



# Environmental & Social Management System

## Mineral Waste Management Plan

## Mineral Waste Management Plan

Effective Date:  
01.04.2016

Document Number:  
OMAS-ESMS-MW-PLN-001

Rev:  
1

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## **1 INTRODUCTION**

### **1.1 Document Number**

This document is the Mineral Waste Management Plan for the Öksüt Gold Project. The document reference number for this Management Plan is OMAS-ESMS-MW-PLN-001.

### **1.2 Purpose**

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 requirement
- set out references for supporting materials and information.

### **1.3 Application**

The requirements set out in this Management Plan apply to all OMAS activities throughout the lifecycle of the Öksüt Gold Project, including those carried out by contractors.

This Management Plan is based on the OMAS Environmental & Social Management System Framework (OMAS-ESMS-001), which is owned by the OMAS General Manager. Any subsequent changes to the OMAS Environmental & Social Management System (ESMS) Framework may result in changes to this Management Plan.

### **1.4 Commencement**

This Management Plan applies from 1 April 2016.

### **1.5 Authority and Management**

The OMAS General Manager approved this Management Plan on 1 March 2016.

This Management Plan is owned by the OMAS Health, Safety, Environment and Training Manager. This Management Plan will be reviewed on a minimum of a six monthly basis during construction and commissioning. During steady state operations, this Management Plan will be reviewed on an annual 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.

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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 as outlined in the Management of Change (MOC) Procedure set out in the ESMS Framework.

## 2 SCOPE

### 2.1 Scope of this Management Plan

This Management Plan covers all OMAS activities, including contractor activities. Implementation by contractors is addressed in the Contractor Management Framework (OMAS-ESMS-CM-PLN-001).

Mineral waste comprises waste rock, overburden (excluding topsoil) and exhausted heap leach material.

### 2.2 Overlaps with other Management Plans

This Management Plan is part of the overall suite of Management Plans developed for the OMAS Project and as described in the ESMS Framework Document (OMAS-ESMS-001).

This Management Plan has overlaps and cross-linkages to a number of other Management Plans which have mineral waste implications, including:

- the Emergency Response Plan (OMAS-ESMS-ERP-PLN-001) in relation to accidental contamination of surface and groundwater resources;
- the Water Resources Management Plan (OMAS-ESMS-WR-PLN-001), particularly in relation to potential impacts to water resources from Waste Rock Dump (WRD) and the Heap Leach Facility (HLF);
- the Mine Closure Framework (OMAS-ESMS-MC-PLN-001), particularly in relation to the restoration of the HLF and WRD;
- The Cyanide Management Plan (OMAS-ESMS-CY-PLN-001), in relation to management of cyanide.

## 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**

<b>Role</b>	<b>Responsibilities</b>
<b>OMAS General Manager</b>	<ul style="list-style-type: none"> <li>• Approval of this Plan and resources required for implementation.</li> </ul>
<b>Health, Safety, Environment and Training Manager</b>	<ul style="list-style-type: none"> <li>• Ensure Project compliance with the Project Standards and other requirements set out in this Plan.</li> <li>• Overall responsibility for Plan scope and implementation.</li> <li>• Development, monitoring and revision of this Plan.</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• Ensure that mineral waste monitoring is undertaken as set out in applicable</li> </ul>

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Role	Responsibilities
<b>Coordinator</b>	Management Plans and Procedures.
<b>Operational Department Managers and Principal Contractors</b>	<ul style="list-style-type: none"> <li>• Ensure that relevant activities are undertaken in accordance with this Management Plan and related Procedures.</li> <li>• Ensure that department personnel are fully trained in appropriate waste management and storage practices and requirements.</li> <li>• Ensure incident<sup>1</sup> investigations are undertaken and reported.</li> </ul>
<b>Workplace Supervisors / Superintendents</b>	<ul style="list-style-type: none"> <li>• Provide oversight and conduct routine work area inspections to ensure relevant activities are in accordance with this Management Plan and related Procedures.</li> <li>• Report all hazards, non-conformances and incidents.</li> </ul>
<b>All employees and contractors</b>	<ul style="list-style-type: none"> <li>• Comply with OMAS requirements.</li> </ul>

### 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:

- OMAS Mine Operations Manager, particularly in relation to the protection of land and water resources from WRDs and potentially acid forming (PAF) waste materials, and ensuring that the WRDs are constructed, capped and closed in accordance with this plan and associated documents.
- OMAS Operational Department Managers, particularly in relation to structural stability at mine mineral waste disposal structures.

## 4 PROJECT STANDARDS

Applicable Standards must be complied with for all Project activities (the “Project Standards”). Project Standards comprise:

- Applicable Turkish Standards;
- Turkish EIA requirements;
- Other commitments to and requirements of Turkish Government authorities;
- Applicable international standards and guidelines;
- Applicable Centerra and OMAS standards, policies and procedures;
- Other industry guidelines with which OMAS has committed to comply.

<sup>1</sup> Incidents are defined by reference to the Project finance documents, Centerra Incident Reporting Standard and OMAS ESMS Framework.

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### 4.1 Applicable Turkish National Standards

Turkish standards related to mineral waste management are set out in the Regulation on the Regular Storage of Wastes (ADDDY)<sup>2</sup>. The ADDDY Regulation classifies mining waste into three categories: hazardous, non-hazardous and inert waste. Processes and requirements for disposing mining waste depend on its classification. The HLF will be built in compliance with the requirements for Class I (hazardous materials) storage facility according to the ADDDY.

### 4.2 Turkish EIA requirements

There are a range specific requirements in the EIA submitted for the OMAS project directly related to the management of mineral waste.

The following key commitments are made in the Turkish EIA (Section 7.1.4) related to mineral waste management:

- The waste rock management and the closure planning will be updated at regular intervals throughout the mining operations based on the geological models developed through progressing drill works. Furthermore, the current kinetic analyses have been continued beyond 20 weeks, and should the data obtained from these tests over the longer period prove different from the results of the first 20 weeks, the estimations will be re-evaluated.
- In addition to this, acid generation and metal leaching potentials of such units excavated during the operation period and sulphur contents of waste rock units will be checked through repeated geochemical analyses. Acid-base accounting and short term static analyses will be performed on the units constituting the waste rock and open-pit surfaces. In addition to the lab analyses, pH, EC and ORP measurements and chemical analyses of leachate and contact waters occurred at the waste rock dump and the open pits will be compared with the results of the estimation modelling, so that new inputs to the final closure plan and designs can be obtained.

Section 7.1.9 of the Turkish EIA states the following related to structural engineering monitoring:

- Checking and monitoring of the engineering structures (open-pits, waste rock dump, heap leaching site) will be carried out throughout the operation period to verify soundness and stability of these structures.

### 4.3 Other Commitments to and Requirements of Turkish Government Authorities

The Regulation on Mining Waste was published in Official Gazette (29417) on 15 July 2015. It introduces principles for mining waste-management for exploration, extraction, enrichment or mine storage activities. The Regulation will enter into effect within 12 months of the Gazette publication date (15 July 2016).

The Regulation classifies mining waste into three categories: hazardous, non-hazardous and inert waste. Processes and requirements for disposing mining waste depend on its classification. The Regulation was prepared by the Ministry of Environment and Urban Planning, in line with the EU Directive on Mining Waste 2006/21/EC.

<sup>2</sup> Official Gazette no. 27533 of 26.04.2010

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#### **4.4 Applicable International Standards and Guidelines**

The international standards which OMAS will implement are those set by the European Bank for Reconstruction and Development (EBRD).

EBRD Performance Requirements (particularly PR1: Environmental and Social Appraisal and Management and PR3: Pollution Prevention and Abatement).

In addition, this Management Plan has taken into account the following international good practice:

- EU - Directive 2006/21/EEC on the *Management of Waste from Extractive Industries*.
- EC Reference Document on *Best Available Techniques for Management of Tailings and Waste-Rock in Mining Activities* (January 2009).

#### **4.5 Applicable Centerra and OMAS Standards, Policies and Procedures**

Centerra Incident Reporting Standard (2014) and Centerra Environmental Incident Categorisation Reporting Standard (2015).

#### **4.6 Other industry guidelines with which OMAS has committed to comply**

None applicable.

#### **4.7 Summary of Applicable Project Standards**

OMAS will comply with the more stringent of national standards, applicable EBRD requirements and applicable Centerra Standards, with these more stringent standards representing the Project Standards.

The ESIA, and this Management Plan, is based on the Turkish EIA prepared to comply with Turkish regulatory requirements. The ESIA and this Management Plan goes beyond the approach adopted for the Turkish EIA in order to meet EBRD requirements. Where additional impacts have been identified, or mitigations proposed, these are in addition to those set out in the Turkish EIA and form additional voluntary commitments by OMAS and do not replace the core regulatory requirements as set out in the Turkish EIA.

### **5 MITIGATION MEASURES AND MANAGEMENT CONTROLS**

#### **5.1 Summary**

The general intent of this management plan is to ensure sound mineral and process waste management at Öksüt by ensuring the safe handling, treatment and disposal of generated mineral wastes. This is achieved through ensuring that the mineral waste disposal facilities and sites are physically, biologically and chemically safe and secure. Mineral waste production and the resulting disturbed footprints shall be minimised and opportunities sought for waste re-use and progressive rehabilitation where feasible and economic.

This will include mineral waste re-use through the re-use of topsoil and alluvial sands and gravels in other constructions and site rehabilitation. Non-acid forming (NAF) and acid neutralising materials will be used in post-mining landforms for cover material, physical stability and acid buffering capabilities.

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Progressive rehabilitation and cover of mining sites, particularly the WRD, will be undertaken as often as reasonably practicable, with the objective of creating a safe and sustainable landform, which resembles, in as far as is feasible, the hills in the surrounding landscape

### 5.2 Waste Management Planning

OMAS will implement a mineral waste management planning approach to identify, assess and document the quantities, physical and chemical characteristics and hazards of the wastes that will be generated by mining and processing of each distinct section of the mineral deposit.

This will be developed in line with development of the OMAS Mineral Waste Inventory and will enable OMAS to manage its mineral waste inventory and maintain an up to date conceptual model of the long-term physical and chemical waste behaviour and impacts on the environment. This will be validated using data from testing and monitoring.

The OMAS Mineral Waste Inventory and Mineral Waste Monitoring Procedure will address mineral waste management, acid rock drainage; leachate management and waste rock dump management and will contain:

- a summary assessment of the chemical and physical hazards posed by the waste and disposal facilities;
- the measures to mitigate the chemical and physical hazards;
- assignment of clear accountabilities and responsibilities for mineral waste management and for implementing the management plan on an on-going basis under actual field conditions;
- detailed on-going monitoring and data collection requirements;
- guidance on emergency plans and contingency measures for response to unplanned conditions or unexpected impacts.

### 5.3 Implementation and Operation

This Mineral Waste Management Plan will be implemented by means of the OMAS Mineral Waste Inventory and by the Mineral Waste Monitoring Procedure.

In addition to the OMAS Mining Waste Inventory and Mineral Waste Monitoring Procedure, which are related to the appropriate segregation, transport, storage and management of waste rock material the Plan will be supported by the following Procedures. These present more details on specific aspects of the day-to-day mineral waste management activities at OMAS:

- Forest Rehabilitation Project, related to the removal, handling and storage of topsoil;
- Environmental Monitoring and Measurement Procedure.

The following table presents the key management controls that OMAS will implement as part of this Plan.

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**Table 2: Key Management Controls**

ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
MW01	Topsoil salvage and segregation	Prior to disturbing an area by construction (WRD, stockpiles, HLF and other infrastructure) or mining activities, topsoil must be stripped and transported to an approved, storage location. This will be undertaken in accordance with the Forest Rehabilitation Project.	Environmental Coordinator Construction Contractor	Inspection records
MW02	Mineral Waste segregation	Waste rock, unconsolidated overburden and low grade ore will be segregated based upon copper content, total sulphur content and texture in accordance with the OMAS Mining Waste Inventory and Management Plan.	Mining Contractor	Inspection records
MW03	Mineral Waste segregation	All assumed NAF and PAF rock will be placed in separate temporary stockpiles. Based on the final chemistry, this rock will then be transported to a permanent waste rock dump, HLF location and/or stockpiled.	Mining Contractor	Mineral Waste Inventory Investigation and laboratory results
MW04	Acid Rock Drainage	The overarching Acid Rock Drainage (ARD) control strategies for the WRD and stockpiles will comprise: 1) segregation and separate handling of NAF and PAF material; 2) containment of any contact water within the operation footprint, and 3) construction of NAF waste rock store and release covers over final PAF waste rock surfaces.	Mining Contractor	Mineral Waste Inventory Laboratory analysis
MW05	Waste rock Dump Closure	All PAF materials will be capped with NAF cover material when they are closed or during operations in order to protect runoff water quality, minimise infiltration, control wind erosion and allow vegetation establishment.	Mining Contractor	Inspection records

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ID	Applicability / Activity	Control Description	Responsible Parties	Means of verification
MW06	WRD Management	The geotechnical and geochemical behaviour of the WRD will be managed and monitored throughout operation and into closure, to ensure that there are no significant environmental or geotechnical risks. Any areas of concern will be subject to appropriate corrective actions to mitigate them.	Environmental Coordinator	Monitoring results
MW07	HLF and WRD Management	HLF slopes, WRD and stockpiles will be visually inspected on a regular basis to identify unacceptable lateral displacement, settlement or erosion during construction and operation	Environmental Coordinator	Visual inspections
MW08	Surface water management	Surface water and any shallow seepage from the WRD and HLF will be managed through a series of perimeter drains and sumps, which will prevent the uncontrolled release of water and maximise the potential to recycle this water.	Environmental Coordinator	Inspection records
MW09	Surface water management	All contact water from the open pits, WRD, stockpiles and HLF will be retained on site and be discharged into the process water circuit or be put to other beneficial use.	Environmental Coordinator	Inspection records

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## 6 IMPLEMENTATION SCHEDULE

### 6.1 Review and Revision of this Management Plan

This Management Plan will be reviewed on a minimum of a six monthly basis during construction and commissioning. During steady state operations, this Management Plan will be reviewed on an annual basis and any necessary revisions made to reflect the changing circumstances or operational needs of OMAS. Revision of this Management Plan will be the responsibility of the OMAS Health, Safety, Environment and Training Manager, who is custodian of this Plan.

If material changes to operating procedures are required (as identified through the MOC Procedure contained within the OMAS ESMS Framework) this Management Plan may be updated on an "as required" basis.

Any revisions to this Management Plan will be uploaded to the OMAS Document Control Centre to ensure that all OMAS staff has 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 identifies non-conformance with Project Standards, these will be investigated and appropriate corrective actions identified (see Component 12 Non-conformance incident and action management, OMAS ESMS Framework).

### 7.2 Monitoring Requirements within the Turkish EIA

The Turkish EIA (Section 7.1.4) sets out the following requirements related to monitoring of mineral waste management facilities.

**Table 3: Turkish EIA Requirements for Mineral Waste Management**

Stage of the Project	Component	Monitoring Spot	Monitoring Method	Parameter	Purpose
Operation period	Open-pit geologic/block model	Waste rock lithologies and open-pit surface lithologies	Evaluation of updated geologic model	Monitoring of amounts and rates of mine lithologies	Operational waste rock management and obtaining of final closure planning
Construction and operation period	Waste rock and open-pit surface lithologies	Selected rock samples	Static analyses	Acid generation and neutralization potentials, state of metal leachate generation	Analysis of rocks which have potential to generate ARD or which will be used for neutralization
Construction and operation period	Waste rock and open-pit surface lithologies	Selected rock samples and/or existing kinetic analysis	Evaluation of updated results of on-going kinetic analyses	Evaluation of the data of acid generation speed, metal	Update open-pit and waste rock dump closure plans and waste rock

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Stage of the Project	Component	Monitoring Spot	Monitoring Method	Parameter	Purpose
		samples		leachate generation rate obtained over the longer period	management plans
Operation period	Quality of contact water obtained at the site	Waste rock dump leachates and open-pit surfaces contract waters	Site measurements and sampling	pH, EC, ORP, measurements and chemical analyses	Comparisons with the results of the water quality estimation models, and operational waste rock management and closure planning

### 7.3 Key Monitoring Activities

OMAS's approach to mineral waste monitoring focuses on the following key general monitoring activities:

- monitoring physical stability parameters of waste disposal structures as an early detection and warning mechanism for potential failure;
- conducting regular monitoring of the geochemical behaviour of the waste repositories for validation or review of the waste behaviour model and early warning of potential pollution problems.

In addition to the monitoring requirements set out in the Turkish EIA, further monitoring requirements are set out in the ESIA.

The combined monitoring requirements from the Turkish EIA and the ESIA are set out below.

Additional monitoring measures may be added based on the goals identified in the preparation of the OMAS Mineral Waste Inventory, and Closure Plan. This will be based on quantitative data and will be focused on measuring progress towards achievement of closure goals.

**Table 4: Key Monitoring Measures**

ID	Topic/Aspects	Parameters	Methods	Periodicity	Location
MWM1	Mineral Waste Inventory	Quantity of mineral waste per year and cumulative total	An inventory, by location and NAF/PAF characteristics, will be maintained of all mineral wastes generated, wastes subject to treatment, wastes subject to disposal, recycled/reused wastes and wastes stored at specific facilities.	Quarterly	N/A
MWM2	Geochemistry	ARD limits	Monitor discharges from WRD and other locations to enable early detection and management of ARD if it occurs	When seepage occurs	Stockpiles, HLF, borrow pits, quarries, low grade ore stockpiles

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ID	Topic/Aspects	Parameters	Methods	Periodicity	Location
MWM3	Heap Leach Facility	Geotechnical stability	Visual and geo-technical assessment of HLF slopes.	Weekly visual inspections and continual instrumentation monitoring	Embankments and perimeter
MWM4	Heap Leach Facility	Groundwater quality standards	HLF groundwater quality monitoring and seepage pond visual inspections by HSE Department.	Routine visual inspection and monitoring.	HLF monitoring wells and seepage pond.
MWM5	Water Quality	Groundwater quality standards	Surface and ground water quality monitoring around WRD and HLF	Routine monitoring on quarterly basis	WRD and HLF  Routine monitoring of treated process circuit waters.
MWM6	Sedimentation and Erosion	Slope stability	Visual assessment of Open Pit, WRD and stockpiles, erosion impacts and stability.	Weekly visual inspections.	Open pit, WRDs, stockpiles.

### 7.4 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 5: Key Performance Indicators and Monitoring Measures**

ID	KPI	Target	Monitoring measure
MWM-KPI 01	Number of reported mineral waste management incidents	Target: zero non-compliances  Minimise and continued improvement in number of reported non-compliances with this Plan.	Number of reported non-compliances per year
MWM-KPI 02	Frequency of mineral waste erosion events	Zero incidences of monitoring findings indicating that erosion or sedimentation control measures are not being properly implemented or maintained.	Number of reported sediment, erosion and structural related incidents per year.
MWM-KPI 03	Number of complaints related to mineral waste management	Target: zero complaints  Minimise and continued improvement in number of complaints received with respect to mineral waste.	Number of reported mineral waste related community complaints per year.

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### 8 TRAINING

#### 8.1 Overview

All necessary training is provided as part of induction training (to provide general awareness) and job-specific training as necessary.

#### 8.2 Induction Training

All employees of OMAS and Contractors working at the Öksüt Gold Project site will be provided with general induction, site specific induction and a broad range of health, safety and environmental awareness training.

Appropriate Personal Protective Equipment (PPE) will be made available to personnel if required. All relevant personnel will be trained in the use and maintenance of protective equipment.

#### 8.3 Job-Specific Training

OMAS Employees and Contractors with specific involvement in areas generating mineral waste will be given additional training in the implementation of the OMAS Mining Waste Inventory and Management Plan.

Hauliers of mineral wastes will have appropriate training, and hauling will be undertaken in a manner that prevents the inadvertent or inappropriate release of mineral wastes en route.

#### 8.4 Other Training Requirements

Additional, specialist training shall be provided to key personnel involved in activities which involve the use, storage or haulage of mineral waste materials.

### 9 AUDIT AND REPORTING

#### 9.1 Auditing

Daily inspections will be carried out by operational area superintendents / supervisors covering a broad range of operational aspects.

Any incidents identified during these inspections will be reported to the incident management system (Component 10 of the ESMS).

Conformance will be monitored in accordance with Component 11 of the ESMS (Monitoring and Evaluation).

All incidents and non-conformances will be reported as per the requirements of the OMAS ESMS as described in the OMAS ESMS Framework Document (OMAS-ESMS-001).

#### 9.2 External Auditing

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

#### 9.3 Record Keeping

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

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### 10 DOCUMENT CONTROL

File Name	Mineral Waste Management Plan
Document Number	OMAS-ESMS-MW0PLN-001
Approval Date	1 <sup>st</sup> March 2016
Version Number	01