges or boats
Placarding of Chemical Stores and Buildings	SRL to: • Develop a SOP for signage requirements for chemicals stores and laboratories; • Ensure that signage is displayed in appropriate locations to identify the presence of hazardous chemicals; and • Cupboards, lockers and refrigerators used for storing chemicals should be labelled to indicate the type of chemicals being stored (e.g. the class label for a dangerous good). Additional signs may also be required, such as “do not use to store food”.	SOP for signage
Labelling	• Develop a SOP describing requirements and systems necessary for the classification and labelling of hazardous substances and dangerous goods to ensure their safe use, storage, transportation and disposal; • Implement a system with hazard symbols and content name; and • All containers to be labelled correctly. The purpose of labelling is to ensure that the contents of a container can be readily identified by product name, and to provide basic information about the contents of the container – its ingredient(s), hazards and precautions for safe use. SRL will develop a chemical labelling system in line with the most current revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).	SOP for labelling
Training and Induction	SRL to: • Implement training to ensure that personnel handling chemicals have the skills and knowledge they need to perform their tasks in a manner that is safe and without risks to health (their own and that of colleagues working around them) and the environment, so far as is reasonably	Training and induction programme/s Training and induction register Toolbox meetings register SOP on chemical, biological and

Issue	Management action	Progress indicators
	practicable; • Regular toolbox meetings and awareness sessions are conducted. Ensure key principles are raised so as to maintain compliance with regulatory requirements for EHS; • Develop a training program for chemical, biological and radiological hazards; • Ensure that chemical safety training and induction covers the following topics: - Pre-purchasing requirements; - Legislation requirements; - Classification of chemicals; - Chemical risk assessment; - Labelling; - Storage and segregation requirements; - Spills management and emergency procedures; - Handling, storing and disposing of chemical waste and containers; - Transportation requirements; - Personal protective equipment (PPE); - Material Safety Data Sheets (MSDS) / Safety Data Sheets (SDS) and other information resources; - SWIs; - Managers and supervisors training; - Hazardous materials.	radiological hazards in place List of hazardous materials handles, stored or used Labelling system in place Chemical safety data sheets
Personal Hygiene	Personal hygiene when handling and storing chemicals is an integral part of controlling physical exposure. Personal hygiene requirements include: • Providing readily available wash up facilities; • Washing hands immediately after using chemicals; • Storing food or drink separately from chemicals (i.e. do not store chemicals and food together); • Ensuring that laboratories, workshops and other areas where chemicals are used, are free from eating and drinking; • Displaying “rules” in laboratories and workshops that include hygiene requirements; and • Wearing and storage of suitable PPE, such as eye/face protection, gloves and over garments (overalls, laboratory coats).	Wash up facilities PPE Signage stating no eating or drinking
Chemical Handling	SRL to: • Ensure that the right is equipment available (e.g. fume cupboard); • Ensure that there is adequate space to work in; and • Ensure appropriate equipment and facilities for chemical wastes.	Equipment register SOP – Purchase of chemicals
Chemical, biological and radiological hazards	SRL to: • Develop a SOP describing requirements and systems necessary for the classification and labelling of hazardous substances and dangerous goods to ensure their safe use, storage, transportation and disposal; • Develop a documented list of hazardous materials stored, handled or used at the SRL Project; • Implement system with hazard symbols and content name; • Develop and implement management system for chemical safety data sheets; and develop	

Issue	Management action	Progress indicators
	training program for chemical, biological and radiological hazards; and • Develop a SOP for the purchasing of chemicals.	
Transportation of chemicals	SRL to develop a chemical transportation SOP with will include, but not limited to: • The transport of samples, chemicals and/or gases should be actively minimised; and • SRL personnel or contractors undertaking such transport must be adequately trained regarding safe handling and transportation, in an appropriate vehicle, and be versed in spill clean-up and reporting procedures.	SOP for the transportation of chemicals
Chemical waste and disposal	• SRL to develop a chemical waste and disposal SOP, in line with legislation and international standards; • Where practicable chemical waste should be reduced to lower the impact on the environment; • Chemical waste should not be allowed to accumulate; and • Labelling chemical waste, including empty chemical containers.	SOP for chemical waste handling and disposal

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9.1 Evaluation

The implementation and effectiveness of this CMP and associated procedures will be regularly assessed to ensure:

- Compliance with legal obligations;
- The overall management strategy remains relevant and current; and
- The plan and procedures adequately address environmental risks.

Table 9-2: Methods to assess legal and procedural effectiveness

Assessment tool	Description
Checklists	Checklist, developed to reflect legal and procedural requirement / outcomes will be used by managers to assess and manage compliance.
Audits	Conduct internal and external audits to formally assess the level of compliance with both regulatory requirements and SRL's procedures. Audit outcomes are used to develop corrective actions which may include changes to the plan and procedures.
Review of incidents	A review of internal incidents, near misses or hazards will be undertaken to identify recurrences of similar incidence types. This may require a change in the plan and/or procedures, development of a new procedure or implementation of another measure or process to address the recurring issue.
Review of data	Analyse all relevant data collected for negative and/or undesirable trends that may be prevented by procedural changes or by implementing of another measure or process.

10 Review

This CMP is a living document and will be reviewed every five years, when significant additional information comes to hand, or when changes occur. Upon review, the document will be revised where appropriate and the revision status will be updated accordingly. It is important that plans and procedures are frequently reviewed and revised as SRL's operations change and opportunities for improved management practices are identified.

The plan will be updated if any of the following occur:

- The plan is not adequately managing the issues;
- Legislative requirements change; and
- The area of activity changes.