

# **SUMMARY AUDIT REPORT**

for the April 2021  
International Cyanide Management Code Certification Audit



## **Prepared for:**

TÜMAD Madencilik Sanayi ve Ticaret A.Ş.

Lapseki Gold Mine

## **Submitted to:**

International Cyanide Management Institute  
1400 "I" Street NW, Suite 550  
Washington, D.C. 20005

## **FINAL REPORT**

4 October 2021



1040 Chamberlain Drive  
North Vancouver, British Columbia, V7K 1N9, Canada

## SUMMARY AUDIT REPORT

**Name of Mine:** Lapseki Gold Mine

**Name of Mine Owner:** TÜMAD Madencilik Sanayi ve Ticaret A.Ş.

**Name of Mine Operator:** TÜMAD Madencilik Sanayi ve Ticaret A.Ş. (TÜMAD)

**Name of Responsible Manager:** Mr. Çağrı ÖKTEN, Operation Manager

**Address (Mine):** TÜMAD Lapseki Gold Mine  
Beyçayır Yolu 12.km No: 210  
Şahinli Village, Lapseki  
Çanakkale, TR17800 Turkey

**Telephone:** +90-286-526 01 70

**Fax:** +90-286-526 01 69

**E-mail:** cagri.okten@tumad.com.tr

**Address (Headquarter):** TÜMAD Madencilik Sanayi ve Ticaret A.Ş. (TÜMAD)  
Buğday Sokak No: 9 Kavaklıdere, Çankaya  
Ankara, Turkey

**Telephone:** +90-312-455 16 00

**Fax:** +90-312-455 16 01

**E-mail:** info@TÜMAD.com.tr

### Location detail and description of operation:

The Lapseki Gold Mine, Turkey is operated by TÜMAD Madencilik Sanayi ve Ticaret A.Ş. (TÜMAD), one of over 40 companies operating within Nurol Holding a large organization of companies with varied industrial and commercial interests. The mine is located 35 kilometres (km) northeast of the city of Çanakkale and 7 km southeast of the town of Lapseki. The site is situated in a hilly topography at an elevation of approximately 280 m above sea level. The climate is generally Mediterranean with hot dry summers and cool rainy winters and an average annual rainfall of about 600 mm per year. The surrounding region is rural, characterized primarily by forest and grazing agricultural land and orchards in the valleys. The access road to the mine site branches from the Bursa-Çanakkale Highway E.90. Electricity is provided from the national grid via a 9.7 km power line from the 154 kV 1272 MCM Korum WPP Transformer Station. Water for the operation is pumped from wells of the Lapseki Municipality through a 10.1 km pipeline.

The mine employs approximately 700 staff, including contractors and began operation in December 2017 with an economic life of 10 years.

**Figure 1: Location of Lapseki Gold Mine, Turkey**



Ore is processed using a conventional tank leach operation. Cyanide is supplied to the mine as solid briquettes. The ore is initially crushed and milled to optimal size and then passes through a leach circuit and carbon-in-pulp (CIP) absorption circuit to extract the precious metal. Tailings are detoxified using the INCO SO<sub>2</sub>/Air process with sodium metabisulphite and copper sulphate and then filterpressed prior to being transferred to a dry stack tailing storage facility (TSF). Gold and silver is recovered from the loaded carbon through stripping, electrowinning and smelting to produce the final dore. The process plant has a yearly capacity of 750,000 tonnes with a process plant gold recovery of 94.91% and silver recovery of 72.35%. The mine's current throughput production is 800-850 thousand tonnes/yr. Gold and silver production in 2020 was 70,359 oz. and 48,294 oz., respectively. The Lapseki Gold Mine became a signatory to the International Cyanide Management Code (ICMC) on 29 June 2020.

# SUMMARY AUDIT REPORT

## *Auditors' Finding*

- The operation is:**
- in full compliance
  - in substantial compliance
  - not in compliance

with the *International Cyanide Management Code*.

**Audit Company:** **Lambert Environmental**  
1040 Chamberlain Drive  
North Vancouver, BC V7K 1N9

**Lead Auditor:** John Lambert, EP(CEA)  
ICMC Lead Auditor  
e-mail: [john.lambert@telus.net](mailto:john.lambert@telus.net)



### **Names and Signatures of Other Auditors**

**Technical Auditor:** **Ata Akcil, PhD**  
e-mail: [ataakcil1@gmail.com](mailto:ataakcil1@gmail.com)



**Date(s) of Audit:** 26 April 2021 through 30 April 2021

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the *International Cyanide Management Institute* for Code Verification Auditors. I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the *International Cyanide Management Code Mining Operations Verification Protocol* and using standard and accepted practices for health, safety and environmental audits.

Lapseki Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor

4 October 2021  
Date

# SUMMARY AUDIT REPORT

**1. PRODUCTION Encourage responsible cyanide manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.**

## ***Standard of Practice***

**1.1 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.**

The operation is:                   ■ in full compliance  
  in substantial compliance  
  not in compliance...with Standard of Practice 1.1

*Summarize the basis for this Finding/Deficiencies Identified:*

TÜMAD has a policy to only purchase cyanide from ICMC certified suppliers. Boxed solid cyanide is procured through a supply contract with Hebei Chengxin Co. Ltd (Hebei) a producer last certified to the Code in February 2019. TÜMAD has purchased cyanide from Lučební závody Draslovka a.s. Kolín (Draslovka) a certified production facility in Czech Republic but this supply was temporarily halted until Draslovka has a complete certified supply chain between their production plant and the mine.

**2. TRANSPORTATION Protect communities and the environment during cyanide transport.**

## ***Standards of Practice***

**2.1 Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.**

The operation is:                   ■ in full compliance  
  in substantial compliance  
  not in compliance...with Standard of Practice 2.1

*Summarize the basis for this Finding/Deficiencies Identified:*

There is a written agreement between TÜMAD and Hebei stating that the cyanide will be shipped Delivery at Place (DAP) to the Lapseki Mine site through any port in China and the

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date









Operations personnel conduct documented inspections each shift using detailed checklist forms that address key aspects of process operations including inspection of pumps, tanks and lines for leakage; cracks in containments, presence of salt residue, presence/condition of fire extinguishers, proper functioning of equipment, and operation of fans and deformation of cyanide boxes in the warehouse. HCN gas levels in the absorption, desorption and refining (ADR) and Process Plant are checked every 4-hours, shower/eyewashes are checked weekly, the Occupational Health and Safety (OHS) Department conducts weekly documented inspections of the process plant, and the Environment Department conducts monthly documented inspections.

TÜMAD also has a robust software-based preventive maintenance (PM) system in place that encompasses critical machinery, tanks, pumps, valves, sensors, and other equipment involved in the management of cyanide.

TÜMAD has a documented Management of Change Procedure that applies to all changes to existing or new site/location/facility or equipment; process; purchase of new material/chemicals, or employee duties, that have an impact on OHS, environment, quality or production. The was used 99 times in 2020 and six times to date in 2021. Of these seven changes were specially related to cyanide facilities.

Contingency procedures for situations when there is an upset in process operations are set out in operation training manuals. Dry tailings are stored in the DTSF and except for periodic local seasonal ponding of precipitation the facility remains dry. In the event of ponding, procedures are in place to pump any accumulated water directly to the process plant or drainage pond. A spill clean-up plan provides response actions to be taken in the event of a cyanide spill. A conceptual closure plan is in place that includes measures to be taken if an unexpected closure of the mine occurs including temporary closure/shutdown and unexpected permanent closure prior to planned end of mine life.

Facility inspections are conducted at an established frequency to identify potential issues before they become severe. These include documented shift inspections, weekly OHS Department documented inspections, and monthly Environment Department documented inspections. Shower/eyewash stations are checked weekly. The adequacy of the inspection frequency was evident during the site audit through the observed good housekeeping, and the clean and well-maintained appearance of equipment and containment structures.

Because the WAD CN concentration in tails discharged from the detox plant is less than 0.5 mg/L and the concentration of cyanide in surface water in the drainage pond is maintained below 0.06 mg/L WAD CN, the potential impact to wildlife from cyanide is not considered an issue and therefore a cyanide specific documented wildlife mortality inspection program is not warranted. Nevertheless, TÜMAD has a wildlife monitoring program in which wildlife sightings or mortalities found on the mine property are reported to the Environmental Department.

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

Tanks that hold cyanide solutions are inspected each shift and integrity of tanks and concrete containments are inspected and tank wall thickness testing is conducted annually by a contractor. The shift inspections include integrity and available capacity of containments, presence of fluids, and checks that tank drain valves are closed and locked out. Pipelines, pumps, and valves are also inspected for deterioration, salt deposits and possible leakage. Pumps are maintained on a 3-month preventative maintenance schedule. TÜMAD operates the DTSF drainage pond to maintain a freeboard of 1.6 m, sufficient to retain a 100-year 1-hour duration storm event continuing over a 24-hour period with a power outage of 24-hours. The pond does not contain cyanide solution so leak detection systems were not required as part of the pond design.

The operators use detailed checklist forms for documenting area shift inspections. For each item on the checklist the operator confirms if it is satisfactory or indicates that it is unsatisfactory and describes the deficiency in the "comments" column. If the deficiency cannot be corrected immediately by the operator a work order request is generated and the request number is recorded on the form and tracked to completion. The date and shift on which inspection was undertaken and the name of the inspector and shift supervisor are recorded. Hard copies of inspection records are maintained in binders and electronic copies are also retained.

The OHS and Environmental Department weekly and bi-weekly inspections are similarly documented and maintained. Deficiencies, however, are also detailed with photographs in an inspection report and corrective actions are assigned and tracked to completion using an "action management" data entry system which allows ongoing tracking of actions to completion.

TÜMAD has a robust software-based PM system in place for maintaining critical equipment including major machinery, tanks, pumps, valves, sensors, and other equipment involved in the management of cyanide. The system generates PM actions based on a predetermined maintenance schedule, or upon generation of work orders in daily response to specific inspection observations or observed operational needs. The schedule is based on manufacturers recommendations and/or site experience. Maintenance is planned every 14 days by electrical and mechanical planners. Maintenance requiring plant shutdown is scheduled approximately every 8 months based on replacement needs for the mill liners.

The Lapseki operation is powered by the national grid via a local substation but also has 14 diesel generator sets dedicated to the backup operation of major equipment or key infrastructure associated with the operation. These generators are included in a 15-day scheduled for routine inspection and maintenance and a 250-hour or annual schedule for general maintenance. Although standby power is critical for continued operation of the plant, temporary loss of power is not critical for pump operation to prevent an unintentional release of cyanide.

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

**4.2 Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.**

The operation is:                                   ■ in full compliance  
  in substantial compliance  
  not in compliance...with Standard of Practice 4.2

*Summarize the basis for this Finding/Deficiencies Identified:*

Bottle roll tests are undertaken as ore characteristics change to determine if the target cyanide concentration needs to be modified to maintain optimum gold/silver recovery. Cyanide concentrations in the leach circuit are closely monitored using a manual titration analysis conducted on samples collected 2-hours from the first and last leach tanks. Cyanide is added to the first tank as needed to maintain the cyanide concentration within an optimal target of 150 to 160 mg/L, resulting in a residual concentration in the final tank of between 110 and 140 mg/L. Minimizing the concentration of cyanide in the final tanks also reduces the quantity of reagents required to detoxify the tailings to meet tailings discharge requirements.

**4.3 Implement a comprehensive water management program to protect against unintentional releases.**

The operation is:                                   ■ in full compliance  
  in substantial compliance  
  not in compliance...with Standard of Practice 4.3

*Summarize the basis for this Finding/Deficiencies Identified:*

TÜMAD has developed and implemented an Excel based comprehensive and probabilistic water balance for managing the water resources for the mine. After destruction of cyanide to less than 0.8 mg/L WAD CN and further dilution of cyanide during the washing and filter pressing of the tailings to reduce the moisture content to about 20%, the concentration of WAD CN in the tailings is between 0.06 and 0.11 mg/L. A comprehensive, probabilistic water balance is therefore not a critical managing potential releases of cyanide. Monitoring data collected from the upper drainage of the DTSF and from the Drainage Pond suggest that the DTSF does not classify as a cyanide facility.

The water balance considers the rate of solids being deposited in the DTSF to calculate the volume of water being delivered to the DTSF; a 100-yr 1-hour design storm continuing over a 24-hour period in the design of the Drainage Pond to provide a sufficient degree of probability that overtopping can be prevented; and historic precipitation and evaporation data obtained from the Turkish State Meteorological Service from which annual average precipitation and maximum rainfall events were predicted. These maximum events were used in the design of the pond and diversion channel capacities. Precipitation entering the DTSF is directed via an

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

upper drainage collection system to collection tanks within the DTSF from where it is pumped to the process water tank for reuse, or to the Drainage Pond. Diversion channels take surface run-off from the surrounding catchment area away from the facility. Infiltration of precipitation in the surrounding catchment area is accounted for as seepage from the underdrain system of the DTSF entering the Drainage Pond. Freezing/thawing effects are not considered in the water balance since snowfall does not extend more than 30 days in the vicinity of the mine. The facilities are operated such that there is no discharge of contact water to the environment. No other aspects are included in the water balance.

Procedures require operators to constantly check that the diversion channels are open. They are also required to check the status of the water lines and pumps, volumes of flow in the lines, level of the Drainage Pond, and rate of drainage to the pond. The pond water is also sampled and analysed daily for parameters of environmental concern including Total and WAD CN.

The Drainage Pond is designed to retain a 100-year 1-hour storm event continuing over a 24-hour period (i.e., 1,464 mm of precipitation). Although, emergency generators are available if there is a national grid power failure, the pond is operated with a minimum freeboard on 1.6 m to ensure sufficient capacity is available to accommodate this storm as well as ongoing seepage from the DTSF over a 24-hour period during a power loss.

Precipitation and evaporation data used in the design were based on average and maximum meteorological data obtained from the Turkish State Meteorological Service collected over a 53-year period between 1960 and 2013. Since 2019, this meteorological data is updated using data from a meteorological station installed near to the process plant. The information collected includes windspeed and direction, temperature, pressure, moisture, solar radiation, evaporation, and rainfall. This data is used monthly to cross-check and update the meteorological data used in the water balance.

#### **4.4 Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.**

The operation is: ■ in full compliance  
in substantial compliance  
not in compliance...with Standard of Practice 4.4

*Summarize the basis for this Finding/Deficiencies Identified:*

The operation does not have any open waters the contain cyanide over 50 mg/L WAD CN. Nevertheless, the Drainage Pond is fenced to prevent access to wildlife. Daily samples are collected of the tailings discharge from the detox plant, drainage from the DTSF and from surface water in the Drainage Pond. Review of records for 2020 to date show that the monthly averages for WAD CN in the tailing discharge were less than 0.8 mg/L; well below

Lapseki Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor

4 October 2021  
Date





All cyanide process pipelines are located within concrete containment with exception of a reagent line running between the holding tank and the ADR building and a cyanide line running between the CIP tanks containment and the ADR building. These lines cross an access lane via a pipeline bridge. In the event of a leak, the lines are located within a metal containment tray that drains to the ADR building containment.

The reagent lines are constructed of pipe-in-pipe HDPE and located within a containment tray the runs the length of the lines. In the event of a line leak cyanide would flow back within the HDPE outer pipeline to a collection tank located with the mix plant containment. The collection tank is fitted with a sensor to detect liquid in the tank.

There are no surface water bodies located near to cyanide facilities. All pipelines that convey cyanide solutions are located within containment. The only pipelines outside of containment carry water pumped from the DTSF and drainage pond to the process water tank. The concentration of cyanide in the process water is less than 0.5 mg/L WAD CN and therefore these lines are not considered cyanide facilities.

All cyanide mixing, storage, and solution tanks are constructed from carbon steel. Cyanide solution pipelines and piping system components are constructed of HDPE or carbon steel or stainless steel; materials are compatible with cyanide and high pH conditions. The DTSF and drainage pond are lined with welded HDPE geomembrane construction.

**4.8 Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.**

The operation is:  in full compliance  
 in substantial compliance  
 not in compliance...with Standard of Practice 4.8

*Summarize the basis for this Finding/Deficiencies Identified:*

The Lapseki Gold Mine Project was executed under the supervision of the TÜMAD Engineering, Procurement and Site Team. TÜMAD assigned ProMer Consultancy Engineering Inc. in collaboration with BBA Engineering (BBA) to undertake the detailed engineering design, project and contract management, construction supervision and commissioning consultancy. Detailed design and project and construction management of the tailings facility was undertaken by Mitto Consultancy Inc. with HES Su Yapilari Denetim Hizmetleri Ltd. Şti. conducting building inspection and approval.

Throughout construction quality assurance quality control (QA/QC) programs were conducted. The project followed a *Commissioning Plan* implemented by ProMer/BBA that set out

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date



contain cyanide, wildlife mortality from cyanide is not considered an issue. No cyanide related mortalities have been reported.

TÜMAD has a water quality management plan, to control and manage the quality of the water not used in mining activities. The plan includes a surface and groundwater sampling and analysis program, and specifies sampling locations, parameters to analysis, analytical detection requirements and sampling schedule. The plan was prepared by TÜMAD senior environmental managers that have extensive experience in mineral exploration, groundwater hydrogeology, water monitoring, environmental impact assessment, and integrated social, environmental, health and safety management systems.

All sample collection and analysis are undertaken by Çınar, an independent accredited analytical laboratory. Samples are collected by trained Çınar field personnel using a protocol developed by Çınar for specific application to meet the cyanide sampling and analysis requirements at TÜMAD's mine sites, that details sampling methods, sample preservation and labelling, shipping procedures and methods of analysis.

Sampling is conducted under the oversight of a representative of the Environmental Department. The sampling protocol details how samples are to be taken, including the field sampling equipment needed, sampling method, sample containers and labelling, preservation requirements, shipping instructions, and completion of sampling form and shipping documents, and chain-of-custody protocol. The sampling label specifies the sample code, sampling date, time, sampling purpose and if necessary, parameters to be analyzed and the type of protection.

Çınar uses a Field Sampling Form. This form is used to report sampler, date, samples number, field conditions (temperature, weather, etc.) during sampling and any information that may affect the sampling. For groundwater sampling the form includes entry for well purging record (pH, conductivity, and dissolved oxygen), depth of well, depth of water, and sampling method.

TÜMAD does not discharge process water to surface water. A surface and groundwater monitoring program monitors for potential leakage and release of cyanide to the environment. The monitoring program includes quarterly groundwater and surface water sampling from locations downgradient of the site. Samples are collected from a total of 15 groundwater wells and an upgradient and downgradient surface water sample taken from the Kestanelik stream located north of the site. Three of these groundwater monitoring wells are located downgradient of the process plant and one well is located just down gradient of the DTSF and Drainage Pond. The downgradient surface water sampling point is located approximately 500 m north of the DTSF and Drainage Pond. The samples and analyzed for a broad suite of parameters including Total, WAD, and Free CN.

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date





TÜMAD has developed a Cyanide Management Plan that describes the steps and procedures implemented for safe management of cyanide. The plan references safe working procedures and standard operating procedures as well as an Occupational and Health and Safety Handbook for Cyanide Management (OHCM) that provide step by step requirements for undertaking specific cyanide related tasks. In addition to operating procedures that include instructions for cyanide delivery and unloading, cyanide mixing, and plant operations, TÜMAD has implemented procedures for equipment decontamination prior to maintenance, and confined space entry. Other general operating procedures include the requirement for completing a Job Safety Analysis (JSA) prior to undertaking any non-routine operation. The plans and procedures are maintained and controlled documents.

Operating procedures specify the PPE to be worn as well as other equipment required to safely undertake the task. Helmet, steel toed boots and safety goggles with side shields are required in all workplace areas with requirements detailed in operating procedures to wear additional items of personal protection (Tyvek coveralls, boots, rubber gloves, and full-face respirators with appropriate filters) as well as use of portable HCN meters when undertaking specific tasks or when working in specific areas where there is a risk of exposure to cyanide. PPE requirements are also posted in areas of the plant where specific PPE is required.

Workplace inspections are undertaken at the start of each shift to check operation of shower/eyewash stations, and pipes, valves, tanks and secondary containments for any signs of leakage. Pre-work inspections are conducted prior to cyanide unloading and mixing operations. These inspections include inspecting PPE, checking for proper operation of forklift and shower/eye wash station. Pre-work inspections are also required as part of confined space entry, work permit requirements and Job Hazard Assessment/Safe Working Procedures when undertaking non-routine tasks.

TÜMAD has a Management of Change Procedure to evaluate environmental, occupational health and safety and administrative/operational impacts of new or modified processes, equipment, or materials. Operational changes are typically communicated through meetings if the changes are implemented within the context of specific tasks. The proposed change is documented on a change request form and routed to the OHS Department and Environmental Department for review and approval by the Operational Manager prior to the implementation.

Employees are encouraged to seek ways to continually improve workplace safety; this ethic was noticeable in the audit with respect to workforce attitudes and general housekeeping practices. In addition to casual discussions with their supervisors, there are several formal approaches for workers to have an opportunity to communicate and provide input into the development and evaluation of health and safety procedures. These include worker health and safety committee meetings, weekly worker representative meetings, weekly toolbox meetings, submission of hazard reporting cards, and posting in the grievance/suggestion box.

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date



or as required. Visitors are provided with respirators and are fit tested prior to being permitted to enter areas where cyanide is present. Workers were observed to be clean shaven and equipped with respirators and portable HCN monitors in the workplace.

All fixed and portable HCN gas detectors are calibrated as directed by the manufacturer. The fixed detectors are calibrated on site semi-annually by experienced contractors and records have been maintained by the Process Department for the past three years. Portable gas detectors are also calibrated semi-annually by an experienced contractor and each department is responsible for their detectors and calibration tracking.

Cyanide warning signage appeared to be well maintained. Signage is clearly posted at entrances to the ADR, mixing area, leach tank unit and cyanide storage warehouses, and includes cyanide hazard warning signs; prohibitions on open flames, smoking, eating, and drinking; restricted entrance to authorized persons only; PPE requirements, and a colour coding key for pipelines. Cyanide hazard warning signs are also posted on fencing around the cyanide facilities.

The tanks and piping in the cyanide mixing area and leach tanks are labeled with cyanide warning signs. Each tank is labelled clearly to identify the size, content, and hazard. Cyanide piping is colour-coded to identify contents, and a colour-coding key, and cyanide warning signage is posted on the access gates at the ADR and leach units. Reagent cyanide piping is colour-coded purple and flow direction is clearly marked. Solution pipelines at the ADR and leach units were clearly labeled with name and flow direction as well as colour-coded yellow and cream, respectively, to identify their contents. The cyanide reagent solution contains ACID RED 14 colourant dye for clear identification. In addition, all workers and contractors are required to complete induction and workplace hazard training that includes cyanide hazard, awareness, and safety training.

Shower and eye-wash units are located in strategic areas of the process plant where there is a potential for exposure to cyanide. The shower/eye-wash units at the mix plant and ADR are plumbed into the fresh water supply system at an operating pressure adjusted to 30 PSI. The other shower/eye-wash units are fed from an overhead supply tank that provides a safe operating pressure to the eyewash and is automatically filled after the unit is operated. In addition, there are several self-contained eyewash stations. The stations are checked weekly for flow, condition, mechanical and visual control, and access.

At the time of audit there was a shower/eyewash station on the upper deck in the vicinity of leach tank TK6 but no station within convenient access around leach tanks TK1 and TK2 where reagent cyanide addition points are located. Also, although there was a shower/eyewash station at ground level at the cyanide mix plant there was no station on the upper deck where there is a potential for an operator to be exposed to cyanide during a mix. Subsequent to the field component of the audit, TÜMAD provided photographic evidence that shower/eyewash stations had been installed in these locations.

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date



TÜMAD has hydroxocobalamin (Cyanokit) available in the event of a cyanide first aid emergency. As hydroxocobalamin is applied intravenously by a qualified medic, the kits are maintained at the medical clinic.

Communication is through radio, cell phone, or fixed phone. All workers including security personnel are equipped with radios for use in the field and plant. However, most workers prefer and use cell phones in place of radio. Light vehicles are equipped with hands-free systems for cell phones. The radios are tuned to Channel 1 to allow for emergency communication. In addition, there is a telephone in the control room and workers have cell phones as an alternative communication system in the event of an emergency. There is also an audible alarm system in the Plant Site.

The oxygen units and antidote are inspected monthly by the clinic. The Cyanokits are kept in room temperature in a cabinet as written in prospectus. The expiry date on each kit is clearly marked and all kits were all within the manufacturer's expiry date.

Emergency response procedures in the event of a cyanide release are set out in the Appendix of the Crisis Management Procedure (CMP) and the Emergency Action Plan (EAP), and detailed protocols, including the roles and responsibilities and response actions for potential cyanide release situations, are provided in the OHCM. Specific emergency response procedures to respond to cyanide or HCN gas exposures are also clearly presented.

The operation has its own on-site capability to provide first aid and medical assistance to workers exposed to cyanide. The ERT members, many of which are plant operators, are trained to provide cyanide first aid including use of medical oxygen pending arrival for the paramedic or physician. Only the paramedic and physician are qualified to administer cyanide antidote. TÜMAD provides a medic clinic with a physician, nurse and paramedics on a 24-hr basis at the mine site that are certified to respond to all cyanide emergencies and stabilize a patient. At the time of the audit there were 65 certified first aid responders including the ERT. The physicians, nurse and paramedics are trained in treating cyanide exposure and mutual prepared the emergency first aid document in the OHCM. Although workers are trained to recognize the symptoms of cyanide poisoning and first response actions in the event of cyanide exposure, they are not expected to apply medical first aid but to immediately report the emergency directly to security who would initiate the emergency call-out procedures.

TÜMAD has an ambulance located at the clinic in readiness for an emergency response. The ambulance response time to the ADR plant in the event of an emergency is less than 5 minutes. This ambulance is available to transport patients to Lapseki state regional hospital in Lapseki, 14 km (approximately 12 minutes) away by paved highway.

In case additional resources are needed to treat cyanide exposure cases, arrangements have been made with the ÇOMÜ University Research Hospital in Çanakkale, 47 km; MAE State Hospital in Çanakkale, 50 km; Uludağ University Medical Faculty Hospital in Bursa, 234 km

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

and Başakşehir Çam-Sakura Hospital in İstanbul, 321 km by paved highway. A local ambulance service is also available in Lapseki if additional ambulance capability is needed.

TÜMAD has communicated with the Ministry of Health Department and Hospitals (Emergency Units) in Lapseki and Canakkale and the clinic physician has met with the Lapseki State Hospital and Çanakkale Provincial Directorate of Health, and an official letter was issued to the directorate in March 2021. Representatives from the Lapseki State Hospital also visited the mine site in February 2021, to gather information the potential risks associated with the operation, the emergency response plan and potential additional medical services that may be requested in the event of an accident.

Simulation exercises are undertaken annually to test the ERT understanding of roles and responsibilities, the competency of the team, and adequacy of the response plans. Mock drills are undertaken that include both worker exposures and environmental releases. In the past three years TÜMAD has undertaken four mock drills involving cyanide or related emergency situations. These have included in May 2019, a simulation of a cyanide release in the mixing area that resulted the requirement for rescue of an injured worker from a HCN gas impacted area; in June 2020, a similar exercise to the one held previously; in December 2020 a simulation of a warehouse cyanide spill that resulted in a release of solid cyanide briquettes on a concrete pad during the offloading the cyanide boxes; and in February 2021, a simulation involved a drop in pH in a leach tank causing to release of HCN gas resulting in a man down. Mock drill procedures require evaluation of drill results and development of appropriate action plans for addressing deficiencies identified during a drill. The drilling reports are filed in the QDMS.

## **7. EMERGENCY RESPONSE Protect communities and the environment through the development of emergency response strategies and capabilities.**

### ***Standards of Practice***

#### **7.1 Prepare detailed emergency response plans for potential cyanide releases.**

The operation is: ■ in full compliance  
in substantial compliance  
not in compliance...with Standard of Practice 7.1.

*Summarize the basis for this Finding/Deficiencies Identified:*

The EAP, CMP, and OHCM identify the emergency management organization, emergency reporting structure, emergency response protocols, roles and responsibilities, evacuation procedures and emergency communication details, contact information of organizations to be taken external support, ERT, equipment and drills scenario, cyanide exposures and symptoms,

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

first aid rules, using of cyanide emergency medical kit and further treatment, and emergency response methods of cyanide spillages. Potential emergencies other than cyanide related emergencies are separately addressed in the EAP. The specific procedures that describe the standard actions to follow in the event of an unplanned release of cyanide or cyanide related emergency are presented in the OHCM.

TÜMAD has identified and periodically evaluated possible emergency response protocols for a range of different scenarios in the EAP and provided detailed scenarios of cyanide emergencies in the OHCM. Emergency Protocols address the following emergency cases which include the probable cyanide emergencies that could occur on the site:

- Cyanide exposure.
- Release of HCN gas from storage or process plant
- Cyanide spillage during transportation within national border
- Cyanide spillage during transportation in mine site
- Cyanide spillage storage and handling at the warehouse
- Emergency during the preparation and mixing cyanide solution
- Cyanide spillage associated with pipeline leakage or failure
- Cyanide spillage associated with cyanide tank failure
- Power failure or pump failure in cyanide containing areas
- Uncontrolled leakage of cyanide solutions
- Emergency during the cyanide detoxification
- Fire
- Explosion
- Waste rock or DTSF failure

Protocols for each scenario include specific actions and identifies the steps to be taken during emergency by personnel with different roles as identified in the plan. As an example, protocol have been prepared for fourteen different scenarios emergencies that may occur in the mine site. The protocols also address all probable emergencies including releases from low potential catastrophic events such as earthquakes, cave-ins, volcanic eruptions, high-speed winds, or prolonged snow conditions, in which communities down gradient from the site might be affected.

Under terms of the current supply agreement, Hebei is responsible for the cyanide transport until the product arrives at the Lapseki Mine Site. Hebei has developed an Emergency Response Plan which is applied to potential transportation emergencies between İzmir Port and Lapseki Mine Site and has overall responsibility to ensure that all parties (including subcontractor personnel) are familiar with the plan. A contracted emergency response company Meke-Hidra accompanies each transport convoy to respond to the emergencies. The emergency response vehicle is equipped with spill response kits, self-contained breathing apparatus (SCBA) units, impermeable chemical overalls, and other response equipment to respond to cyanide related emergencies enroute. Each convoy is subjected to highway

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date





- c) ERT members are trained according to an annual training plan. Training sessions are conducted every month with the attendance of ERT members in four groups to accommodate members from different areas and shifts.
- d) TÜMAD has a 24-hour security service, and security manage the call out procedures for relevant coordinators and ERT members. An up-to-date list of emergency contacts and telephone numbers is maintained by security at the main security office.
- e) Roles and responsibilities of employees and emergency response personnel are defined in the EAP and OHCM.
- f) TÜMAD has extensive emergency response equipment and personal gear on site to respond to cyanide related emergencies. The fire and rescue station (located opposite of ADR), fire truck, and rescue vehicle contents are listed in EAP and OHCM.
- g) Emergency response equipment is inspected monthly. The fire truck and rescue vehicle are inspected daily. The inspection checklist records are maintained and were reviewed during the audit.
- h) The EAP and OHCM provide contact information for outside responders, medical facilities and communities to be notified in emergencies. Because of the remoteness of the site, TÜMAD has developed the capacity to respond to all probable emergencies and therefore, except for requesting possible medical assistance from hospitals, outside responders do not have a direct role in the emergency response plan for the site.

Meetings held with stakeholders provide awareness to outside entities about potential emergency situations where outside emergency response assistance may be requested. Once Covid-19 restrictions ease, TÜMAD plans to conduct drills with outside entities after signing a mutual protocol with the Disaster and Emergency Management Presidency. Changing regulation sets out requirements by companies to conduct mutual exercises with outside entities.

**7.4 Develop procedures for internal and external emergency notification and reporting.**

The operation is:
 

- in full compliance
- in substantial compliance
- not in compliance...with Standard of Practice 7.4.

*Summarize the basis for this Finding/Deficiencies Identified:*

The EAP includes contact information for TÜMAD and its corporate management personnel, regulatory agencies, external responders (i.e., fire and ambulance), and hospitals, as well as call out procedures and other emergency response protocols. Depending on the level of emergency there are procedures for notifying TÜMAD corporate and for communicating with media and regulators. The Manager of Public Relations is the designated spokesperson through which all communication to the public will be funnelled. The OHCM also details the types of cyanide incidents that are required to be reported to the government agencies.

Lapseki Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor

4 October 2021  
Date





**Standards of Practice**

**8.1 Train workers to understand the hazards associated with cyanide use.**

The operation is: ■ in full compliance  
in substantial compliance  
not in compliance...with Standard of Practice 8.1.

*Summarize the basis for this Finding/Deficiencies Identified:*

Induction training is mandatory for all employees and contractors prior to entering the site. Induction training is a 3-hour program that includes topics such as site policies, procedures, site safety, signage, workplace hazards, PPE, MSDS, alarms, emergency response, incident reports and safety meetings. The training includes instruction on cyanide awareness that includes an introduction to ICMC, forms of cyanide, recognition, hazards, signage, safe handling guidelines, exposure routes, control of the generation of HCN gas, symptoms of cyanide poisoning, and first aid treatment in the event of exposure. For visitors, an induction video is watched, and a short exam is applied. Minimum score of this exam is 70 points.

Cyanide refresher training is periodically required by all workers. For those that work with cyanide this refresher training is required annually. Employees specifically working or engaged on cyanide related tasks are required to complete additional training on specific cyanide related operating procedures. These include emergency procedures, cyanide offloading and mixing procedure, cyanide storage, oxygen resuscitation kit operation, CyanoKit and CarboSorb, expiry dates for HCN gas canisters, cyanide facility inspections, working on cyanide pump/valve/pipeline/tank, wet and dry sodium cyanide decontamination. This training was provided by the Process Plant and Health Unit.

All induction and refresher training records are tracked. Review of training records for selected operators and managers confirmed that records were available and complete. Paper copies of the training attendance sheets are filed by the Process Plant Department Office.

**8.2 Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.**

The operation is: ■ in full compliance  
in substantial compliance  
not in compliance...with Standard of Practice 8.2.

*Summarize the basis for this Finding/Deficiencies Identified:*

All workers that undertake cyanide related tasks are required to complete cyanide awareness training as well as task specific training. As per a legal requirement, plant operators must also

Lapseki Gold Mine  
Name of Mine

  
\_\_\_\_\_  
Signature of Lead Auditor

4 October 2021  
Date

receive "Occupational Certification" before being permitted to work. Certification is gained through a 5-days program provided by government trainers. The program provides a general understanding of process operations. Prior to undertaking tasks without direct supervision, workers must undertake training in standard operating procedures.

There are 345 general operating procedures for non-cyanide specific mine site operating tasks that all workers are required to be trained. In addition, workers that have job tasks involving cyanide are required to complete training in specific procedures for each of the applicable cyanide related tasks conducted as part of their job role.

Operating procedures form the basis of the written materials for training. These procedures provide the information on the primary hazards of the task, required PPE, step by step instruction on performing the task, and reference to related safety and operating procedures. Training requirements associated with the operational procedures applicable to each area/process in the plant must be completed to the satisfaction of the training supervisor before a worker can work unsupervised in that area or process.

Employee task training is undertaken by supervisors or managers who are experienced in cyanide process operations. This training is supplemented by monitors, usually a supervisor, assigned in each area who have been trained to provide cyanide training. After satisfactorily passing the probationary period, the worker is allowed to undertake assigned tasks unsupervised. The training is provided by the Process Superintendent who has over 13 years of cyanide process experience including completion of Technical Trainer Training, and Work Safety Leadership Training.

First aid trainers have lifetime first aid certificates issued by the governmental health service and have completed the governmental train the trainer courses. The Emergency Response Coordinator who provides training to ERT Members, is professionally trained, and has 7 years' experience as a Health and Safety Professional.

Induction, Long - Period OHS training (OHS Training, Physical and Chemical Risk Factors, PPE Training, Health Training, Fire Training) is provided by safety department trainers under the guidance of the Health and Safety Chief. All employees that may encounter cyanide in the workplace have been trained in cyanide hazard recognition and refresher training has been provided annually.

Cyanide refresher training (including cyanide awareness, risks of cyanide, cyanide handling procedures and emergency response) is required by all workers on an annual basis. The refresher training that Process and ADR operators receive is more extensive and on a different time scale than the refresher training other employees receive.

Understanding of basic cyanide hazard recognition and spill response training is evaluated via written examinations. Examination format is robust, requiring substantial explanation of key

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date



plant and cyanide storage mix area, alert operators of HCN gas releases and when to evacuate a work area.

The cyanide hazard training and refresher training includes recognition of cyanide exposure symptoms, decontamination and first aid. ERT members receive additional training as first responders and emergency response coordinators and serve as an internal training resource for Emergency Response Plan training. The ERT members have been trained to apply first aid including the use of medical oxygen and advanced medical first aid. Two of the ERTs are also process operators and would therefore be at hand to provide immediate first aid assistance. A physician, nurse or paramedic are on duty at the clinic, located just a few minutes' drive from the ADR and Leach area, if needed.

The Emergency Response Coordinator has training meetings with the ERT members whereby a range of topics are covered including emergency call out procedures, cyanide awareness and management, first aid procedures, and cyanide exposures. Topics discussed in the training sessions include evacuation drills, hazardous materials handling, fire extinguisher use, basic firefighting, cyanide management, basic first aid and mock drill rehearsal.

The ERT conduct monthly emergency response training exercises. Since the beginning of 2017, these exercises included a cyanide solution spill and HCN release in the ADR; a vehicle rollover and solid cyanide spill with release of HCN, and a man-down cyanide exposure scenario. These exercises include the ERT, security and medical personnel from the clinic.

The emergency coordinators conduct tabletop and mock drills to hone their response skills and test the ERP. Briefings are undertaken during these exercises to discuss responses to cyanide related emergency scenarios.

Lapseki Gold Mine has the resources to handle all probable emergency situations through an onsite team of well-trained emergency brigade personnel, emergency response vehicles and equipment, and medical capability available from on-site paramedics, nurse and physician. The mine meets annually with local community stakeholders and has also communicated with local government agencies, including the Ministry of Health Department in Çanakkale to provide information on the Lapseki mining operation, and the potential additional services and support that may be requested in the event of an accident.

Cyanide hazard recognition refresher training is undertaken annually by all workers including members of the ERT. This training includes recognition of cyanide exposure symptoms, decontamination and first aid. In addition, the ERT participates in the emergency training sessions which periodically include hazardous materials training including cyanide, and mock drills that involve cyanide emergency scenarios.

Mock drills are conducted that include both worker exposures and environmental releases. The ERT undertake regular emergency respond exercises that include cyanide spill and

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date

exposure scenarios. As discussed in Section 6.3 TÜMAD has undertaken four mock drills involving cyanide or related emergency situations since 2019.

Procedures for conducting mock drills require evaluation of drill results and development of appropriate action plans for addressing deficiencies identified during a drill. Mock drill records include action plans that list each deficiency, the proposed solution and the date and responsible person for implementing and completing the recommended action. Records reviewed from 2019 through to 2021 confirm that corrective actions were identified following the mock drills and implemented as follow up training exercises or entered in the QDMS to allocate and track corrective actions.

Records for cyanide training are retained. Basic cyanide training is tracked by the Process Plant Department on an online spreadsheet and hard copy including the training attendance sheets. Records are in the form of signoff sheets; that include the training topic(s), trainers name and signature; date of training, and sign-off by each attendee. The course materials are either PowerPoint presentations, as in the case of induction training and cyanide awareness refresher training, or the actual standard operating procedures in the case of task training. Hard copies of training records with the training materials and exam test are kept by the Process Plant Department. Copies of training records are entered into SAP.

## **9. DIALOGUE Engage in public consultation and disclosure.**

### ***Standards of Practice***

#### **9.1 Provide stakeholders the opportunity to communicate issues of concern.**

The operation is: ■ in full compliance  
in substantial compliance  
not in compliance...with Standard of Practice 9.1.

*Summarize the basis for this Finding/Deficiencies Identified:*

TÜMAD actively engages with the community and has extensive records on regional community consultation since the commissioning of the operation in 2017 where stakeholders have the opportunity to raise issues of concern regarding management of cyanide.

TÜMAD public relations staff undertake periodic outreach campaigns in local villages including Şahinli, Kocabaşlar, Çamyurt, Yeniceköy, Dumanlı, Subaşı) located within 8 km of the mine. These meetings provide an opportunity for external stakeholders (governmental and private) and members of the public to verbally communicate and ask questions or relay any concerns related to the use of cyanide and its management at the mine site. Many local and national-

Lapseki Gold Mine  
Name of Mine



Signature of Lead Auditor

4 October 2021  
Date





regions. Procedures are in place that require that appropriate press releases be prepared by or at the direction of the General Manager to accurately describe the particulars of the event, probable cause, the individuals involved, the actions taken, and other appropriate information. If a cyanide exposure incident were to occur, communications will be controlled to ensure that 1) responsible regulatory agencies and officials are immediately notified; 2) ICMI is notified; and 3) the causes of the incident and associated corrective/preventive action is discussed in subsequent meetings with communities and regulatory authorities.

With respect to wider release of such information TÜMAD management indicate that regulatory agencies are not obliged to share information of this type to the public. However, TÜMAD prepares an annual Sustainability Report in accordance with Global Reporting Initiative guidelines. As the guidelines specifically require the inclusion of information on environmental or social impacts to properly inform external stakeholders, information on cyanide exposures or releases from this mine site would be made available on the company website in the next issue of the TÜMAD Sustainability Report, beyond those individuals engaged as part of the community meetings. The regulators and authorities will in turn inform communities of the incident, making use of the media. Reportable spill data is also required to be recorded as an annual key performance indicator in the Environmental Performance Report.

Lapseki Gold Mine  
Name of Mine



\_\_\_\_\_  
Signature of Lead Auditor

4 October 2021  
Date