

# TÜMAD

MADENCİLİK SANAYİ VE TİCARET A.Ş.



## CYANIDE MANAGEMENT PLAN for LAPSEKİ & İVRİNDİ PROJECTS

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## CYANIDE MANAGEMENT PLAN for LAPSEKİ and 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.
EBRD	: European Bank for Reconstruction and Development
EIA	: Environmental Impact Assessment
ESMS	: Environmental and Social Management System
EU	: European Union
HR	: Human Resources
IMS	: Integrated Management System
KPI	: Key Performance Indicator
MoEU	: Ministry of Environment and Urbanization
OHS	: Occupational Health and Safety
PR(s)	: Performance Requirement(s)

## 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 Küçükıllica 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 Cyanide Management Plan that is prepared for TÜMAD Operations. The Integrated Management System (IMS) document registration number for Cyanide Management Plan is TMD\_CEV\_PLN.008. This management plans sets the requirements for the operation phase of the Lapseki Project and for construction and operation phases of the İvrindi Project and is an integral part of the Environmental and Social Management System (ESMS) implemented by TÜMAD for these 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

This Cyanide Management Plan describes the measures TÜMAD will implement in order to minimize the risk to employees, adjacent communities, and the environment from the use of cyanide compounds in the precious metal recovery process for the mining Project. This plan applies only to TÜMAD Mining Project's ore processing activities; it addresses the necessary elements of design, construction and operation of facilities for unloading and storage of cyanide, its use in the gold recovery process, and its ultimate detoxification and safe disposal. Programs for employee and contractor safety and training and procedures for preventing (and responding to) any potential accidental cyanide exposures and releases are identified. This plan emphasises TÜMAD commitments to full public disclosure of cyanide related information. It also requires that the manufacturer and transporter of the cyanide used at the operation is also a demonstration of protective manner. The Cyanide Management Plan conforms to the International Cyanide Management Code (ICMC) for the Manufacture, Transport, and Use of Cyanide in the Production of Gold Cyanide Management Institute, November 2005. Implementation of this Code demonstrates that TÜMAD will employ internationally recognized best management practices (BMPs) for the management of cyanide, and TÜMAD reserves the option of becoming a code signatory and independently certifying the compliance of its cyanide operations with the Code's principles and standards of practice.

The cyanide will be purchased from external supplier called CY Plus. CY Plus is a licensed company according to the ICMC and for this reason TÜMAD has been selected them as a cyanide supplier.

TÜMAD will seek ICMC certification for its operations and the whole life-cycle of the Cyanide such as procurement, transport, storage, use and disposal.

- All of the required processes to determine, minimize, assess and control all kinds of risks, which may be posed when the cyanide is being delivered and transported to mine site, shall be included by considering the possibility that the stakeholders, community and environment may be exposed to risk.
- TÜMAD shall be responsible for the preparation of all cyanide management plans and procedures for the storage and preparation of cyanide for use at the Mine Site. The contractor shall be responsible for the transportation of the Cyanide, however TÜMAD will prepared instructions/guidelines for the usage of the contractor with respect to the transportation of cyanide outside the Project area. TÜMAD will be ensured the

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external transportation contractor has valid licence to transport cyanide and TÜMAD will monitor its performance based on the requirements listed in the Contractor Management Plan (TMD\_ISG\_PLN.003).

- TÜMAD shall be responsible for the preparation of all site management and monitoring procedures, emergency planning and stakeholder engagement.

### 3 SCOPE

This plan includes the creation of design parameters of the plant, construction, transportation, storage and loading of cyanide, gold extraction from the ore, refining and safe disposal activities within the scope of separation of gold from the ore.

This plan includes all TÜMAD activities, including contractor activities, with regard to transportation, storage, usage and management of cyanide.

This document generally specifies TÜMAD's commitment and approach in terms of defining, assessing, preventing and managing by minimizing the cyanide risks that may be encountered as a direct or indirect result of TÜMAD project.

Key risks considered within the framework of this plan include followings:

- Leakage or accidents that may occur during transportation of cyanide to the mine site (Construction and Operation);
- Leakage or accidents that may occur during storage of cyanide at the mine site (Operation);
- Cyanide solution leakage that may occur during preparation and usage of cyanide as tank and heap leach solution at the mine site (Operation);
- Possibility that hydrogen cyanide gas formation during usage of leach solution, which includes cyanide, at the mine site and that the workers may be exposed to this gas (Operation);
- Contamination of soil, surface water or groundwater resources with leach solution at the mine site (Construction, Operation and Closure);
- Reputational risks related to leakage or accident that may occur during transportations of cyanide and/or related to supplier.

#### 3.1 Overlap with Other Management Plans

This Management Plan is part of the overall suite of Management Plans developed for the TÜMAD's Lapseki and İvrindi Gold and Silver Mine Projects and Overlaps with other Management Plans.

This Management Plan has a series of overlapping with and cross-reference to other Management Plans that possess recommendations for Occupational Health and Safety and Job Safety, including following items presented in the figure.

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**Figure 1: Structural Relationship of Management Plans in Environment**

As noted in Figure1, this plan is one of a suite of management plans that have been developed to support the Environmental and Social Management System (ESMS) separately described in the current version of the TÜMAD Project Environment and Social Management Monitoring Plan.

Collectively, the Cyanide Management Plan and its companion plans address key operational control needs that have been established for those areas for which the Environmental Impact Assessment (EIA) process indicates that environmental or social impacts are either known to exist, or may occur in various phases of the mine life cycle. The implementation of this plan is also supported by a number of detailed, lower-tier standard operating procedures. These procedures are compiled in the TÜMAD Standard Operating Procedures Manual, the development, review, approval, distribution, and update of which is controlled by the TÜMAD Project Environment. Social Management Monitoring Plan. Other specific document distribution, change control, personnel training, and records management needs associated with the implementation of this management plan are likewise addressed through the processes and procedures defined in the TÜMAD Project Environmental and Social Management Plan.

- Emergency Action Plans (TMD\_LAP\_ISG\_PLN.002 & TMD\_IVR\_ISG\_PLN.002) and Cyanide Transportation Procedure (TMD\_ISG\_PRD.009) with regard to the accidents and/or incidents that take place during transportation of cyanide at the mine site as well as intervention to accidents and incidents that occur outside the mine site;
- Air Quality Management Plan (TMD\_CEV\_PLN.006) regarding management of exposure of stakeholders to dust that may be generated due to activities of TÜMAD;
- Water Resources Management Plan (TMD\_CEV\_PLN.003) with regard to preserving drinking water resources of the region;
- After operation activities of Lapseki and İvrindi mines are completed, Mine Closure Plan (TMD\_CEV\_PLN.001) with regard to protection of local community from remaining physical hazards;
- Stakeholder Engagement Plans (TMD\_LAP\_EYS\_PLN.001 & TMD\_IVR\_EYS\_PLN.001) for communication especially with local communities and stakeholders;
- Spill Clean-Up Plan (TMD\_CEV\_PLN.009);
- Framework Biodiversity Action Plans, particularly in relation to impacts of noise and vibration on biodiversity components;
- Contactor Management Plan (TMD\_ISG\_PLN.003) for defining contractor requirements and monitor the performance of the contactor.

#### 4 PROJECT STANDARDS

Current Standards ("Project Standards") shall be complied with in all Project activities. Project Standards include the followings:

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- Applicable Turkish Standards;
- Turkish Environmental Impact Assessment (EIA) requirements;
- Other commitments given to Turkish government institutions and requirements of such institutions;
- Applicable international standards and guidelines;
- Applicable TÜMAD IMS standards, policies, plans and procedures.

#### 4.1 Applicable Turkish National Standards

- Notification on Major Accident Prevention Policy (Official Gazette No. 29435 dated August 4, 2015)
- Mine Waste Regulation (Official Gazette No. 29417 dated July 15, 2015)
- Regulation on Major Industrial Accident Prevention and Mitigation of Impacts (Official Gazette No. 28867 dated December 30, 2013)
- Regulation on Preventive Occupational Health and Safety Precautions When Working with Chemical Substances (Official Gazette No. 5467 dated December 26, 2013)
- Regulation on Control of Air Pollution Caused by Industrial Activities (Official Gazette No. 27277 dated July 3, 2009)
- Regulation on Transportation of Hazardous Material On Highways (Official Gazette No. 15742 dated October 22, 1976)

#### 4.2 Turkish EIA requirement

Cyanide usage and commitment has been given in final EIA report in Section 2 for Lapseki Project.

Cyanide usage and commitment has been given in final EIA report in Section 6 and Annex 7 for İvrindi Project.

#### 4.3 Applicable International Standards and Guidelines

The standards, which TÜMAD shall implement, are those specified by European Bank for Reconstruction and Development (EBRD):

EBRD Performance Requirement 1 *Assessment and Management of Environmental and Social Impacts and Issues* specifies the requirements for integrated assessment to identify the environmental and social impacts and issues associated with projects and the client's management of environmental and social performance throughout the life of the project.

EBRD Performance Requirement 3 *Resource Efficiency and Pollution Prevention and Control* referred the resource efficiency and pollution prevention and control which are essential elements of environmental and social sustainability and projects must meet good international practice (GIP) in this regard. TÜMAD shall also carry out its activities in a manner to fulfil the corresponding requirements of this PR.

EBRD Performance Requirement 4 *Health and Safety* specifies the requirements for hazardous substance safety and emergency preparation and intervention subjects. TÜMAD shall also carry out its activities in a manner to fulfil the corresponding requirements of EU environmental legislation that especially include the following items:

- Directive 2012/18/EU ("Seveso Directive") on the control of major accident hazards involving dangerous substances;

**Table 1: Seveso II Requirement and TÜMAD Management Action**

Seveso II Requirement	TÜMAD Management Action
Provide the competent authority with information on its proposed activities, the quantity and physical form of the cyanide to be used, and the elements liable to cause or aggravate the consequences of a major accident	TÜMAD will include the requested information in a Safety Report to be submitted to appropriate local and regional authorities.

Seveso II Requirement	TÜMAD Management Action
Prepare and implement a policy for the prevention of major accidents and make the policy available to the competent authority	TÜMAD major accident prevention policy is defined in Spill Clean Up and Emergency Action Plan; the plan will be appended to (and submitted with)
Prepare and submit to the competent authority a Safety Report demonstrating that the facility will be designed, constructed, operated and maintained to prevent and respond to major accidents	The project-specific Safety Report will contain or reference the process plant and Tailings Management Facility design information developed in the project EIA ("Technological Processes").
Review and revise its policies and procedures for accident prevention when the facility or its use or storage of cyanide changes significantly.	Such review and revision requirements are included in the document updating requirements presented Cyanide Management Plan and in the Spill Clean Up & Emergency Action Plan
Prepare an internal Emergency Plan and provide the competent authority with the information necessary for preparation of an external Emergency Plan	TÜMAD has prepared the Spill Clean Up & Emergency Action Plan and will 1) provide a copy to appropriate local and regional authorities, TÜMAD the update or development of external (community) emergency plans.
In the event of a major accident, provide the competent authority with information regarding the circumstances of the accident, the dangerous substances involved, the available information to assess the effects of the accident on man and the environment, the emergency measures taken, the measures to be taken to alleviate medium- and long-term effects of the accident and to prevent recurrence	The Spill Clean Up & Emergency Action Plan fully addresses the documentation and reporting of major accidents; mandatory corrective/preventive action investigation processes are involved for all significant spills, releases, or emergency situations for which TÜMAD is responsible, in accordance with the Spill Clean Up & Emergency Action Plan and in the TUMAD Lapseki and Ivrendi ESMS Plan.

- Directive 2006/21/EC ("Mine Waste Directive") on management of mine wastes.

EBRD Performance Requirement 6 *Biodiversity Conservation and Sustainable Management of Living Natural Resources* specifies that recognises that the conservation of biodiversity and sustainable management of living natural resources<sup>2</sup> are fundamental to environmental and social sustainability. TÜMAD shall also carry out its activities in a manner to fulfil the corresponding requirements of this PR.

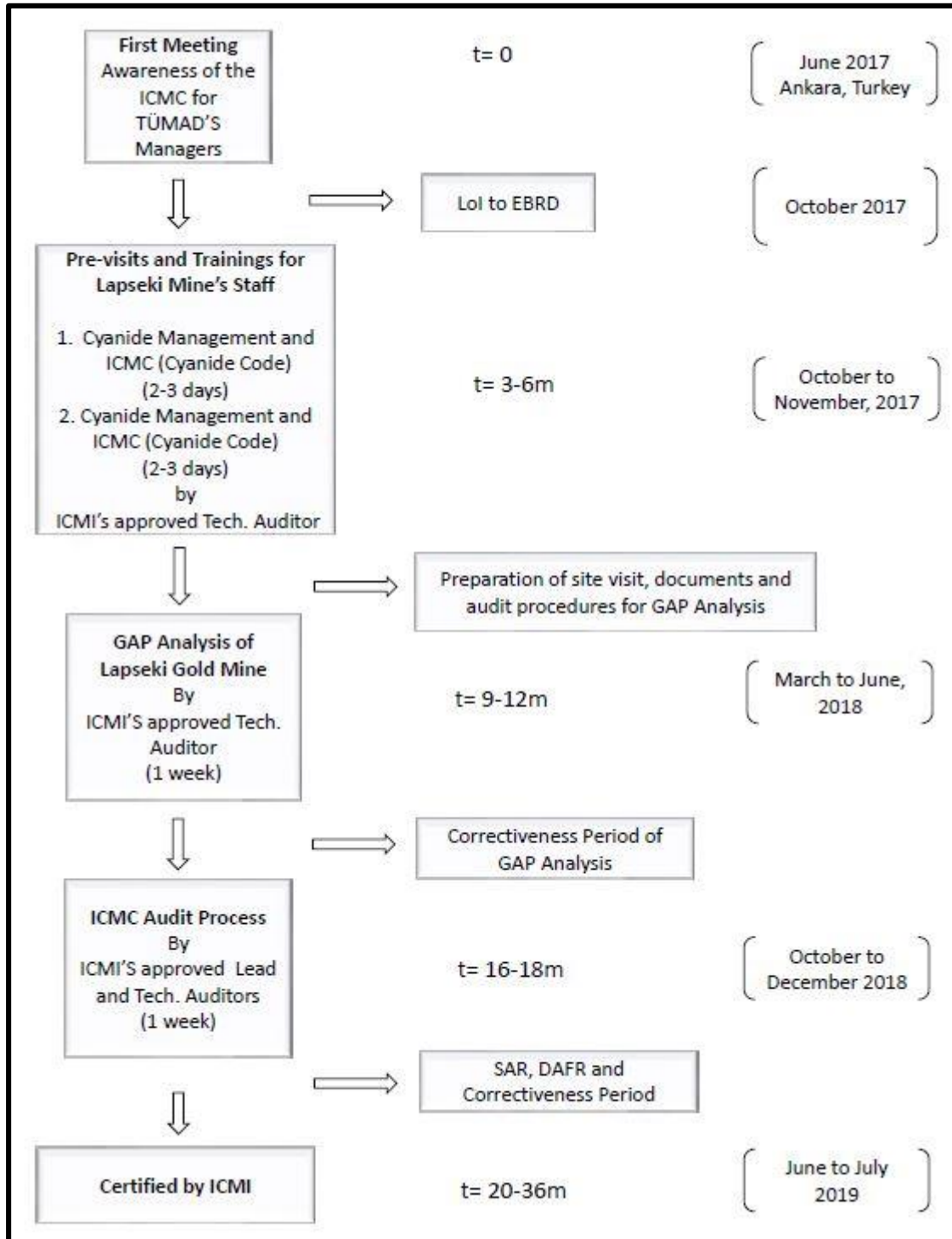
EBRD Performance Requirement 10 *Information Disclosure and Stakeholder Engagement* specifies that the importance of an open and transparent engagement between the client, its workers, local communities directly affected by the project and, where appropriate, other stakeholders as an essential element of good international practice (GIP) and corporate citizenship. TÜMAD shall also carry out its activities in a manner to fulfil the corresponding requirements of this PR.

#### 4.3.1 International Cyanide Management Code (ICMC)

TÜMAD will seek ICMC certification for its operations and the whole life-cycle of the Cyanide such as procurement, transport, storage, use and disposal. The Principles and standards of practice in Cyanide Management and the 3- Year Roadmap for Lapseki Gold Mine's ICMC are presented in the Table 2 and Figure 2.

**Table 2: Principles and Standards of Practice in Cyanide Management**

Production	Transportation	Handling and storage	Operations	Decommissioning
<ul style="list-style-type: none"> <li>Encourage responsible cyanide manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.</li> </ul>	<ul style="list-style-type: none"> <li>Protect communities and the environment during cyanide transport.</li> </ul>	<ul style="list-style-type: none"> <li>Protect workers and the environment during cyanide handling and storage.</li> </ul>	<ul style="list-style-type: none"> <li>Manage cyanide process solutions and waste streams to protect human health and the environment.</li> </ul>	<ul style="list-style-type: none"> <li>Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.</li> </ul>
<p>Standard of practice;</p> <ul style="list-style-type: none"> <li>Purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide and to prevent releases of cyanide to the environment.</li> </ul>	<p>Standard of practice;</p> <ul style="list-style-type: none"> <li>Establish clear lines of responsibility for safety, security, release prevention, training, and emergency response in written agreements with producers, distributors, and transporters.</li> <li>Require that cyanide transporters implement appropriate emergency response plans and capabilities, and employ adequate measures for cyanide management.</li> </ul>	<p>Standard of practice</p> <ul style="list-style-type: none"> <li>Design and construct unloading, storage, and mixing facilities consistent with sound, accepted engineering practices, and quality control and quality assurance procedures. Spill prevention and spill containment measures.</li> <li>Operate unloading, storage, and mixing facilities using inspections, preventive maintenance, and contingency plans to prevent or contain releases and control and respond to worker exposures.</li> </ul>	<p>Standard of practice;</p> <ul style="list-style-type: none"> <li>Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventive maintenance procedures.</li> <li>Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.</li> <li>Implement a comprehensive water management program to protect against unintentional releases.</li> <li>Implement measures to protect birds, other wildlife, and livestock from adverse effects of cyanide process solutions.</li> <li>Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.</li> <li>Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water.</li> <li>Provide spill prevention or containment measures for process tanks and pipelines.</li> <li>Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.</li> <li>Implement monitoring programs to evaluate the effects of cyanide use on wildlife, and surface and ground water quality</li> </ul>	<p>Standard of practice;</p> <ul style="list-style-type: none"> <li>Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife, and livestock.</li> <li>Establish an assurance mechanism capable of fully funding cyanide-related decommissioning activities.</li> </ul>











**Figure 2: 3 - Year Roadmap for Lapseki Gold Mine's ICMC**



Basic terms of ICMC are briefly specified in Principles and Application Standards below.

**Table 3: Basic Terms of ICMC**

Principle	Application Standard	
<b>1. PRODUCTION - To encourage responsible cyanide production by purchasing from producers, who conduct their activities in a safe manner with an environmental protection approach.</b>	<p>To purchase cyanide from producers, who benefit from appropriate applications and procedures, in order to limit cyanide exposure of workers and to prevent cyanide being released to the environment.</p>	
<b>2. TRANSPORTING - To protect public and environment during cyanide transportation.</b>  <b>Cyanide Transportation Procedure TMD_İSG_PRD.009</b>  <b>Cyanide Storage Procedure TMD_İSG_PRD.010</b> <ol style="list-style-type: none"> <li>Truck Transportation</li> <li>Shipping and Ports</li> <li>Rail Transport</li> </ol> <ul style="list-style-type: none"> <li>Chain of Custody</li> <li>Proper Container System</li> <li>Equipment Maintenance</li> <li>Driver Certification</li> <li>Documentation</li> <li>SDSs</li> <li>Emergency Response</li> <li>Drug Testing</li> <li>Security</li> <li>GPS tracking</li> <li>Communications</li> <li>Fatigue Management</li> </ul>	<p>To clearly specify responsibility principles with regard to safety, security, release prevention, training and emergency intervention when signing written agreements with producers, distributors and transporters.</p>  <p>To oblige cyanide transporters to implement appropriate emergency intervention plans and opportunities and to take sufficient precautions for cyanide management.</p>	  
<b>3. HANDLING AND STORAGE - To protect workers and environment during cyanide handling and storage</b>  <b>Cyanide Preparation and Storage Procedure TMD_İSG_PRD.011</b>	<p>To design and build consistent discharging, storage and mixing facilities in accordance with the current and accepted engineering practices as well as quality control and quality assurance procedures and by taking leakage prevention and limiting precautions into consideration.</p>  <p>To operate discharging, storage and mixing facilities by taking the advantage of investigations, preventive maintenance and unexpected circumstance plans in order to prevent or limit releasing and intervene worker exposures.</p>	 

		
<p><b>4. ACTIVITIES - To administer cyanide processing solutions, refining slurries, solid wastes and waste piles in a manner to protect human health and environment. Corrective Activity Procedure TMD_EYS_PRD.002</b></p> <p><b>Emergency Action Plan TMD_LAP_İSG_PLN.001</b></p> <p><b>TMD_IVR_İSG_PLN.001</b></p>	<p>To implement management and operation systems, including unexpected circumstance plans and investigations as well as maintenance procedures that are designed to protect human health and environment.</p> <p>To limit cyanide concentrations in the waste residuals by using management and operation systems in order to minimize cyanide usage in Heap Leach Processes.</p> <p>To reduce cyanide concentrations to a level, which will not pose a risk for human health or environment, by using chemical treatment systems in Tank Leach Processes.</p> <p>To implement a comprehensive water management plan in order to provide protection for unintentional releases.</p> <p>To take precautions to protect birds, other wildlife and herds against negative impacts of cyanide process solutions.</p> <p>To take precautions to protect wildlife against direct or indirect discharge of cyanide process solutions to surface water.</p> <p>To take precautions to manage seepage from cyanide facilities in order to preserve usefulness of groundwater.</p> <p>To provide leakage prevention or limiting precautions for process tanks and pipelines.</p> <p>To implement quality control / quality assurance procedures to verify that cyanide facilities have been built in accordance with the accepted engineering standards and conditions.</p> <p>To conduct monitoring programs to assess impacts of cyanide usage on wildlife, surface water and groundwater quality.</p>	



<p><b>5. DECOMMISSIONING - To protect society and environment against cyanide by developing and implementing decommissioning plans for cyanide facilities.</b></p>	<p>To plan and implement procedures for effective decommissioning of cyanide facilities in order to protect human health, wildlife and herds.</p>	
<p><b>6. WORKER SAFETY - To protect worker health and safety from exposure to cyanide.</b></p>	<p>To specify potential cyanide exposure scenarios and to take necessary precautions to eliminate, mitigate and control these risks.</p> <p>To operate and monitor cyanide facilities in order to protect workers' health and safety and to periodically assess effectiveness of health and safety precautions.</p> <p>6.1 To improve and implement emergency case plans and procedures to intervene cyanide exposure of workers.</p>	
<p><b>7. EMERGENCY INTERVENTION - To protect public and environment by improving emergency case intervention strategies and opportunities.</b></p>	<p>To prepare detailed emergency intervention plans with regard to potential cyanide releasing.</p> <p>To engage site personnel and stakeholders in the planning process.</p> <p>To assign suitable personnel for urgent intervention and to provide necessary equipment and sources.</p> <p>To develop procedures for internal and external emergency case notifications and reporting.</p> <p>To include monitoring items and improvement precautions, which explain additional hazards caused by usage of cyanide refining chemicals, in the intervention plans.</p> <p>7.1 To periodically assess the intervention procedures and opportunities and revise the same in due manner.</p>	

<b>8. TRAINING - To train workers and emergency intervention personnel in order to manage cyanide in a safe and environmentally protective manner.</b>	<p>To train workers to ensure that hazards regarding the cyanide usage are understood.</p> <p>To train suitable personnel to ensure that the plant is operated in accordance with the system and procedures that protect human life, society and environment.</p> <p>8.1 To train suitable workers and personnel, who will intervene worker exposure and cyanide release to the environment.</p>	
<b>9. COMMUNICATION - To attend the phases of obtaining public opinion and informing.</b>	<p>To provide stakeholders with the opportunity to express their apprehension.</p> <p>To initiate communications to explain cyanide management procedures and to sensitively discuss the determined subjects.</p> <p>9.1 To provide stakeholders with the information regarding the cyanide activities and environmental issues.</p>	

#### 4.4 Summary of Applicable Project Standards

TÜMAD shall comply with the strictest standards of national and applicable creditor standards, and thus, the strictest standards shall represent the Project Standards.

Summary of the current Project Standards is given below.

**Table 4: Summary of the current Project Standards**

Standard	Scope
Regulatory requirements of Turkish legislation	Management and control of the risks associated with transportation, storage and usage of cyanide
EBRD Performance Requirement 1 <i>Assessment and Management of Environmental and Social Impacts</i>	Management and control of the environmental and social impacts associated with transportation, storage and usage of cyanide
EBRD Performance Requirement 3 <i>Resource Efficiency and Pollution Prevention and Control</i>	Prevention and control of the pollution may caused associated with transportation, storage and usage of cyanide
EBRD Performance Requirements 4: Health and Safety	Risk assessment, mitigation and management with regard to community health, safety and security
EBRD Performance Requirement 6 <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>	Management and control of the risks/impacts associated with transportation, storage and usage of cyanide on the Biodiversity
EBRD Performance Requirement 10 <i>Information Disclosure and Stakeholder Engagement</i>	Open and transparent communication with the local communities related to usage of cyanide
International Cyanide Management Code	Cyanide transportation, storage and usage. Emergency intervention planning

Standard	Scope
Seveso and Mining Waste Directives	Provide the competent authority with information on its proposed activities, the quantity and physical form of the cyanide to be used, and the elements liable to cause or aggravate the consequences of a major accident.

## 5 ROLES AND RESPONSIBILITIES

TÜMAD shall be responsible for the preparation of all site management and monitoring procedures, emergency planning and stakeholder engagement.

**Table 5: Roles and Responsibilities**

Roles	Responsibilities
<b>General Manager</b>	<ul style="list-style-type: none"> <li>is responsible for Approval of this plan</li> <li>is responsible to provide Resources for certification to ICMC</li> <li>is responsible for allocating resources to implement this plan and for performance of this plan.</li> </ul>
<b>Operations Manager</b>	<ul style="list-style-type: none"> <li>To ensure that the relevant activities are carried out in accordance with this Management Plan and the corresponding procedures.</li> <li>To provide department personnel with a complete training on the current cyanide safety and management applications.</li> <li>To ensure that accident incident loss reporting activities are performed.</li> </ul>
<b>TÜMAD IMS &amp; Sustainability Manager</b>	<ul style="list-style-type: none"> <li>To supervise and conduct regular workplace and internal investigations in order to ensure that the relevant activities are performed in accordance with this Management Plan and the corresponding procedures.</li> <li>To ensure the compliance of the project with the Project Standards as well as other requirements set forth in this plan.</li> <li>For the performance of in-site activities and outside transportation activities in a safe manner during the operation phase;</li> <li>General responsibility for the scope and application of the Plan.</li> <li>To improve, monitor and revise this Plan</li> </ul>
<b>TÜMAD employees and Contractors</b>	<ul style="list-style-type: none"> <li>To report all kinds of activities causing unnecessary emission or potential risks that threaten local people and stakeholders.</li> </ul>
<b>Head of OHS Department</b>	<ul style="list-style-type: none"> <li>TÜMAD for public and worker health and worker trainings</li> <li>To report all hazards, non-compliances and incidents.</li> </ul>
<b>Investment and Construction Manager</b>	<ul style="list-style-type: none"> <li>for the performance of in-site activities in a safe manner during the construction phase.</li> </ul>
<b>Head of Environmental Department</b>	<ul style="list-style-type: none"> <li>Monitoring and Measurement</li> </ul>

<b>Roles</b>	<b>Responsibilities</b>
<b>Head of Community Relation Department</b>	<ul style="list-style-type: none"><li>for the communication with local people and stakeholders in terms of public health, safety and security;</li></ul>
<b>Financial and Administrative Manager</b> <b>Assistant Purchase Manager</b>	<ul style="list-style-type: none"><li>selection and inspection of local transporting sub-employers and cyanide supplier, which possesses the suitable qualifications as per ICMC code</li></ul>

## **6 MITIGATION MEASURES AND MANAGEMENT CONTROLS**

The table below indicates primary management controls and other commitments, which TŪMAD shall implement.

**Table 6: Primary Management Controls and Other Commitments**

Applicability / Activity	Definition of Control	Responsible Parties	Verification Tools
<b>Cyanide Purchase</b>	<ul style="list-style-type: none"> <li>TÜMAD shall purchase cyanide from an ICMC signatory producer (ORICA, HEBEI CHENGXIN, CY PLUS etc.)</li> </ul>	TÜMAD Assistant Purchase Manager  Finance & Administrative Affairs Manager	Agreement concluded with the ICMC signatory producer
<b>Cyanide Transportation</b>	<ul style="list-style-type: none"> <li>TÜMAD has developed a transportation procedure, which specifies clear responsibility principles for safety, security, release prevention, training and emergency intervention subjects during the entire supply chain from production by the cyanide supplier, which it has commissioned, to transportation from port and delivery at the mine site TMD_ISG_PRD.009</li> <li>TÜMAD stipulates that the cyanide supplier that it has commissioned shall develop appropriate emergency intervention plans and opportunities and take sufficient precautions for cyanide management during supply chain.               <ul style="list-style-type: none"> <li>Responsibilities during Transport:</li> <li>As part of its contractual arrangements, TÜMAD will prepare written agreements with the cyanide manufacturer and transporter, which will outline which party will be responsible for the following health, safety and environmental issues during each phase of cyanide transportation: packaging; labelling; storage prior to shipment; evaluation and selection of routes to reduce risks establishment of protocols for driver/TÜMAD communications; storage and security at ports of entry; interim loading, storage and unloading during shipment; transport to the TÜMAD process plant; unloading at the process plant; proper maintenance and operation of transportation vehicles throughout each delivery activity; accident prevention, emergency response, and safety training for transporters and handlers throughout the transportation process; and co-ordination of security and emergency response actions throughout the transportation process. All transport for dangerous goods inside the EU will be performed by transport companies audited by an independent party.</li> <li>These agreements will also specify that any designated responsibilities of TÜMAD, the cyanide manufacturer, and the cyanide transporter extend to any subcontractors used by these parties for any activities related to cyanide transportation, and that all affected parties are required to inform subcontractors of their designated responsibilities. At the discretion of the Operation Manager &amp; Department Head of OHS Department, copies of training records and other related information may be made available in response to external information requests, via the communications.</li> </ul> </li> </ul>	Cyanide supplier  Head of OHS Department	Including emergency intervention plans during supply chain  cyanide transportation procedure

Applicability / Activity	Definition of Control	Responsible Parties	Verification Tools
<b>Usage and Storage</b>	<p>TÜMAD shall design and build consistent discharging, storage and mixing facilities in accordance with the current and accepted engineering practices as well as quality control and quality assurance procedures and by taking leakage prevention and limiting precautions into consideration.</p> <p>TÜMAD shall develop standard operation procedures to operate discharging, storage and mixing facilities by taking the advantage of investigations, preventive maintenance and unexpected circumstance plans in order to prevent or limit releasing and intervene worker exposures.</p> <p><b>Cyanide Preparation and Storage Procedure (TMD_İSG_PRD.012)</b></p> <p><b>Cyanide Storage Procedure (TMD_İSG_PRD.010)</b></p> <p><b>Cyanide Transportation Procedure (TMD_İSG_PRD.009)</b></p> <p><b>Cyanide Spillage Cleaning Procedure TMD_İSG_PRD.011</b></p>	<p>Project and Business Development Manager</p> <p>Promer/BBA Canada</p> <p>KCA/Dama Mühendislik</p> <p>TÜMAD Investment and Construction Manager</p> <p>TÜMAD Operations Managers</p>	<p>Cy Plus SLS system to be implemented and dissolution facility to be established within the scope of Balıkesir İvrindi project.</p> <p>The current cyanide management standard operation procedures</p>
<b>Operational Management</b>	<ul style="list-style-type: none"> <li>TÜMAD shall develop and implement management and operation systems, including unexpected circumstance plans and investigations as well as maintenance procedures that are designed to protect human health and environment.</li> <li>TÜMAD shall develop and implement management and operation systems to use cyanide as effective as possible in order to reduce cyanide usage.</li> <li>TÜMAD shall develop and apply a comprehensive process water management program in order to minimize the possibility and amount of unintentional releases.</li> <li>TÜMAD shall take precautions to protect birds, other wildlife and herds against negative impacts of cyanide process solutions.</li> <li>TÜMAD shall take precautions to protect wildlife against direct or indirect discharge of cyanide process solutions to surface water.</li> <li>TÜMAD shall implement measures to manage seepage from cyanide facilities in order to protect groundwater quality.</li> <li>TÜMAD shall take leakage prevention and/or secondary barrier precautions for process tanks and pipelines which contain cyanide.</li> <li>TÜMAD shall implement quality control / quality assurance procedures to verify that cyanide facilities have been built in accordance with the accepted engineering standards and conditions.</li> </ul>	<p>TÜMAD Operations Manager</p> <p>TÜMAD Plant Superintendents</p> <p>TÜMAD Plant Engineers/ Foreman's/ Supervisors</p>	<p>The current cyanide management standard operation procedures</p>

Applicability / Activity	Definition of Control	Responsible Parties	Verification Tools
	<ul style="list-style-type: none"> <li>TÜMAD shall conduct monitoring programs to assess impacts of cyanide usage on wildlife, surface water and groundwater quality.</li> </ul>		
<b>Decommissioning</b>	<ul style="list-style-type: none"> <li>TÜMAD shall prepare a decommissioning plan, which considers the requirement of effective decommissioning of the cyanide facilities, in order to protect human health, wildlife and herds.</li> <li>TÜMAD shall develop a Closure plan that includes a guaranty mechanism, which can completely finance decommissioning activities of the cyanide.</li> </ul>	TÜMAD OHS, Environmental District Directorate, Operations Directorate and Plant Principal Engineering	Closure plan includes decommissioning of cyanide facilities
<b>Worker Safety</b>	<ul style="list-style-type: none"> <li>TÜMAD shall specify potential cyanide exposure scenarios and take necessary precautions to eliminate, mitigate and control these risks.</li> <li>TÜMAD shall operate and monitor cyanide facilities in order to protect workers' health and safety and periodically assess effectiveness of health and safety precautions.</li> <li>TÜMAD shall improve and implement emergency case plans and procedures to intervene cyanide exposure of workers.</li> </ul>	TÜMAD Head of OHS & Environment Department	The current workers' health and safety system and standard operation procedures



Applicability / Activity	Definition of Control	Responsible Parties	Verification Tools
<b>Emergency Case Intervention</b>	<ul style="list-style-type: none"> <li>TÜMAD shall prepare a detailed emergency case intervention plans for potential cyanide release scenarios</li> <li>TÜMAD shall engage site personnel and stakeholders in the planning process.</li> <li>TÜMAD shall assign suitable personnel for urgent intervention and provide necessary equipment and sources.</li> <li>TÜMAD shall develop procedures for internal and external emergency case notifications and reporting.</li> <li>TÜMAD shall include monitoring items and improvement precautions, which explain additional hazards caused by usage of cyanide refining chemicals, in the intervention plans.</li> <li>TÜMAD shall periodically assess the intervention procedures and opportunities and revise the same in due manner.</li> </ul>	<p>TÜMAD Head of OHS &amp; Environment Department</p> <p>Plant Superintendents</p> <p>TÜMAD Plant Engineers/ Foreman's/ Supervisors</p>	The existing Cyanide Emergency Action Plan as part of the detailed Cyanide Management Plan
<b>Worker Training</b>	<ul style="list-style-type: none"> <li>TÜMAD shall train workers to ensure that hazards regarding the cyanide usage are understood.</li> <li>TÜMAD shall train suitable personnel to ensure that the plant is operated in accordance with the system and procedures that protect human life, society and environment.</li> <li>TÜMAD shall train suitable workers and personnel, who will intervene worker exposure and cyanide release to the environment.</li> </ul>	<p>TÜMAD Head of OHS &amp; Environment Department</p> <p>Plant Superintendents</p> <p>TÜMAD Plant Engineers/ Foreman's/ Supervisors</p>	OHS training plan
<b>Stakeholder Engagement</b>	<ul style="list-style-type: none"> <li>TÜMAD shall provide stakeholders with the opportunity to express their apprehension</li> <li>TÜMAD shall initiate communications to explain cyanide management procedures and sensitively discuss the determined subjects.</li> <li>TÜMAD shall provide stakeholders with the information regarding the cyanide activities and environmental issues.</li> </ul>	<p>IMS&amp; Sustainability Manager</p> <p>Head of Community Relations Department</p>	The existing Stakeholder Engagement Plan as part of the detailed Cyanide Management Plan


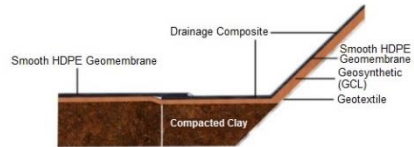
### 6.1 Wildlife Protection - Production Facilities




Due to the chemical detoxification and Dry Stack Tailing Facility in Lapseki, Floating Bird Balls on Process Solution Pond and Temporary Netting On Heap Leach Pad Solution for the İvrindi and for both project access to cyanide solutions is strictly limited and project zero discharge principle will be supply. In order to further minimize any exposure possibility, TÜMAD will expedite the neutralization and clean-up of any accidental releases of cyanide solution, as noted in the Spill Clean Up Plan (TMD\_CEV\_PLN.009) and Emergency Action Plans (TMD\_LAP\_ISG\_PLN.002 & TMD\_IVR\_ISG\_PLN.002). TÜMAD will also prepared, SOP's for all process for cyanide usage, and will train employees in the process area to observe their workplace for incidents of wildlife mortality and to immediately report any such observations to their supervisors. Inspection, documentation and management of wildlife mortality due to potential exposure to poisons is addressed in standard operating procedures, This procedures ensures that such inspections are part of the process plant operator's daily routine; it requires a daily notation of such observations, includes specific corrective and preventive action procedures to be followed in the event that a mortality occurs.

According to the ICMİ Principle 4;

- Operations: Manage cyanide process solutions and waste streams to protect human health and the environment.
- Standard of Practice 4.3: Implement a comprehensive water management program to protect against unintentional releases.
- Standard of Practice 4.4: Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.( Floating Bird Balls on Process Solution Pond and Temporary Netting On Heap Leach Pad Solution
- Standard of Practice 4.5: Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.

**Table 7: Wildlife Protection - Production Facilities**

Numerical National Cyanide Standards	TÜMAD	MITIGATION
<p><b>Less than 50 mg/L WAD cyanide for protection of birds and other wildlife</b></p> 	<p>Less than(&lt;10ppm) to the Dry Stack Tailing Facility</p> <p>Zero Discharge to receptive environment</p>	<p>INCO S<sub>02</sub>Air &amp; Chemical Detoxification</p> <p>Filter Press</p> <p>Impermeable Dry Stack Tailing Facility</p> 

Numerical National Cyanide Standards	TÜMAD	MITIGATION
<p>Less than 0,022 mg/L free cyanide in stream below a discharge</p> 	<p>Zero Discharge to receptive environment</p>	<p>Floating Bird Balls on Process Solution Pond</p>  <p>Temporary Netting On Heap Leach Pad Solution</p> 

This plan shall be reviewed in six months periods at most during the construction and commissioning phases. It shall be reviewed annually and necessary revisions shall be made in order to reflect changed conditions and TÜMAD operation requirements. IMS and Sustainability Manager, who is in charge of the plan, and TÜMAD General Manager shall be responsible for the revision of this Management Plan.

## 7 MONITORING

### 7.1 Overview of Monitoring Requirements

The circumstances, which, according to the monitoring studies, are determined as non-compliances of the Project Standards, shall be investigated, and appropriate corrective actions shall be specified for these circumstances. Corrective Activity Procedure (TMD\_EYS\_PRD.002) Monitoring Requirements as per Turkish EIA

Monitoring requirements, which have been determined for cyanide within the framework of Turkish EIA, are included in the following management plans:

- Air Quality Management Plan (TMD\_CEV\_PLN.003)
- Water Resources Management Plan (TMD\_CEV\_PLN.006)

### 7.2 Key Monitoring Activities

Key monitoring activities shall focus on ensuring effective implementation of detailed Cyanide Management Plan requirements.

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Monitoring measures shall be defined in the detailed Cyanide Management Plan but they shall include the following Turkish EIA monitoring measures.

**Table 8: Key Monitoring Measures**

No	Title / Subjects	Methods	Frequency	Place
<b>CMP-01</b>	Worker Safety	<ul style="list-style-type: none"> <li>Continuous monitoring of Hydrogen Cyanide atmospheric concentration. Threshold limit value is 10 ppm (11mg/m<sup>3</sup> Drager Multi Warn II Gas Measurement Device Instruction Manual (TMD_İSG_TLM.008). Personal Gas Measurement Device Instruction Manual (TMD_İSG_TLM.007)Hydrogen Cyanide Gas Measurement Record Form (TMD_İSG_FRM.016), HCN Gas Measurement Device Calibration Form (TMD_İSG_FRM.017)</li> </ul>	Continuous	All working environments where cyanide is stored and used
<b>CMP-02</b>	Environmental Levels (inside and outside the site)	<ul style="list-style-type: none"> <li>Monitoring of groundwater and surface water quality including cyanide concentrations, which have been determined in Water Resources Management Plan TMD_CEV_PLN.003</li> </ul>	Periodic	As defined in Water Resources Management Plan
<b>CMP-03</b>	Environmental Levels (inside and outside the site)	<ul style="list-style-type: none"> <li>Water Total Cyanide (TCN) and weak acid dissociable Cyanide (WADCN) shall be monitored at Kestanelik Stream on the downstream direction and the ground water observation wells, which have been specified in <b>Water Resources Management Plans for Lapseki and İvrindi Projects.</b></li> </ul>	Periodic	As defined in Water Resources Management Plan
<b>CMP-04</b>	Atmospheric Emissions	<ul style="list-style-type: none"> <li>Atmospheric emissions from ADR plant and Solid Waste Storage Area, which have been specified in <b>Air Quality Management Plan TMD_CEV_PLN.006</b>, shall be continuously monitored, and HCN concentrations shall be maintained below the limit value of 5 m/Nm<sup>3</sup> which is specified in the IAPCR (Industrial Air Pollution Control Regulation).</li> </ul>	Continuous	Exhaust vent of the ADR plant

### 7.3 Key Performance Indicators

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

**Table 9: Key Performance Indicators**

No	KPI	Target	Measurement
<b>CMP-KPI-01</b>	Total number of non-compliances with cyanide management and monitoring measures identified in this Plan.	To minimize non-compliances and aim at <b>zero</b> per annum.	Non-conformance Reports
<b>CMP-KPI-02</b>	Number of community complaints from local communities related to cyanide management as recorded in the complaint management system.	<b>Zero cyanide management complaint</b> from stakeholders; to reduce number of complaints from internal clients and to provide continuous improvement.	Grievance Reports
<b>CMP-KPI-03</b>	Number of reported cyanide incidents	To reduce number of complaints from stakeholders to zero; to aim at zero per annum for the complaints from internal clients.	Accident/Incident Reports

## 8 TRAINING

### 8.1 Overview

All necessary trainings are provided as part of the workplace orientation training (to provide general awareness) and prescribed job-specific training.

ICMC Principle and Standards of Practice about Training;

- Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.
- Standard of Practice 8.1: Train workers to understand the hazards associated with cyanide use.
- Standard of Practice 8.2: Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.
- Standard of Practice 8.3: Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

### 8.2 Workplace Orientation Training

All TÜMAD employees and contractors working at Çanakkale Lapseki and Balıkesir İvrindi Gold Mine Projects shall be provided with general workplace orientation training, site-specific orientation training as well as comprehensive health, safety and environmental awareness trainings and the trainings shall be evaluated.

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

### 8.3 Job-specific Training

Additional specialist trainings shall be provided to workers, who may be exposed to cyanide solutions as part of their working activities or who work in areas where cyanide is used. (OHS-HR and Environment)

#### 8.4 Other Training Requirements

General aspects of environmental management shall be included in orientation training to be provided to all employees.

- Dialogue: Engage in public consultation and disclosure.
- Standard of Practice 9.1: Provide stakeholders the opportunity to communicate issues of concern.
- Standard of Practice 9.2: Initiate dialogue describing cyanide management procedures and responsively address identified concerns.
- Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.

### 9 AUDIT

Daily inspections, which cover a broad range of subjects regarding the activities, including the compliance with this Plan and cyanide management as appropriate to activities inside and outside the site boundary, shall be carried out by operational area superintendents / supervisors within the scope of IMS, General Directorate, Quality, Internal Inspection and Project inspection programs.

Independent external inspections and also periodic assessments by Project creditors shall be carried out. Records of inspections, supervisions and incidents shall be managed according to Tümad Madencilik Record Management Procedure (TMD\_EYS\_PRD.004).

#### Key Points for GAP Analysis/Pre-Audit

From several of the summary audits posted on the Cyanide Code website to get a feel for what is important. It is all about lowering risk and enhancing worker awareness. The operation must pass all 196 check points to get full certification.

1. First, is the general lack of documentation of operational procedures, plans and programs?
  - People tend to know what to do but do not document it. Daily operational sheet recording activities, no written water balance or management plan, lack of environmental monitoring data and reporting and recording of operator training sessions.
2. Second, is the issue of secondary containment for tanks and conveyance systems for slurry and solutions?
  - This is of particular importance with heap leach operations.
3. Third is the lack of a decommissioning and closure plan and demonstration of the financial means to complete these tasks at the end of mine life.
4. Fourth, is the lack of a comprehensive emergency preparedness and response plan that also include the local emergency response and medical people in nearby villages?
5. Fifth, is the community involvement and engagement plan?
6. Sixth, is also the issue of keeping the WAD cyanide below 50 mg/L if there is a tailings dam? No way around it. Other process ponds like those at a heap leach must be covered and fenced to exclude wildlife and birdlife. Usually through the use of plastic floating balls.
7. Seventh, if there is a discharge to the environment of treated solution or water demonstrating there is no impact on aquatic life.
8. Eighth, sufficient signage around the operation to know which way solutions or slurry is flowing and what is in a particular pipe such as mine water or process solution.

### 10 REPORTING

Audits, incidents and nonconformities shall be documented and managed pursuant to the Records Management Procedure of TUMAD (TMD\_EYS\_PRD.004).

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