



WASTE MANAGEMENT PLAN for LAPSEKİ & İVRİNDİ PROJECTS

TÜMAD Madencilik San. ve Tic. AŞ

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WASTE MANAGEMENT PLAN for LAPSEKİ & İVRİNDİ PROJECTS

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ABBREVIATIONS AND DEFINITIONS

Project(s)	: Lapseki and İvrindi Gold and Silver Mine and Processing Projects
TÜMAD	: TÜMAD Madencilik San. ve Tic. A.Ş.
CR	: Community Relations
EBRD	: European Bank for Reconstruction and Development
EIA	: Environmental Impact Assessment
ESMS	: Environmental and Social Management System
HDPE	: High Density Polyethylene
HR	: Human Resources
IFC	: International Finance Corporation
IMS	: Integrated Management System
KPI	: Key Performance Indicator
MoEU	: Ministry of Environment and Urbanization
OHS	: Occupational Health and Safety
PR(s)	: Performance Requirements
WPCR	: Water Pollution Control Regulation

Emergency Action Plan (EAP): The plan, which is continuously reviewed and renewed and where accidents and hazardous circumstances that may take place within the plant are evaluated, the activities to be performed in such a case are explained and the personnel task distribution is specified,

Acid Rock Drainage (ARD): The acidic water, which has a pH value less than 2 and which may contain heavy metals and which is created through chemical and biological reactions of sulphide minerals when ore, waste rock and other wastes containing sulphide minerals are exposed to air and water,

Waste: The stripping material, waste rock and processing waste, which are generated as a result of mining activities and which have to be disposed by the operator, including mineral and non-mineral waste

Waste Management Plan (WMP): The plan in which the principles with regard to waste storage system, the properties, operations, monitoring and control of tailing ponds, emergency action plan and closure and improvement of tailing ponds are specified,

Dispose of: Collection, classification, handling, treatment and storage of wastes in such a way that their environmentally harmful features will be brought to the acceptable levels.

The Current Best Techniques: Techniques, which are economically and technically applicable and accessible and which ensure that discharge and emission limit values will not be exceeded and that their environmentally harmful features will be prevented or brought to the acceptable levels.

Dry Stack Tailing Facility (DSTF): The area where the material, which will or will not be used, which will be stored temporarily or permanently and which has been or has not been processed, is dumped as a pile.

Inert waste: The wastes, which have not been subject to significant physical, chemical or biologic transformation, which do not have negative impacts on other materials, with which they contact, in a manner to cause environmental pollution or biodegradation or to threaten human health, which do not physically or chemically react with the said materials or which do not burn or solve these materials, and whose pollution levels and toxicity data are not at a level to change or prevent usage of surface and groundwater,

Stripping: Surface excavation to reach mineral deposit at an open pit,

Stripping material: Natural rock and soil piles, which are generated as a result of stripping activities and which are not qualified as ore,

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Waste Rock: Rock pile, which is generated during mineral excavation activities and which should be removed from the excavation area since it is not qualified as ore or since it cannot be evaluated under current economic conditions even if it contains any type of low grade ore.

Process Waste: Mud or particles having different sizes and features that are generated as a result of mineral processing activities,

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1 INTRODUCTION

TÜMAD Madencilik San. ve Tic. A.Ş. (TÜMAD) plans to establish the Lapseki Gold and Silver Mine and Processing Project (the Lapseki Project) within the administrative boundaries of the Şahinli and Kocabaşlar Villages of the Lapseki District in the Province of Çanakkale. The construction phase of the Lapseki Project has been at completion stage and the operation phase will start in October 2017.

TÜMAD plans to establish the İvrindi Gold and Silver Mine and Processing Project (the İvrindi Project) within the administrative boundaries of Değirmenbaşı and Küçükılınca Villages of the İvrindi District of Province of Balıkesir. The İvrindi Project has started with mobilization.

The project is seeking finance and this document is produced as a part of studies conducted to assess the Environmental and Social Impacts of the Project as per the EBRD Performance Requirements (PRs).

This document is the Waste Management Plan that is prepared for TÜMAD Operations. The Integrated Management System (IMS) document registration number for Waste Management Plan is TMD_CEV_PLN.004. This management plans sets the requirements for the operation phase of the Lapseki Project and for construction and operation phase of the İvrindi Project and is an integral part of the Environmental and Social Management System (ESMS) implemented by TÜMAD for the two mine projects.

This Management Plan is based on the Project(s) ESMS Framework (TMD_EYS_PLN.004) of TÜMAD, which is owned by the TÜMAD General Manager. Any subsequent changes to the TÜMAD ESMS may result in the changes to this document.

This Management Plan will be reviewed on a minimum of a six monthly basis during construction and commissioning. During operation phase, this Plan will be reviewed on an annual basis to determine whether any changes or updates are required to the Management Framework unless a more frequent update is required to reflect changing project design or ESMS requirements and 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 as outlined in the Management of Change Procedure (TMD_EYS_PRD.006).

2 PURPOSE

The purpose is to ensure management of wastes in order to prevent or minimize their negative impacts on human health and environment, and to determine monitoring and inspection methods.

The purpose of Waste Management Plan is:

- To define regular monitoring and storage activities for waste rock, waste, topsoil that are generated by TÜMAD's activities,
- to define project standards in terms of waste,
- To define legal responsibilities, commitments and operating procedures and instructions for storage of waste rock, waste and topsoil at the Project Site.
- To define evaluation and performance targets,
- To define training requirements,
- To define Duties, Authorities and Responsibilities and,
- To specify references within the scope of waste monitoring works.

The requirements set forth in the Waste Management Plan, which has been prepared within the framework of IMS, are valid during the course of activities of TÜMAD Revisions, which are made within the scope of operating activities on storage activities for waste, waste rock, top soil, standard revisions of IMS and legal legislation modifications may also require revisions on this plan.

Waste Management Plan is valid as of the date on which it is approved by the TÜMAD General Manager.

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3 SCOPE

Waste Management Plan includes all activities of TÜMAD during execution of Project(s) and also applicable to all TÜMAD contractors involved in the Project(s).

3.1 Overlaps with other Management Plans

This Management Plan is part of the overall suite of Management Plans developed for the TÜMAD Project and as part of ESMS overlaps with the following management plan;

- The Emergency Action Plans (TMD_LAP_İSG_PLN.002 & TMD_İVR_İSG_PLN.002) in relation to accidental contamination of surface and groundwater resources;
- The Water Resources Management Plan (TMD_CEV_PLN.003), particularly in relation to potential impacts to water resources from Waste Rock Dump (WRD), DTF (Dry Stack Tailing Facility) and the Heap Leach Facility (HLF);
- The Conceptual Mine Closure Framework (TMD_CEV_PLN.001), particularly in relation to the restoration of the HLF and WRD;
- The Cyanide Management Plan (TMD_LAP_CEV_PLN.008), in relation to management of cyanide.

4 PROJECT STANDARDS

The standards applicable to Project(s) activities are defined by;

- Turkish Environmental Impact Assessment (EIA) Requirements
- Legal Legislations
- Company Commitments and Commitment Requirements
- International Standards and Guides
- TÜMAD policies, procedures and instructions

4.1 EIA Requirements

Waste in EIA Report:

- During the activities, DSTF (Solid Waste Storage) areas shall be designed by considering earthquake risks within the region. Process tailings that are planned to be stored in solid phase shall be stored as a mass, which is subject to maximum compaction on an impermeable base layer.
- Wastes shall be stored in DSTF area for a long time in such a way that the ground impermeability is achieved. The seepage that may be generated when the dry wastes, which are stable at DSTF area under atmospheric conditions, are subject to precipitation water shall be collected in a pond (as a precaution, to ensure balance reactions with atmosphere) and it shall be discharged according to the Table 7.1 of the WPCR (Water Pollution Control Regulation) by ensuring that it does not include any pollutant (that the system works under appropriate conditions).
- Top Soil to be stripped during the land preparation activities from the areas, where the units to be established will exist, shall be stored at soil storage area to be used again. Top Soil at the pit areas shall be stripped simultaneously with the production activities.

4.2 Applicable Turkish National Standards

The activities with regard to the processing plant waste shall be carried out in accordance with the provisions of the “Regulation on Regular Storage of Wastes” which was published in and enacted by the Official Gazette No. 27533 dated March 26, 2010 (No. 29292 dated March 11, 2015), those of the “Regulation on Waste Management” which was published in and enacted by the Official Gazette No. 29314 dated April 02, 2015, and those of the Notice No. 2014/13 published by the General Directorate of Environment Management.

4.2.1 Related Non Mineral Wastes Regulations

Regulation on the Control of Waste Oils, Regulation on the Control of Vegetable Waste Oils, Regulation on the Control of Hazardous Wastes, Regulation on the Control of Solid Wastes, Regulation on the Control of Packaging

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Wastes, Regulation on the Control of Hazardous Wastes, Regulation on the Control of Waste Oils, Regulation on the Environmental Permit and License, Other Applicable Regulations

4.3 Company Commitments and Commitment Requirements

EIA commitments with respect to Waste;

- Seepage will be generated since precipitation water will contact to waste dump area, DSTF area and the open area where dry waste from processing plant will be stored. Seepage from these areas shall be collected in the settling ponds, which will be built at the outlet of drainage channels at the base. If possible, this water shall be pumped back to the processing plant, otherwise it shall be discharged to the receiving environment by ensuring that the limit values for the parameters given in Table 7.1 of WPCR which is given in Water Resource Management Plan (TMD_CEV_PLN.003) are not exceeded.

Contact with precipitation water shall be encountered since the waste from open pit and the dry waste from processing plant will be stored in open atmosphere. Seepage from these areas shall be collected in the settling ponds by means of drainage channels to be built at the base. The water shall be used at the plant. If precipitation increases and water cycle balance is unstable, excess water to be collected from settling ponds and treated as per the criteria of Table 7.1 of WPCR shall be discharged to the receiving environment within the scope of “Environmental Permit on Waste Water Discharge(01.06.2017 Date and AAT01590 numbered of TÜMAD Domestic Waste Water Discharge Approval Form)” which will be obtained as per the “Environmental Permit and License Regulation” which is published in and enacted by the Official Gazette No. 29115 dated September 10, 2015. Peripheral channels and ponds shall be located at open pit, waste dump and DSTF areas in the project area. Waters that will come from these areas by means of surface flow shall be collected in peripheral channels and transferred to settling ponds. Waters, which will come into these areas through precipitation and which will be contaminated by contact, shall be collected in the settling ponds at the downstream of the areas by means of drainage systems.

4.4 International Standards and Guides

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

Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries.

Table 1: EU Directives

EU DIRECTIVES	ÇANAKKALE LAPSEKİ GOLD MINE
Cyanide concentration in waste material discharged to tailing pond shall not exceed 50 ppm.	Environmental commitment for Lapseki Gold Mine is 10 ppm. Wastes from chemical treatment shall be dewatered and sent to the Solid Waste Storage area.
It is mandatory to apply the “Best Available Techniques” (BAT) when constructing and managing waste storage facilities.	Dewatering and solid waste storage measures have been selected for the Lapseki Project considering the “EC Reference Document on <i>Best Available Techniques for Management of Tailings and Waste-Rock in Mining Activities</i> (January (2009)).
It is essential to prepare waste management plan.	Waste management plan is available.
It is essential to prepare emergency plan.	Emergency plan is available.
Monetary guarantee should be provided for the closure phase and post-closure monitoring phase.	Environmental Compliance Fee is paid in cash to GDMA (General Directorate of Mining Affairs) and Rehabilitation Fee is paid in cash to GDF (General Directorate of Forestry).
Potential hazard class of the plant should be determined by risk assessment report. It should be determined how and when the plant will be closed and what will be the liabilities of the operator after closure.	Assessment report and mine closure plan is available.
An inspection system that is comprised of experts should be set up.	An independent Monitoring-Inspection Commission including representatives of relevant departments has been proposed to Çanakkale Governorship

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4.5 TUMAD Policy Procedure and Instructions

In its Mining activities, TUMAD has adopted prevention of potential negative impacts on the environment by evaluating the environmental impacts and by taking appropriate precautions and implementing monitoring procedures to eliminate or minimize the negative impacts on the environment.

Ore from the open pits that will be used in mineral processing shall be stored in the open atmosphere at the temporary storage area for a short period of time. In the meantime, ARD potential due to contact between precipitation and the material has been investigated. Static testing results have shown that there will be no dominant acid generation with rarely uncertain features. SPLP test results have shown that the ore will not generate ARD and that it does not have a dissolvable metal content. According to the kinetic testing, the results of HCT-2 sample have similarly shown that there will be no ARD generation or metal leaching. No geochemical modelling study was required since the ore will not generate ARD during temporary storage based on the available data. During operation period, content of the ore shall be regularly controlled and if it is determined that it contains sulphide minerals, then the preventive measures shall be taken against ARD generation. Thresholds and Standards about ARD is given in Water Resources Management Plan (TMD_CEV_PLN.003).

Environmental Objectives and Targets Procedure	(TMD_CEV_PRD.001)
Environmental Work Flow Procedure	(TMD_CEV_PRD.002)
Determination of Environmental Aspects	(TMD_CEV_PRD.003)

5 ROLES AND RESPONSIBILITIES

The Waste Management Plan has been prepared under the responsibility of Environmental Department of TUMAD.

This management plan shall be reviewed biannually by including construction and operation periods of TUMAD. In addition, it shall be reviewed and updated in consideration of legal responsibilities and changes in the instructions and procedures of TUMAD.

Primary roles and responsibilities with respect to implementation of Waste Management Plan are given in Table 2.

Table 2: Roles and Responsibilities

Roles	Responsibility			
General Manager	<ul style="list-style-type: none">Approval of necessary resources to implement this management plan			
Head of Environmental Department Environmental Engineer	<ul style="list-style-type: none">To prepare this management plan and convey and distribute it to the relevant departmentsTo ensure that this management plan conforms to applicable legal requirements, commitments and standards,To provide technical assistance to TMAD Madencilik Sanayi ve Ticaret A.Ş. department managers and Sub-employers with respect to studies to be carried out within the scope of Waste Management Plan and the relevant procedures.To ensure monitoring, measurement and reporting as described in the Waste Management Plan, the relevant procedures and instructions,To make the plan available to employees of TMAD Madencilik Sanayi ve Ticaret A.Ş. and to those of sub-employers,To control effectiveness of this plan through periodic inspections on all activity areas of TMAD Madencilik Sanayi ve Ticaret A.Ş. and those of sub-employers.To report all hazards, non-compliances and incidents,			
Construction Manager	<ul style="list-style-type: none">To ensure that all activities of TMAD are conducted in accordance with the Waste Management Plan and the relevant procedures and			
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Roles	Responsibility
Operation Manager Contractor's Managers	instructions, <ul style="list-style-type: none"> To report all hazards, non-compliances and incidents,
Contractors and all employees	<ul style="list-style-type: none"> Working in line with this management plan in accordance with the commitments and standards
Head of Community Relations Department	<ul style="list-style-type: none"> Manage complaints from the community, informing stakeholders truly
Internal inspectors	<ul style="list-style-type: none"> To perform routine inspections in the working area in order to ensure that the related activities are being carried out in accordance with this management plan and the relevant Procedures. To report all hazards, non-compliances and incidents,

6 MITIGATION MEASURES AND MANAGEMENT CONTROLS

The general purpose of this management plan is to achieve a flawless waste and process tailing management for TÜMAD by ensuring a safe management, treatment and disposal of generated wastes. This management is achieved by ensuring the safety and security of waste treatment plants physically, biologically and chemically. Waste generation and the resultant disturbed areas shall be minimized.

6.1 Waste Management Planning

TÜMAD 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 TÜMAD Mineral Waste Inventory and will enable TÜMAD to manage its mineral and non-mineral wastes inventory and maintain an up to date conceptual model of the long-term physical and chemical waste behavior and impacts on the environment. This will be validated using data from testing and monitoring.

The TÜMAD Mineral Waste Inventory will address mineral waste management, acid rock drainage; leachate management and waste rock dump management, **Dry Stack Tailing facility 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.

6.2 Implementation

This Waste Management Plan will be implemented by means of the TÜMAD Mineral and Non-Mineral Waste Inventory and by the Measuring and Monitoring Environment Activities Procedure (TMD_CEV_PRD.006).

In addition to the TÜMAD Mineral or Non-Mineral Waste Inventory and Mineral Waste Monitoring and Measurement Table (TMD_CEV_TAB.003), 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 & non-mineral waste management activities at TÜMAD:

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

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Table 3: Control Tools for Mine Wastes

Applicability / Activity	Control Description	Responsible Parties	Means of verification
Topsoil salvage and segregation	Prior to disturbing an area by construction (WRD, stockpiles, Dry Stack Tailing Facility (DSTF), 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 & Regulation On Regulatory Storage Of Waste	Head of Environmental Department Open Pit & Heap Leach facility and Surface work contractor	Inspection records
Mineral Waste segregation	Waste rock, unconsolidated overburden and low high grade and Run of Mine ore will be segregated based upon ore content, total sulphur content and texture in accordance with ARD barrel test result.	Mining Contractor Open Pit Superintendent Operation Manager Mine Geologist	Inspection records
Process Waste	In the Tank –Leach process wastes will be subjected to chemical detoxification (INCO-SO ₂ Air)* and will be dried and dewatered by filter press will be stored built according to the Regulation On Regulatory Storage Of Waste of Dry Stack Tailing Facility (DSTF)	Mining Contractor Operation Manager Plant Superintendent DSTF Engineer	Inspection records
Mineral Waste segregation	All assumed NAF and PAF rock will be placed in separate temporary stockpiles according to ARD results. Based on the final chemistry, this rock will then be transported to a permanent waste rock dump, HLF, DSTF location and/or stockpiled to encapsulation process	Mining Contractor Open Pit Superintendent Operation Manager Mine Geologist Plant Superintendent	Mineral Waste Inventory Investigation and laboratory results

Applicability / Activity	Control Description	Responsible Parties	Means of verification
Acid Rock Drainage	The overarching Acid Rock Drainage (ARD) control strategies for the WRD and stockpiles will comprise: 1) Static & kinetic test results 2) ARD Barrel Test Results 3) segregation and separate handling of NAF and PAF material; 4) containment of any contact water within the operation footprint, and 5) Construction of NAF waste rock store and release covers over final PAF waste rock surfaces.	Mining Contractor	Mineral Waste Inventory Laboratory analysis
Waste rock Dump Closure	Encapsulation which all PAF materials will be capped with NAF cover material when they are closed or during operations in order to protect runoff water quality, minimize infiltration, control wind erosion and allow vegetation establishment.	Mining Contractor	Inspection records
WRD Management	The geotechnical and geochemical behavior 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.	Head of Environmental Department Open Pit Superintendent Contractor	Monitoring results
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. Additionally, topographical measurement will regularly conducted in order to be identify unaccepted displacement.	Head of Environmental Department Open Pit Superintendent Contractor	Visual inspections

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Applicability / Activity	Control Description	Responsible Parties	Means of verification
DSTF Management	DSTF Has been surrounded by drainage channels for water management %80 percent of dewatering performance will be obtained from the filter press Compaction will be performed to stabilization, impermeability and dust prevention of waste which will be stored in DSTF	Mining Contractor Operation Manager Plant Superintendent DSTF Engineer	Visual inspection
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 maximize the potential to recycle this water. Mine waste and DSTF areas will be collected by drainage channels and accumulated in the contaminated settling basins in the scope of the Project. Sampling studies will be conducted at outlets of the basins. Analyses will be conducted in accordance with Table 7.1 of By-law on Water Pollution Control in order to determine whether sampled waters comply with discharge criteria as detailed in Water Management Plan (TMD_CEV_PLN.003)	Head of Environmental Department Open Pit Superintendent Contractor	Inspection records
Surface water management	All contact water from the open pits, WRD, stockpiles, DTSF 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

*INCO S₀₂Air Process: INCO (SO₂+Air) chemical decomposition unit

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6.2.1 Chemical decomposition unit

*INCO SO₂Air Process: INCO (SO₂+Air) chemical decomposition unit. Chemical decomposition unit is comprised of the following phases;

- Cyanide decomposition
- Heavy Metal Stabilization

Waste pulp generated from leach and adsorption unit is decomposed at the chemical decomposition unit before transferred to tailing pond in order to ensure limit values declared by the Ministry of Environment. Limit value for free cyanide is 10 ppm.

6.2.2 ARD Barrel Test Results

Site-scaled kinetic testing studies, which were initiated in January 2015, shall be terminated when the operation phase commences. 11 waste rock samples are placed in a 200 L barrel and seepage from this barrel is collected in the 20 L HPDE barrels and when there is enough amount of seepage water in these barrels, analyses shall be conducted and compared to the lab-scaled kinetic test results.



Figure 1: Lapseki Project In-Situ Barrel Test



Figure 2: İvrindi Project In-Situ Barrel Test

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In-situ barrel tests are continued in order to verify the measures, which will be taken for the samples having an acid generating potential, through in-situ tests. Although only 2% of the waste rock has an acid generating potential, a waste management plan has been prepared for the waste rock area. The means of waste storage and relevant measures (encapsulation) in the waste management plan (TMD_CEV_PLN.004) are discussed in detail in the Final EIA Report.

Cyanide Decomposition: At the first phase, free and metal cyanide compounds (except iron cyanide compounds) are converted to cyanate through INCO process with sodium meta bisulphate. Later on, cyanate is subject to hydrolysis and converted to carbonate and ammonium. Iron cyanide compounds become stabilized by being precipitated with copper. The optimum pH value of 8.5 is automatically achieved with hydrochloric acid or rarely sodium hydroxide.

Heavy Metal Stabilization: At this stage, heavy metals, such as arsenic and antimony, become stabilized by being precipitated with ferric sulphate. The optimum pH value of 7 is automatically adjusted with hydrochloric acid or rarely sodium hydroxide.

In order to measure WAD cyanide ratio at the outlet of chemical decomposition unit, hourly samples are taken and measurements are made by means of picric acid test. In addition, a sample to be taken by an automated sample taking equipment is analysed at the laboratory with the distillation method. If the cyanide value exceeds 10 ppm, the plant is certainly shut down and waste transfer to solid waste storage area is stopped. The plant is not commissioned until the problem is solved. The waste having a cyanide value of less than 10 ppm is dewatered at the filter press units and delivered to the solid waste storage area, whose cross-section is shown below.

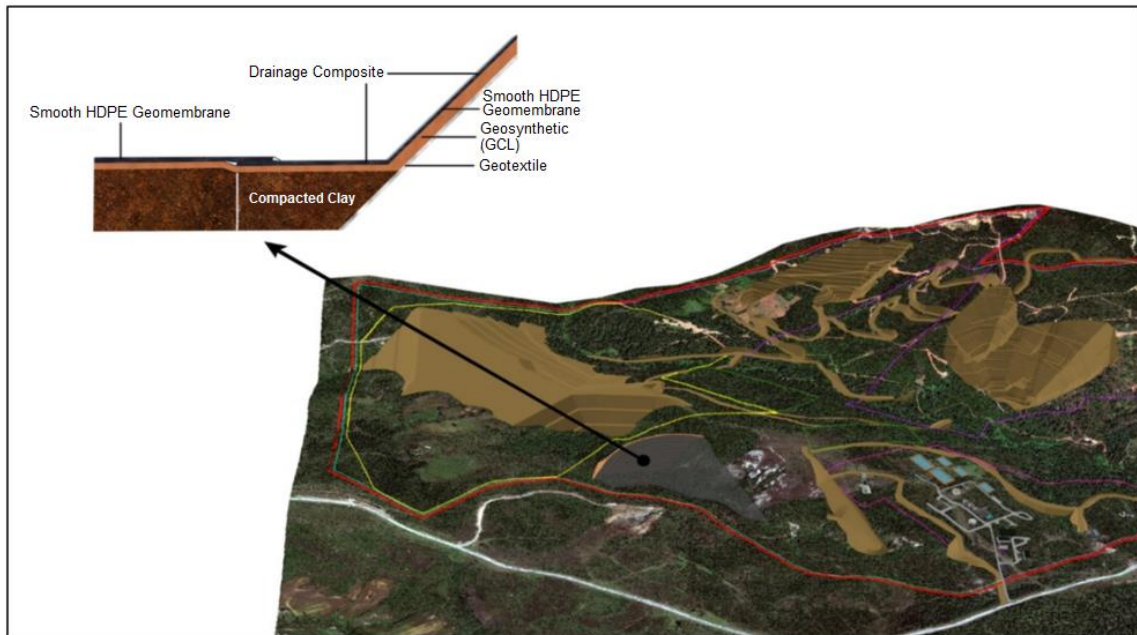


Figure 3: DSTF (Dry Stack tailing Facility)

6.3 Impact Mitigating Measures

- Domestic wastewaters shall be treated at the biological treatment plant. They shall be fed to the plant after treatment.
- Domestic solid wastes shall be delivered to the municipal storage area.
- Wastes from processing plant and settlement pond shall be delivered to DSTF area.
- According to the regulation on Regular Storage of Wastes, dry waste storage area shall be constructed in such a way that it will conform to the 1st class standards.
- Hazardous wastes (such as batteries, waste oil, and contaminated wastes) shall be first stored at the temporary storage area (Figure 4) and then delivered to the licensed waste facilities. Temporary waste

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storage area (WSA) will be constructed according to requirement of MoEU and international standards. This will include the followings:

- The temporary WSA will be separated from the facilities and buildings, located in a proper place for licensed vehicles to get hazardous wastes and away from human crowd;
- Secondary containment systems will be constructed;
- All required precautions will be taken against fires (fire extinguishers etc.);
- A warning sign "Attention! Hazardous Waste" will be placed at the entrance of the area where hazardous wastes are stored;
- Each waste in the WSA will be labelled. On the label, following information shall be covered:
 - Waste code;
 - Whether it is hazardous waste;
 - Hazard characteristics and risks for the hazardous wastes;
 - Date of entry;
- An employee responsible for the temporary waste storage area will identified and the WSA will be enclosed, the entrance door will be lockable, the keys shall be used only by the responsible employee (restricted access).
- In order to protect the hazardous waste storage area from rainfall, a roof and walls around the WSA will be constructed.
- An absorbent material, i.e. a spill kit, will be located in the WSA against a spillage.

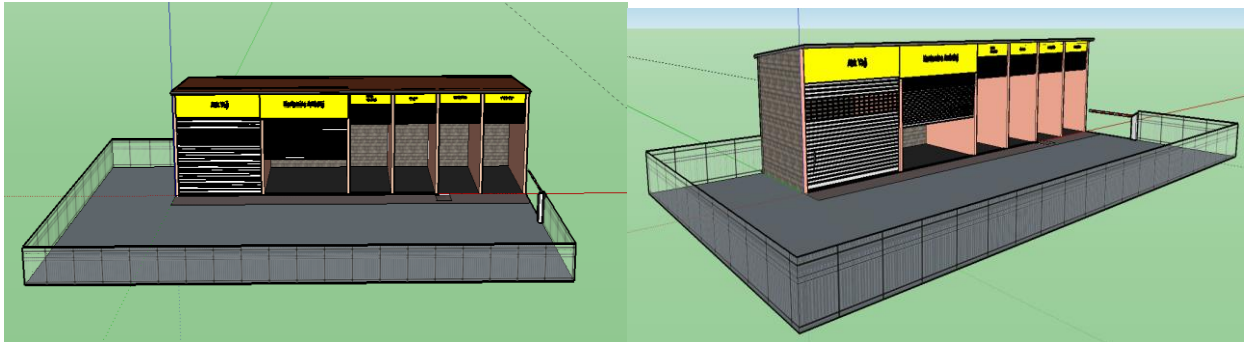


Figure 4: Temporary Hazardous Waste Storage Area

- A training on the management of wastes will be provided to the workers. The training subjects at least includes:
 - requirements of this management plan
 - precautions and risks when handling wastes
 - proper usage of PPEs
 - waste minimization, categorization, segregation, storage
 - waste recycling and appropriate disposal

6.4 Waste Management Plan

TÜMAD Madencilik Sanayi ve Ticaret A.Ş. shall implement a Waste Management Plan approach in order to determine, evaluate and document the amount, physical and chemical properties and hazards of the waste materials that will be generated due to mining activities to be carried out on each different section of the mineral deposit.

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This approach shall be prepared in accordance with the Waste Inventory List TMD_CEV_LST_001 (which is given in Appendix 1) and TUMAD shall ensure that it will manage the Waste inventory and maintain an updated conceptual model for the long-term physical and chemical behaviors and impacts of the inventory on the environment. This model shall be verified by using the results to be obtained from the tests and monitoring studies.

6.5 Non-mineral Wastes

Waste Codes and definitions and the codes and the definitions regarding to the methods of collecting- segregating and disposal/recovery have been given in the line with Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314.

The below table represents the areas of activity, hazardous and non-hazardous waste generated by waste source from the facility and waste codes.

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Table 3: Hazardous and Non-Hazardous Waste Originated from the Facility Codes, Waste Code, and Areas of Activity

Waste Type	Waste Code	Activity	Areas of activity	Waste Resource	Waste Code Instructions	Disposal/Recovery Method
Contaminated waste	15 02 02*	Maintenance Actions	Mine Facility	Machine maintenance and repair done in the pits and facilities	Dangerous materials contaminated by absorbents, filter materials (oil filter if not otherwise specified), cleaning cloths, protective clothing (Contaminated, cloths and gloves)	R12
Contaminated Packing	15 01 10*	Maintenance Actions	Mine Facility	oil package, paint package, chemical package etc.	Packings contaminated by hazardous substances or contaminated by residues of hazardous substances	R 12
Waste Oil	13 02 08*	Maintenance Actions	Mine Facility	From machineries, trucks, maintenance and repair of all machineries and equipment in concentration plant	Other engine, gearbox and lubrication oils	R12
Oil Filters	16 01 07*	Maintenance Actions	Mine Facility	From machineries	Oil Filters	D5
Dangerous parts removed from the scrap	16 02 15*	Maintenance Actions	Mine Facility	From machineries, trucks, maintenance and repair of all machineries and equipment in concentration plant	Dangerous parts removed from the scrap equipment	D5
Battery	16 06 01*	Administrative Building	Overall Facility	Administrative and technical offices	Leaded Batteries	D15
Fluorescent lamps	20 01 21*	Administrative Building	Overall Facility	Administrative building/ overall facility lighting	Fluorescent lamps and other mercury-containing wastes	D5

Waste Type	Waste Code	Activity	Areas of activity	Waste Resource	Waste Code Instructions	Disposal/Recovery Method
Wasted toner	08 03 17*	Administrative Building	Overall Facility	Administrative and technical offices	print cartridge toners containing hazardous substance	D15
Wasted Oil	20 01 26*	Cafeteria	Cafeteria	Cafeteria wastes	Liquid and solid oil except for 20 01 25	R12

-* The relevant wastes did not occur in 2017 due to the fact that the plant has had a new activity. In case of occurrence, they will be stored in the hazardous waste area in accordance with their type in the facility. Then it will be sent to Environmental Permit and Licensed Company in return of UATF for being ensured of disposal.

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Waste codes, waste production amounts, estimated amounts of wastes in 3 years are given in the below table.

Table 4: Waste Codes, Waste Production Amounts, Estimated Amounts of Wastes

Waste Type	Waste Code	Waste Production Amount of Declared Year (2017) (kg)	Estimated Waste Amount of 2018 (kg)	Estimated Waste Amount of 2019 (kg)	Estimated Waste Amount of 2020 (kg)	Recovery/Disposal Plans for Estimated Wastes will be produced in the Future (with percentages %)	
						Method	Percentage (%)
Contaminated Packings	15 01 10*	500	2500	2000	2000	R12	100
Contaminated Waste	15 02 02*	200	200	200	200	R12	100
Other engine, gearbox and lubrication oils	13 02 08*	1000	1000	1000	1000	R12	100
Oil Filters	16 01 07*	100	200	150	150	D5	100
Dangerous parts removed from the scrap equipment	16 02 15*	300	700	500	500	D5	100
Wasted Battery	16 06 01*	100	250	150	150	D15	100
Fluorescent Lamps	20 01 21*	5	10	5	5	D15	100
Wasted Toner	08 13 17*	10	30	25	25	D15	100
Wasted Oil	20 01 26	0	200	200	200	R12	100

There is no disposal unit in the facility. Waste generated from operation and recoverable is sent to Environment Permit and Licensed Disposal Facilities to provide recovery or disposal. Waste that cannot be recovered and does not have suitable recycling facilities will be sent to the Sanitary Landfill Site and disposal will be ensured. The summary of the disposal methods of the wastes given below:

- Domestic wastes are collected by municipality and sent to Municipality's landfill. There is a municipal council decision about the collection of the domestic wastes from Project Site.
- Excavation wastes are transferred to the area operated by private company which has permits from municipality. The wastes transferred with official written report.
- Hazardous wastes: Temporary storage will be done in the field and the construction of the temporary waste storage area is ongoing.
- The agreements made for some of the waste types with the licenced companies:
 - Waste batteries will be collected by the licenced private company called TAP.
 - Waste accumulators will be collected by the private company which are the supplier of the accumulators.
 - Waste oils will be collected by the licenced private company called PETDER
 - Hazardous wastes will be collected by the licenced private company called İZAYDAŞ.

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6.6 Wastewater Treatment Plant

Domestic wastewater originating from the use of the employees at the operation phase shall be used for dust suppression and irrigation after being treated with the 250-person / day capacity treatment plant. The rest of the solid part will be removed with the help of a sewage truck within the framework of agreements with the municipalities in the operating area.

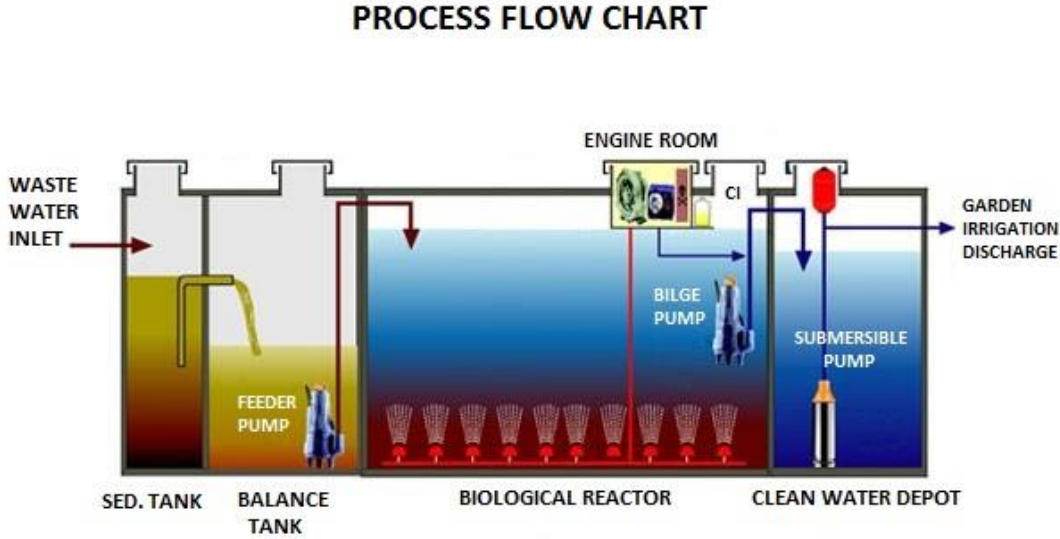


Figure 5: Wastewater Treatment Plant

7 MONITORING

Within the scope of TÜMAD activities, monitoring and measurement activities to be performed as per the international standards and guidelines are defined in Waste Management Plan. In addition, this plan also includes corrective and preventive plans which shall be applied in case of determination of a non-compliance.

Monitoring commitments set forth in the EIA report, monitoring as per the legal requirements and monitoring and measurement requirements according to the Integrated Management System;

ARD monitoring studies have been planned to cover operation and post-operation phases of the project. Results of the monitoring studies to be carried out by TÜMAD Madencilik during the operation phase shall be submitted to the Provincial Directorate of Ministry of Environment and Urbanization by means of biannual monitoring reports. Except the inspection studies to be performed by government institutions, sampling and in-situ measurements shall be performed by the personnel of TÜMAD Madencilik. Laboratory analyses shall be conducted in an internationally accredited laboratory. Monitoring studies shall commence at the construction phase of the project and continue at the post-operation phase.

ARD is generated when sulphide minerals, which are present in the rock material, are in contact with surface water, groundwater and rain water by being oxidized as a result of contact with air and moisture. It is possible to eliminate ARD potential thanks to the buffering capacity of rock materials and the existence of rocks with high neutralization potential in the Lapseki Project and by supplying limestone, if necessary. Within the scope of the existing report, minimizing measures have been planned for the locations where ARD is possible and these measures shall be practically continued during the course of operation period. Studies shall be conducted during the operation period in order to determine the most efficient and effective methods for ARD control. ARD database shall be created based on the monitoring data, which are obtained during operations, in order to be used at the mine closure phase.

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Table 5: ARD monitoring data for operations

Phase	Compound	Monitoring Point	Method	Parameter	Purpose
Until Operation Period	11 site-scaled kinetic testing barrels	Seepage samples	Kinetic testing analyses	pH, Alkalinity, Acidity, conductivity, metals, anions	Comparison with laboratory scaled kinetic tests
Operation and Closure	Open pit surfaces and Waste Rock	Sulphide and transition zones	Static Tests and if there is an acid generation potential, 40 week kinetic testing on the samples	Chemical composition, ABA test (AP, NP), metal leach generating rates	monitoring NP and AP values of the reagents and investigating their metal leaching potential
Operation and Closure	Pit wall contact surfaces and waste rock as per lithology and alteration properties	Open pits, waste rock	Mineral exploration drill holes ,geological model update, mass balance calculation update	Update of geological model and waste amount estimations based on the data obtained from mineral exploration drill holes continued during operation period	Revision of waste rock and open pit management plans according to the geological model

7.1 Key Monitoring Activities

Key monitoring measures are set out below;

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Table 6: Wastes Monitoring Program

No	NAME OF THE ACTION	FREQUENCY	NAME OF THE APPLICABLE REGULATIONS/BYLAWS/COMMUNIQUE/DIRECTIVES	RESPONSIBILITY
WM-01	Sampling from Biological Waste Water Treatment Plant	Within durations given in the scope of the Environmental Permit	Regulation on Environmental Permit and License & the Regulation on the Control of Water Pollution (under the Environmental Permit)	Environmental Department Accredited Laboratory
WM-02	Soil Contamination Analyses	Every 6 Months	Commitment Requirements & the Regulation on the Control of Water Pollution and Point Source Polluted Lands	Environmental Department
WM-03	Top Soil Analyses	When deemed necessary/Visual Inspection	Commitment Requirements & the Regulation on the Control of Water Pollution and Point Source Polluted Lands	Environmental/Related Departments
WM-04	Categorical Analysis of Waste Oils	Applies Until the Type of Waste Oil Changes	Regulation on the Control of Waste Oils	Environmental Department
WM-05	Delivery of Vegetable Waste Oils to Licensed Companies	Variable depending on the amount of waste	Regulation on the Control of Vegetable Waste Oils	Environmental Department
WM-06	Ensure the Disposal of Hazardous Wastes	Variable depending on the amount of waste	Regulation on the Control of Hazardous Wastes	Environmental Department
WM-07	Ensure the Recycling of Non-Hazardous Wastes	Variable depending on the amount of waste	Regulation on the Control of Solid Wastes	Environmental Department
WM-08	Delivery of Packaging Wastes to Recycling Companies	Variable depending on the amount of waste	Regulation on the Control of Packaging Wastes	Environmental Department

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No	NAME OF THE ACTION	FREQUENCY	NAME OF THE APPLICABLE REGULATIONS/BYLAWS/COMMUNIQUE/DIRECTIVES	RESPONSIBILITY
WM-09	Waste Declaration Form	Annually	Regulation on the Control of Hazardous Wastes	Environmental Department
WM-10	Waste Oil Declaration Form	Annually	Regulation on the Control of Waste Oils	Environmental Department
WM-11	Applications for Provisional Operating Certificate and Environmental Permit	Every 5 years	Regulation on the Environmental Permit and License	Environmental Department Ministry of Environment and Urbanization
WM-12	Completion of the Forms for National Waste Transportation during the Delivery of Hazardous Wastes	In Each Delivery	Applicable Regulations	Environmental Department Licensed Transporters Licensed Disposal Companies

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7.2 Key Performance Indicators

Basic performance monitoring of Waste Management Plan and the corresponding Procedures and Instructions are organized in the following table.

Table 7: Key Performance Indicator

NO	Performance Indicator	Target	Monitoring and Measurement
WM-KPI-01	Wastes	WAD Cyanide ≤ 10 ppm	per Hour
WM-KPI-02	Non-compliance With the Standards	Zero non-compliance	Internal investigation monitoring control report and site inspections
WM-KPI-03	Complaints	Zero complaints	Complaints and Feedback Mechanism
WM-KPI-04	ARD	Zero Acid Rock Drainage	Seasonal Barrel Tests

8 TRAINING

All employees of TÜMAD as well as contractors shall have a training on special site entry induction and environmental awareness training and they shall be subject to comprehensive medical screening.

A training on the usage of the chemicals and management of wastes shall be provided to the workers and the trained persons shall use the chemicals as per the standards. The training subjects at least includes:

- requirements of this management plan
- precautions and risks when handling wastes
- proper usage of PPEs
- waste minimization, categorization, segregation, storage
- waste recycling and appropriate disposal

All personnel who start to work at the mine site are provided with orientation trainings periodically under supervision of Department Administrators.

Plant operators and key personnel, who are engaged site cleaning, construction or material usage activities, shall be provided with Job-specific specialist training.

9 INSPECTION

Daily Inspections: operation supervisors and inspectors perform these inspections in accordance with the activities outside the fence boundary by including a wide range of operation issues, including community health and safety.

Any incident or non-compliance determined during these inspections shall be recorded and reported according to the documents of the Integrated Management System of TÜMAD.

Legal responsibilities and Management System Responsibilities are periodically inspected by government agencies and inspectors within the framework of Waste Management Plan in the line of Inspection Procedure (TMD_KAL_PRD.001).

Waste contractors will regularly monitored and audited in order to be ensure their compliance of this management plan.

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10 REPORTING

Inspections, incidents and non-compliances shall be documented and administered in accordance with the Instructions and Procedures of TÜMAD. Record Management Procedures (TMD_EYS_PRD.004).

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APPENDIX 1 - WASTE INVENTORY LIST

					WASTE FORMATION AND STOCK LEVEL				DISPOSAL					REGAIN					WASTE TRANSPORTATION
Province	District	Waste Code (Waste code will be selected from drop down menu)	Explanation	Hazardous waste type (A / M) (This section will be left blank if it is not Hazardous Waste)	2017 Yearly Waste Quantity (Ton)	In-Plant Stock Status (Status at current reporting date - Ton)	Current Stored Top Open - Uncovered Area (Ton)	Stock Waiting Time (Days)	Licensed company name & license number where waste is disposed of in 2017	2017 Disposal Quantity (Ton)	Total cost of disposal in 2017 (TL)	Amount Disposed in the Plant in 2017 (Ton)	TOTAL 2017 Amount Disposed (ton)	Licensed company name & license number where waste is recycled in 2017	Amount sent back to recycling in 2017 (Ton)	Recycling cost for year 2017 (TL)	Amount recycled in the facility in 2017 (Ton)	TOTAL 2017 recycled amount (ton)	2017Waste transport costs (TL)
Çanakkale	Lapseki	08 03 17*	Waste print cartridges containing hazardous materials	M	0,002	0,002		365					0					0	
Çanakkale	Lapseki	13 02 08*	Other engine, gearbox and lubrication oils	to	0,06	0,06		365					0					0	
Çanakkale	Lapseki	15 01 10*	Containers containing hazardous substances or contaminated with dangerous substances	M	0,2	0,2		365					0					0	
Çanakkale	Lapseki	15 02 02*	Dangerous materials contaminated absorbents, filter materials (oil filters if not otherwise specified), cleaning cloths, protective clothing	M	0,1	0,1		365					0					0	
Çanakkale	Lapseki	16 01 07*	Oil filters	to	0,005	0,005		365					0					0	
Çanakkale	Lapseki	18 02 02*	To prevent infection, collect wastes and dispose of wastes subject to special treatment	to	0,05	0,05		365	Çanakkale Medical waste Disposal Centre	0,05	900	0	0,05					0	0
Çanakkale	Lapseki	16 06 01*	Leaded pillars	to	0,01	0,01		365					0					0	
Çanakkale	Lapseki		N/A	N/A	0	0							0					0	
Çanakkale	Lapseki		N/A	N/A	0	0							0					0	