



Environmental & Social Management System

Hazardous Materials Management Plan

Hazardous Materials Management Plan		
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1 INTRODUCTION

1.1 Document Number

This document is the Hazardous Materials Management Plan for the Gatsuurt Gold Project ('Gatsuurt' or 'the Project'). The document reference number for this Management Plan is Gatsuurt-HMP-Ver. 1.

1.2 Purpose

This Hazardous Materials Management Plan has been developed by Centerra Gold Inc. (Centarra) for the exclusive application at the Gatsuurt Gold Project site. This Management Plan is one of a series of Management Plans that outline how Centerra through its subsidiary, Boroo Gold Company (BGC) manages the environmental aspects of its Gatsuurt operations. The purpose of this Management Plan is to:

- Define the scope of the Management Plan and set out applicable management interfaces;
- Define roles and responsibilities;
- Outline the applicable Project Standards relevant to this Management Plan;
- Define Project commitments, operational procedures and guidance relevant to this Management Plan;
- Define monitoring and reporting procedures, including Key Performance Indicators;
- Define training requirements; and
- Set out references for supporting materials and information.

1.3 Application

The requirements set out in this Management Plan apply to all Gatsuurt operations and personnel, including contractors. The requirements of this Plan are applicable for all aspects of the Project, including mining operations at Gatsuurt, ore haulage and processing at the Boroo Gold Mine.

This Management Plan is based on the BGC Health, Safety and Environment Management System (HSEMS), which is implemented for all Centerra operations in Mongolia and will provide the framework for the management of health, safety, environment and social aspects of the Gatsuurt Project. Any subsequent changes to the BGC HSEMS may result in changes to this Management Plan.

1.4 Commencement

This Management Plan applies from the commencement of construction of the Gatsuurt Project.

1.5 Authority and Management

This Management Plan is owned by the BGC Environment Director. This Management Plan will be reviewed on a two-yearly basis to determine whether any changes or updates are required to the plan unless a more frequent update is required to reflect changing project design or procedures.

Any requests for changes to this Management Plan must be addressed to the owner of this management plan and will be subject to appropriate review and approval processes.

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2 SCOPE

2.1 Scope of this Management Plan

This Management Plan applies to all construction and operations at the Gatsuurt Mine, mine related transport and ore processing at Boroo Gold Mine including contractor activities.

2.2 Overlaps with other Management Plans

This Management Plan is part of the overall suite of Management Plans developed for the Gatsuurt Project and as described in the BGC HSEMS:

- Surface Water Management Plan;
- Acid Rock Drainage Management Plan;
- Biodiversity Management Plan;
- Transport Management Plan;
- Gatsuurt Mine Closure Plan;
- Social Management Plan;
- Stakeholder Engagement Plan; and
- BGC Tailings Management Facility Manual;

3 ROLES AND RESPONSIBILITIES

3.1 Key Roles and Responsibilities for Management Plan Implementation

Principal roles and responsibilities for the implementation of this plan are outlined below.

Table 1: Key Roles and Responsibilities

Role	Responsibilities
BGC General Director	Ensuring Project compliance with the Project Standards and other requirements set out in this Plan. Approval of this Plan and resources required for implementation.
BGC Director Environment	Overall responsibility for Plan scope and implementation. Development, monitoring and revision of this Plan.
Environment Superintendent	Timely implementation of this Plan, including coordination with various operational departments, implementing organisations and other stakeholders. Monitor and report on plan implementation. Ensure communication and awareness of the Plan requirements to supervisors, employees and contractors.
Contractors	Ensuring all assets under their control comply with Centerra and BGC's policies and procedures.

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Role	Responsibilities
	Supplying certification and/or license in accordance with statutory requirements. Complying with BGC's requirements for environmental management. Reporting of all actual and potential environmental impacts to relevant supervisor or managing body.
Employees	Minimise the impact of their activities on the environment wherever practical and reasonable. Complying with the obligations outlined in this Management Plan, as well as any other relevant Gatsuurt environmental policies and procedures. Reporting of all actual and potential environmental impacts to relevant supervisor or managing body.

3.2 Key Interfaces

Key interfaces in the implementation of this Management Plan (i.e. roles with responsibility for delivering elements of this Management Plan) include:

- General Manager Operations, particularly in relation to security management and the safe implementation of off-site activities;
- Processing Manager in regards to reagent storage at the BGC processing site;
- Mine Manager for the storage and use of fuels, explosives and waste oils at the Gatsuurt Mine;
- Director of Health and Safety for the effective implementation of health and safety controls for hazardous materials management,
- Manager Logistics in regards to the procurement and transport of hazardous materials to the Boroo Site and the Gatsuurt Mine; and
- Director Human Resources, particularly in relation to labour management.

4 PROJECT STANDARDS

Applicable Standards must be complied with for all Project activities (the "Project Standards").

4.1 Applicable Mongolian Legislation

Applicable Mongolian Legislation related to this HMMP include:

- Law on Environmental Protection (1995);
- Law on Environmental Impact Assessment (2012);
- Law on Water (2012);
- Law on Water Resource Pollution Fee (2012);
- Law on Subsoil (1988);
- Law on Air Pollution Fee (2010);

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- Law on Waste (2012);
- Law on Water Pollution Fee (2012);
- Law on Toxic and Hazardous Chemicals (2006).

4.2 Applicable Mongolian National Standards

Applicable Mongolian National Standards (MNS) related to this HMMP include:

- MNS 3342 - 1982 Environmental protection. Hydrosphere. general requirement for protection of groundwater from pollution;
- MNS 2573:1978 Environmental protection. Hydrosphere. Water quality indicators.
- MNS 900:2005 Environment. The human health protection. Security. Drinking water. Hygienic requirements and quality control.
- MNS 4586 - 1998 Water Quality. Indicator of water environmental quality and general requirements;
- MNS 4047 – 1988 Procedures for monitoring the quality of surface water
- MNS 6148:2010 Water quality. Permissible level for ground water polluting substances.
- MNS 5917 - 2008 Environment. Reclamation of land destroyed due to mining activities. General technical requirements;
- MNS 4990:2000. Occupational Health and Safety. Workplace environment. Hygienic requirements.
- MNS 3297:1991 Soil. Permissible level for hygienic characteristics.

Mongolian hazardous materials handling standards applicable to the Project are listed below:

- Mongolian law provides for the regulation of hazardous materials within the Law on Hazardous and Toxic Chemicals, 2006. This law addresses the import, export, transportation, storage, use, and control of toxic chemicals. It imposes measures to prevent the impact of toxic and hazardous substances on human health and the environment. Chemicals will be used at and transported to, from and within the Project Area. This Hazardous Materials Management Plan will help to ensure compliance with this law;
- Law on Sanitation (In force on 1 July 1998). This is a public health law and its purpose is to ensure the rights of individuals to healthy and safe living and working conditions and to define the rights and duties of individuals and businesses in this regards. The law includes the requirement for activities associated with chemicals use to be carried out in accordance with regulations addressing the use of toxic chemicals. Businesses are required to ensure to provide a safe workplace including training of personnel.
- Regulation on export, import, trans-border transportation, production and trade of hazardous and toxic chemicals (Appendix to order # 334/104 of Minister of Nature, Environment and Tourism and Minister of Foreign Affairs);
- Regulation on storage, transportation, use and removal of hazardous and toxic chemicals Appendix 1 to order # 28/40/29 of Minister of Nature, Environment and Tourism and Minister of Health and Chief of National Emergency Management Agency;
- Regulation on Risk Assessment of Toxic & Hazardous Chemicals Appendix 2 to order # 28/40/29 of Minister of Nature, Environment and Tourism and Minister of Health and Chief of National Emergency Management Agency; and
- List of toxic and hazardous materials the use of which is banned in Mongolia, Government resolution # 95, 2007, Government resolution # 95, 2007;

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4.3 DEIA requirements

Mongolian Detailed Environmental Impact Assessments (DEIAs) have been undertaken for this Project and outline required environmental management and monitoring requirements. Commitments made in the following DEIAs are applicable to this MP:

- BIOX® Plant DEIA (Nature Friendly LLC, 2010);
- Gatsuurt Haul Road DEIA (Gazar Eco, 2006);
- Gatsuurt Mining DEIA (Nature Friendly LLC, 2009)); and
- Boroo Gold Mine DEIA Addendum 2015 (Nature Capital 2015).

4.4 Other Commitments to and Requirements of Mongolian Government Authorities

Mongolia has entered into a number of International agreements that include commitments to act or refrain from acting in the manner prescribed in the agreement. The government of Mongolia has promulgated specific laws implementing specific international agreements; it has also incorporated provisions in national laws indicating that where the national law is inconsistent with international agreements to which Mongolia is a signatory, the requirements of the international agreement will prevail. Accordingly, the terms of international agreements to which Mongolia is a party need to be understood. Set out below is a brief summary of international agreements applicable to the use and handling of hazardous materials for the Gatsuurt Project. .

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (In force in Mongolia on 8 March 2001)

This Convention covers pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by parties to the convention and which have been notified by parties for inclusion in the Prior Informed Consent Procedure. Under the Prior Informed Consent Procedure, all parties have an opportunity to make informed decisions as to whether they will consent to future imports of certain listed chemicals.

Stockholm Convention on Persistent Organic Pollutants (In force in Mongolia on 30 April 2004)

The objective of this treaty is to protect human health and the environment from chemicals that remain intact in the environment for long periods; become widely distributed geographically; and which are bio-accumulative in humans and wildlife.

4.5 Applicable International Standards and Guidelines

The International Organization for Standardization has established a series of broadly accepted standard for tea management of environment and occupational health and safety.

- ISO14001:2004 Standard for Environmental Management Systems
- OHSAS 18001 Standard for occupational health and safety management systems

The European Bank for Reconstruction & Development (EBRD); In accordance with EBRD's 2014 Environmental and Social Policy, EBRD seeks to ensure, through its environmental and social appraisal and monitoring processes, that the projects it finances:

- Are socially and environmentally sustainable;
- Respect the rights of affected workers and communities; and
- Are designed and operated in compliance with applicable regulatory requirements and good international practice.

Relevant EBRD Environmental and Social Performance Requirements include:

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- Performance Requirement 1: Assessment and management of environmental and social impacts and issues;
- Performance Requirement 3 Resource efficiency and pollution prevention and control

EBRD funded projects are required to comply with European Principles for the Environment that include items specific to hazardous materials management including:

- Regulation EC 1907/2006 on Registration, Evaluation and Restriction of Chemicals
- Directive 2003/105/EC on major hazards involving Dangerous Substances
- Directive 2008 1/EC on Industrial Pollution Prevention and Control
- Directive 89/391/EEC on Health and Safety at Work.

4.6 Applicable Centerra Policies

This Management Plan is developed within the Centerra corporate policies that include policies for worker health and safety, environmental protection and sustainable development.

4.7 Boroo Gold Procedures

All Centerra operations are implemented under the requirements of the BGC HSEMS which includes the Hazardous Materials Handling and Storage Procedure in place at Boroo Gold Mine. The Procedure is consistent with the objectives and controls outlined in this Management Plan.

4.8 Other industry guidelines with which Gatsuurt has committed to comply with

Centerra, is a signatory to the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold. The Code includes measures specific to:

- The supply and transport of cyanide to protect human health and environment
- The responsible use and storage of cyanide for use in gold extraction
- The optimisation of cyanide addition to minimise cyanide use;
- Measures to protect workers from the harmful effects of cyanide;
- Measures to minimise the risk of unintentional release of cyanide to the environment and prevention of harmful exposure to workers and the public;
- Measures to prevent harmful exposure to cyanide to wildlife from open process waters at gold mines;
- Requirements to ensure discharge of waste water and/or mine tailings prevents impacts to human health and the environment.

5 MITIGATION MEASURES AND MANAGEMENT CONTROLS

5.1 Summary

This document outlines Gatsuurt's commitment and approach to mitigating Hazardous Material risks that may arise as a direct or indirect result of the Gatsuurt project.

The intent of this Management Plan is to ensure sound hazardous materials management for the Gatsuurt Project through the safe and appropriate transport, handling, use and storage of hazardous materials. This is achieved through the implementation of the management controls designed to minimise health, safety and environmental risks related to hazardous materials in accordance with Mongolian and relevant

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international standards. Hazardous materials storage are designed and maintained in accordance with statutory approval and permit requirements specific to these facilities and are subject to regular inspection from Government of Mongolia authorities.

The Project requires the use of a range of reagents in the gold extraction process which are of a hazardous nature; including cyanide, acids, caustic, explosives and hydrocarbons. Appendix A provides an inventory of the chemicals that may be present at the BGM and Gatsuurt operations at any one time.

This Management Plan will be supported by a suite of documents detailed below, which will present more detail on specific aspects of the day-to-day hazardous materials management activities at Gatsuurt. These documents will be prepared prior to construction and operation of the Gatsuurt Project

The BGC HSEMS includes the Hazardous Materials Handling and Storage Procedure and other procedures that prescribe details of minimum standards and requirements for worker safety and environmental protection during handling and the minimum requirements for storage on site. These procedures will be updated and revised to include the construction and operations at Gatsuurt, new processes at Boroo and activities along the haul road. The following describes the key updates required to existing procedures.

- Hazardous Materials Handling and Storage Procedure including details on the following -
 - Identification of hazardous materials used on the Project;
 - The risk assessment and approval process for all hazardous materials stored and used at the Gatsuurt Project;
 - The appropriate design and construction of hazardous material storage facilities including secondary containment;
 - Procedures for the transport of hazardous materials to and from the Project;
 - Procedures for decommissioning of hazardous material facilities;
- Hazardous Material Substance Approval – existing procedures will be amended to provide detail of the controls required for chemicals to be used on site. The approvals process is aimed at ensuring that only approved chemicals are used, transported and stored onsite by employees and contractors.
- Blasting Management Procedure - will be added to include the safe storage and handling of explosives for mining operations at Gatsuurt.
- Spill Incident Response Procedure – will be updated to provide details of initial response to loss of containment of chemicals, including hydrocarbons, to ensure risks to human health and the environment are avoided or minimised due to spill events. The response procedures will include:
 - Immediate corrective measures to contain hazardous materials and minimising the extent of spills, including measures to prevent spills from entering waterways;
 - Spill response measures suitable for specific materials including cyanide, acids, caustic and hydrocarbons;
 - Personal protective equipment and other safety measures to protect the safety and health of spill response contain incidents will be recorded and reported in accordance with. As a minimum the report will include the following details;
 - Spill clean-up measures including methods for removal of spilled material, decontamination procedures, sampling of soils/water and use of neutralising agents where appropriate;
 - Instructions for recording and reporting of incident event;
 - Identification of corrective actions, incident investigation and completion of follow up actions including monitoring of potential environment and/or health impacts.
- Emergency Preparedness and Response Plan – the BGS Emergency response Plan for Boroo Gold Mine will be expanded to include the operations at Gatsuurt and accommodate the additional hazardous materials, transport and storage risks posed by the mining at Gatsuurt and the new processing facilities at Boroo Gold Mine. The purpose of this plan (ERP) is to define the organisational responsibilities,

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actions, reporting requirements, and resources available both internally and externally, to affect a coordinated and timely response to an emergency situation (e.g. hazardous chemical release) associated with the Project and environment. This plan provides coordinated and effective response to an emergency by:

- Documenting the overall emergency response process and interfaces;
- Identifying all potential emergency scenarios that could occur;
- Identifying the procedures which apply to emergency events;
- Defining the roles and responsibilities of personnel including Subcontractors in an emergency event;
- Emergency notification and reporting.

Other Procedures may be developed, as required, to support this Hazardous Materials Management Plan in addition to the procedures described above.

Table 2 below presents the key management controls that Gatsuurt will operate to. These controls are supported by specific procedures (such as hazardous material approval) or standard working practices (such as hazardous material storage).

5.2 Plan Goals and Objectives

The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. This objective will be achieved by:

- Establishment of hazardous materials management priorities based on risk;
- Avoid or minimise the use of hazardous materials;
- Preventing uncontrolled releases to the environment;
- Implementation of engineering controls for containment;
- Implementation of management controls to address remaining residual risk.
- Ensure appropriate risk based emergency management procedures are in place in the event of an incident.

These objectives will be pursued through implementation of this Management Plan, and will be measured and evaluated through the key performance indicators detailed in Section 7.2 below.

5.3 Key Stakeholders

Key stakeholders of relevance to this management plan include:

Stakeholder	Area of interest/interaction
Environmental Department	Inspection of hazardous materials storage facilities; monitoring compliance with the Plan; promoting awareness of hazardous materials management practices, coordination of permits and approvals for new hazardous materials and storage facilities.
Process Department	Documentation and inventory of mill reagents; Contribution to training materials; Training; Review and sign off on engineering plans

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Stakeholder	Area of interest/interaction
Maintenance Department	Inventory and Documentation of Maintenance chemicals; Training;
International Cyanide Management Institute	Verification of compliance with the International Cyanide Management Code
Government of Mongolia	Approval of hazardous materials use, storage and transport; periodic inspection of compliance with permit requirements.

5.4 Management Controls

Based upon the identified impacts and opportunities contained in the EIA and presented above, the control measures detailed in Table 2 below will be put in place during construction, operations and mine closure phases of Gatsuurt Project.

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Table 2 Key Management Controls

ID	Topic/ Aspect	Applicability/ Activity	Control Description	Responsible Parties	Means of verification
HM01	Material assessment and selection	Selection of all hazardous materials	All hazardous materials will be evaluated in accordance with the requirements of the Chemicals DEIA and Gatsuurt guidelines. Such assessments will be undertaken by a suitably qualified and experienced person and approved by the HSE Department.	<ul style="list-style-type: none"> • HSE Department • Procurement • Operational Departments • Principal Contractors 	<ul style="list-style-type: none"> • Chemical and hazardous materials register and records • Audits and Inspection
HM02	Hazardous material inventory	Storage of hazardous materials	Material Safety Data Sheets (MSDSs) will be provided for all stored materials in Mongolian, English and any other languages as appropriate. These will be available in the storage locations and principle points of use.	<ul style="list-style-type: none"> • HSE Department • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit programme and records • Visual confirmation of MSDSs at storage areas • Chemical and hazardous materials register and records
HM03	Storage procedures	Storage of hazardous materials	Storage of liquid hazardous materials (including waste oil and solvents) will be provided with 120% capacity low permeability secondary containment.	<ul style="list-style-type: none"> • HSE Department • Operational Departments • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit programme • Visual inspections • Post construction design engineering sign-off and verification
HM04	Storage procedures	Storage of hazardous materials	Waste oils will not be stored for extended periods in underground sumps; tanks and sumps will be emptied and inspected regularly for any signs of cracks or holes. The findings of the	<ul style="list-style-type: none"> • HSE Department • Operational Departments • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit programme • Visual inspections

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ID	Topic/ Aspect	Applicability/ Activity	Control Description	Responsible Parties	Means of verification
			inspection will be recorded; any cracks or holes will be repaired, and any repairs conducted will be recorded.		
HM05	Storage procedures	Storage of hazardous materials	Spill kits, protective equipment, fire extinguishers and other necessary equipment will be available onsite, where hazardous materials are located and handled, to clean and mitigate spills or fires..	<ul style="list-style-type: none"> • HSE Department • Operational Departments • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit programme • Visual inspections
HM06	Storage Procedures	Storage of hazardous materials	Appropriate first aid will be located close to hazardous material storage areas such as eye-wash, showers, and first aid kits.	<ul style="list-style-type: none"> • HSE Department • Operational Departments • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit and inspection programme
HM07	Transport of hazardous materials (general)	Transport of hazardous materials	Hazardous materials will only be transported by operators licensed and/or approved by Gatsuurt for the specific material.	<ul style="list-style-type: none"> • HSE Department • Principal Contractors 	<ul style="list-style-type: none"> • Internal audit programme • Visual inspections • Delivery records
HM08	Cyanide management	Transport, storage and use of cyanide	The Gatsuurt operations will be in constructed and operated I full compliance with the ICMI Cyanide Code	<ul style="list-style-type: none"> • Process Department • HSE Department 	<ul style="list-style-type: none"> • 3rd party verification and public listing by ICMI.
HM09	Hydrocarbon management	Refuelling and maintenance Areas	All vehicle refuelling areas and maintenance workshops shall be located on low permeability hardstand areas where spills or leaks can be contained and collected within dedicated drains and sumps. Hardstand areas shall be designed to accommodate and contain rainfall in	<ul style="list-style-type: none"> • Maintenance • Mining Department 	<ul style="list-style-type: none"> • No loss of hydrocarbon to the environment from equipment refuelling or maintenance.

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ID	Topic/ Aspect	Applicability/ Activity	Control Description	Responsible Parties	Means of verification
			accordance with specified design standards.		

6 IMPLEMENTATION SCHEDULE

6.1 Review and Revision of this Management Plan

This Management Plan will be reviewed on an annual basis and any necessary revisions made to reflect the changing circumstances or operational needs of Gatsuurt. Revision of this Management Plan will be the responsibility of the Director Environment, who is custodian of this Plan.

If material changes to operating procedures are required (as identified through the Management of Change procedure contained within the GBC HSEMS), this Management Plan may be updated on an "as required" basis.

Any revisions to this Management Plan will be uploaded to the Centerra [server/portal] to ensure that all Gatsuurt staff have access to the latest version of this Management Plan.

7 MONITORING

7.1 Overview of Monitoring Requirements

The Monitoring measures that are to be implemented during the operations phase to assess compliance with Project Standards (see *Section 4: Project Standards*) are described in the section.

In the event that monitoring identified non-conformance with Project Standards, these will be investigated and appropriate corrective actions identified.

7.2 Key Performance Indicators

The table below summarises the key performance indicators and associated key monitoring actions that can be used to assess the progress and effectiveness of proposed mitigation strategies.

Table 3: Key Performance Indicators and monitoring actions for Hazardous Materials

ID	KPI	Target	Monitoring Measure
HM-KPI 01	Number of reported non-compliances with the mitigation controls identified in this Management Plan.	Target: Zero Minimise and continued improvement in number of reported non-compliances	Internal audit results
HM-KPI 02	Number of reported incidents of hazardous material releases leading to actual or potential harm to humans or the environment.	Target: Zero Minimise and continued improvement in reducing the number of reported incidents	Incident reporting records

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ID	KPI	Target	Monitoring Measure
HM-KPI 03	Response time for clean-up of spills of hazardous materials	Target: All spills that pose a risk to human health and/or the environment will be reported responded to within a 24 hr period.	Incident reporting response records; Incident debrief records
HM-KPI 04	Maintain full compliance with ICMI Cyanide Code for Gatsuurt operations	Achieve full certification for Gatsuurt operations within 12 months of commissioning of new process facilities.	Third party verification audit.

7.3 Key Monitoring Activities

Key monitoring activities will focus on design and use of hazardous materials storage and containment facilities through the BGC HSEMS internal audit and inspection program. Incidents involving hazardous materials will be monitored through review of HSEMS incident statistics. Monitoring of emergency response and spill response preparedness will occur through records obtained from spill response drills.

Key monitoring measures are set out below.

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Table 4: Key Monitoring Measures

ID	Topic/Aspects	Parameters	Methods	Periodicity	Location
HM001	Hazardous Materials Inventory	Volumes of Hazardous Materials	Gatsuurt will maintain an inventory of all hazardous materials purchased, delivered, stored and used.	Monthly updates	N/A
HM002	Hazardous Materials handling	Various	Gatsuurt will collect and maintain records on hazardous substances for the following: <ul style="list-style-type: none"> reconciled bulk inventory; weekly use summaries; weekly reconciliation for each storage area; overflow alarm tests; pressure tests (if applicable); inspections and maintenance checks of storage tank system, piping and delivery system; any alteration to the system; reports of leaks or losses; and reports of spill responses. 	Weekly/ various	N/A
HM003	Hazardous materials handling and Storage	Loss of Containment/ Spill events	Review of incident reports via the HSEMS	Monthly	N/A
HM004	Hazardous materials handling and Storage	Emergency Response Preparedness	Completion and review of incident drill debrief reports	Annually	N/A
HM005	Cyanide management	Compliance with ICMI Code	3 rd party verification audit	3 yearly	Boroo Mine process facilities

8 TRAINING

All employees of Centerra and selected Contractors for the Gatsuurt Project are required to complete basic training on Hazardous Material Management. Additional specialist training is to be provided to:

- Emergency response personnel for responding to hazardous material spills, chemical fires or gas release events, first aid and decontamination;
- Process plant personnel will be specifically trained for reagent handling, including cyanide, use of PPE, first aid and use of personal gas monitoring devices;

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- Environment personnel are trained in the response to and clean up of hazardous materials spills; decontamination and remediation and ongoing monitoring of soil and groundwater;
- Mining and maintenance personnel are trained in handling of fuels and oils and clean up of hydrocarbon spills;
- Mine personnel involved in blasting activities will have specific recognised accreditations in explosives handling;
- All employees and contractors are trained in hazardous materials awareness; use of PPE and incident reporting.
- Chemical suppliers/drivers will be formally trained and accredited in chemical transport, incident response and first aid.

Records of all training completed shall be maintained.

9 AUDIT AND REPORTING

9.1 Internal Auditing

Operational area supervisors will carry out regular inspections of hazardous materials storage and handling areas. Hazardous materials inspections will involve or more of the following: Environmental Superintendent; Environmental Engineer; Environmental Officer; Chemical Engineer; Senior Safety Officer and will cover a broad range of operational aspects, including chemical and reagent storage, refuelling areas, emergency response equipment and hazardous waste storage areas.

All incidents and non-conformances identified during these inspections are reported as per the requirements of the BGC HSEMS.

9.2 External Auditing

Conformance with this plan will be subject to periodic assessment as part of the BGC HSEMS audit programme and by Project Lenders.

The BGC operations are subject to third party external audits for compliance with the ICMI Cyanide Code on a three yearly frequency.

9.3 Record Keeping

Records of audits, inspections and incidents will be managed in accordance with BGC HSEMS procedures.

Hazardous Materials Management Plan		
Effective Date: 06.06.2016	Document Number: Gatsuurt-HMP-Ver. 1	Rev: 1

Appendix A Hazardous Materials Register for Gatsuurt Mine and Boroo Gold Mine

Hazardous Materials Management Plan

Effective Date: 06.06.2016	Document Number: Gatsuurt-HMP-Ver. 1	Rev: 1
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Name of Substance	CAS No	Chemical Formula	Processes	Average consumption
Sodium cyanide	143-33-9	NaCN	Industry – Leaching (CIL)	0.2 kg/ton
Hydrated lime	1305-62-0	Ca(OH) ₂	Industry – Detoxification Shop Set up solution pH	0.04 kg/ton
Copper sulphate	7758-98-7	CuSO ₄	Industry – Detoxification Shop WAD Cyanide detoxification catalyst	0.14 kg/ton
Sodium metabisulphite	7681-57-4	Na ₂ S ₂ O ₅	Industry – Detoxification Shop Cyanide detoxification	0.6 kg/ton
Ferric sulphate	10028-22-5	Fe ₂ (SO ₄) ₃	Industry – Detoxification Shop Arsenic detoxification	0.21 kg/ton
Leach accelerant		Sodium salts >96	Industry – Catalyst for dissolving gravitational gold	120 kg/month
Activated carbon	7440-44-0	C	Industry – Gold Absorbent	0.037 kg/ton
Carbon charge			Gas purification, moist absorber	440 kg/year
Magnafloc	79-06-01		Industry – Suspension precipitator	0.021 kg/ton
Hydrochloric acid	7647-01-0	HCl	Industry – activated carbon cleaning	0.023 l/ton
Sulfuric acid	7664-93-9	H ₂ SO ₄	Industry – Detoxification Shop Set up solution pH	0.017 l/ton
Sodium borate	1303-96-4	Na ₂ B ₂ O ₇ x 10H ₂ O	Industry – Melting gold	1.5 ton/year
Sodium carbonate	497-19-8	Na ₂ CO ₃	Industry – Melting gold	700 ton/year
Silica flour	7631-86-9	SiO ₂	Industry – Melting gold	500 ton/year
Sulphamic acid	5329-14-6	NH ₂ SO ₃ H	Industry – sieve and crater cleaning	3000 ton/year
Caustic soda	1310-73-2	NaOH	Industry – Desorption solution	0.08 kg/ton
Antiprex 11			Industry – Prevent from scum in water	0.004 l/ton
Rock lime	1305-78-8	CaO	Industry – Set up pH in suspension	1.92 kg/ton
Zeolite charge	1318-02-01		Gas purification and moist absorbent	1760 kg/year
Desiccant charge			Gas purification	880 kg/year
Molecular sieve				1500 kg/year
Desiccant, activated alumina	1344-28-1	Al ₂ O ₃	Gas purification and moist absorbent	3000 kg/year
Magnesium chloride	7786-30-3	MgCl ₂	Dust suppression	5000 kg/year
Acetylene	7486-2	C ₂ H ₂	Repair Shop for welding	320-480 m ³ /year
Argon	7440-37-1	Ar	Repair Shop	48-60 m ³ /year
Propane	7498-6	C ₃ H ₈	Repair Shop for welding	210-280 kg/year
Nitrogen	7727-37-9	N ₂	Auto vehicles maintenance	120-180 m ³ /year
Nitrous oxide	10024-97-2	N ₂ O	Detoxification Shop for arsenic determination analyses	144-240 kg/year
Oxygen	7782-44-7	O ₂	Repair Shop for welding	900-1200 m ³ /year
Hydrogen cyanide	74-90-8	HCN	Calibration of fixed gas detectors	515 l/year