

**OPERATIONAL VERIFICATION AUDIT
POLYMETAL INTERNATIONAL PLC
VORO MINE**

MAY 2019



Prepared by

WARDELL ARMSTRONG INTERNATIONAL

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SUMMARY AUDIT REPORT

Name of Mine: Voro Gold Mine
Name of Mine Owner: Polymetal International PLC
Name of Mine Operator: _____
Name of Responsible Manager: Daria Goncharova
Address: Polymetal, Prospect Narodnogo, Opolcheniya 2
State/Province: St Petersburg
Country: Russia Telephone: +7 812334 3666 Fax: +781 27536376
E-Mail: Goncharova@polymetal.ru

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SUMMARY AUDIT REPORT

Background and Location

Voro is located in Russia's Sverdlovsk region, approximately 370 km north of the regional centre of Ekaterinburg (population of 1.5 million) and 25 km south of the city of Krasnoturinsk (population of 65,000). Voro is easily accessible from Ekaterinburg via the federal highway that runs 7 km from the site. The industrialised and moderately populated area around the deposit is home to several mining companies, ensuring good access to the grid and other infrastructure. In addition, there is good railway access with a Group-owned spur located 18 km from the site.



Figure:1 Sverdlovsk Region, Russia



Figure: 2 Supply Chain

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SUMMARY AUDIT REPORT

Supply Chain Overview

Polymetal (St Petersburg Office) purchases the sodium cyanide for all its mining operations including Voro. Polymetal have signed a 5 year contract with Tongsuh Petrochemical Corp, South Korea (Tongsuh) and Hyosong Corporation, South Korea (Hyosong). Both Tongsuh and Hyosong are signatories of the Code and have full compliance status.

The cyanide for Voro mine enters Russian via the port of St Petersburg.

St Petersburg port is the largest industrial marine port in Russia and holds an operating license for the importation of Dangerous Goods (DGs). St Petersburg port works under the auspices of the International Maritime Organization (IMO) is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships. IMO's work supports the UN SDGs. The Russian Federation (RF) has been a member since 1958.

As with all seaports in Russia, including privately owned ones, the access to the DG storage areas are prohibited. The Auditor was not able to secure passes to enter the commercial side of the port, however research, discussions and understanding of how the port operates, the Auditor has no doubt that the port would be compliant with the Code requirements.

The cyanide is off loaded in St. Petersburg Port, by the Stevedores and taken to the Dangerous Goods (DG) storage area within the port boundary to await customs clearance before being loaded on to Russian Rail (RZD) station on flat-bed rolling stock to Nizhny Tagil.

Polymetal employs TNT (office located in Nizhny Tagil) and ADR Express (office/depot located in Perm) to organize the transportation of cyanide to Voro. TNT prepare all the importation documentation and customs requirements. They also act as the liaison between Russian Rail (RR), ADR and Voro. TNT do not have any vehicles themselves. The Supply Chain audit included verification of St. Petersburg port for the handling (loading and unloading of cyanide from ship to rail cars (flat bed for containers). Rail transport to Nizhny Tagil, transfer to ADR vehicles for onward and final journey to Voro. See Figure 3 below.



SUMMARY AUDIT REPORT

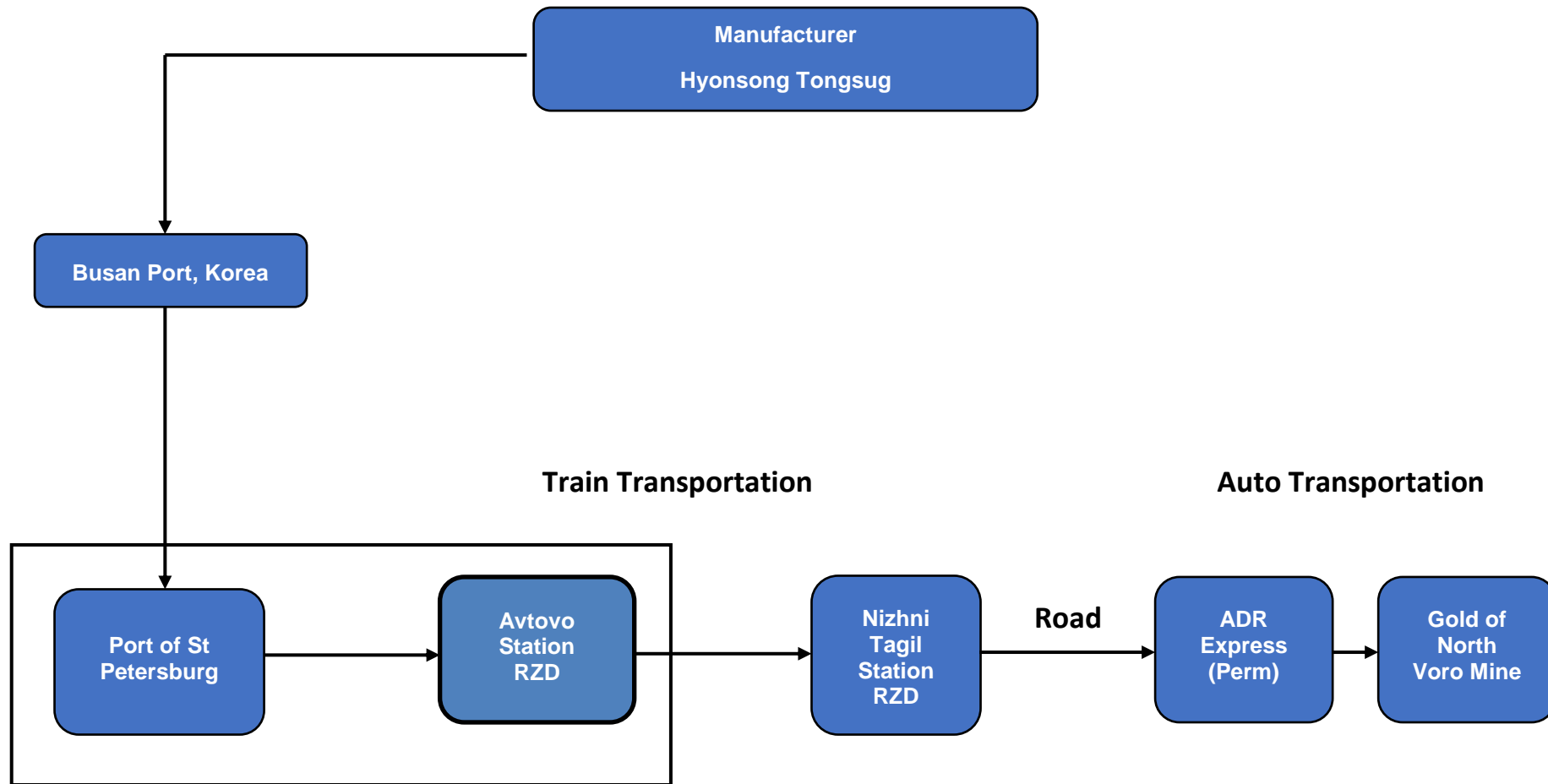


Figure 3 Supply Chain Flow Chart

SUMMARY AUDIT REPORT

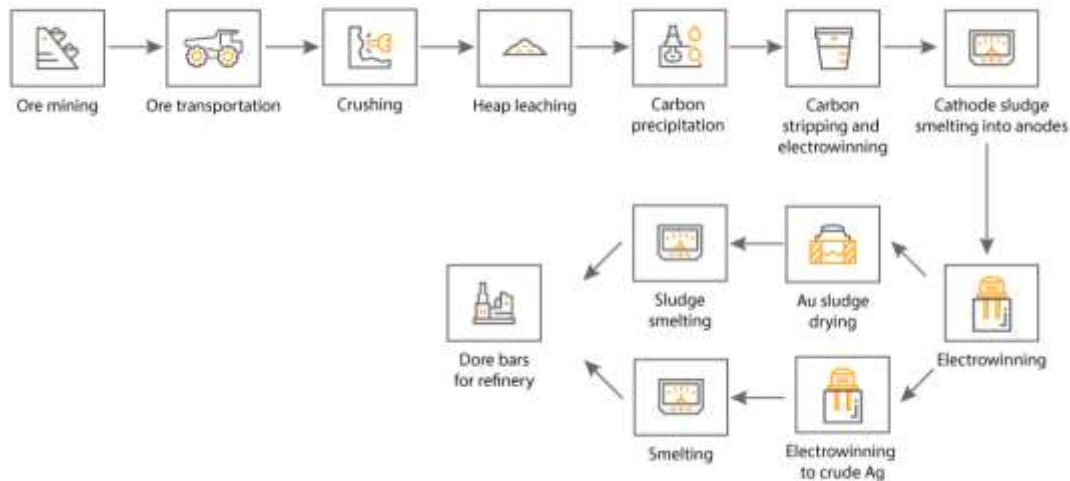
Operational Overview

Voro is one of Polymetal's very first key gold assets acquired in 1998. Voro comprises an open-pit mine, a 950 Ktpa carbon-in-leach processing plant and a seasonal 1000 Ktpa heap leach circuit that accommodate the processing of both primary and oxidised ore.

The process plant is fully automated; Figures 4 below are the flow sheets for the primary ore and oxidised ores.

Voro Block Flow Diagram for oxidised ores

(Heap leaching)



Voro Block Flow Diagram for primary ores

(Carbon-in-Pulp Plant)

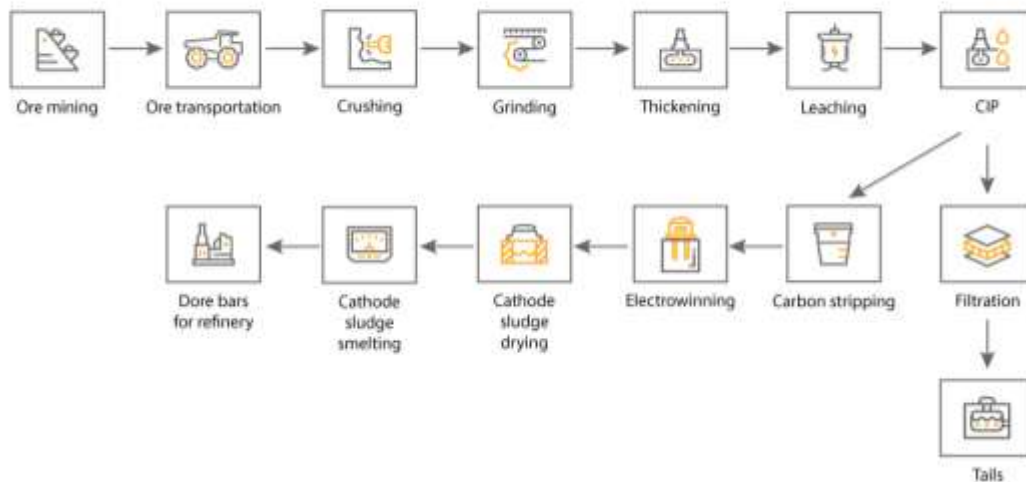


Figure: 4 Schematic Process Flow Sheets for the Primary Ore and Oxidised Ores

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The process plant operates as per the illustrative flow sheet (Figure 4). Tailings produced from the gold recovery process are sent to the filtration system, where the filtrate is collected and re-circulated in the process (closed loop system). The filter cake dry tailings are deposited in the Tailings Storage Facility (TSF). The TSF is geosynthetically lined with a 1.5mm HDPE geomembrane. Surface water runoff from the tailings is captured and flows to the "surface water runoff pond", and flows to the water treatment plant before being discharged.

The oxidised ore uses a heap leach system, where by cyanide solution is drip fed onto the ore rock in order to liberate the gold into solution. This is collected via numerous collection pipes and drains into collection ponds from where it enters into the process plant for gold recovery. All residue solution is collected within the plant and re-used in the cyanide circuit (closed loop). The cyanide is received in St Petersburg port from South Korea. St Petersburg port holds a license for the importation of Dangerous Goods (DGs), which includes cyanide.

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SUMMARY AUDIT REPORT

Auditor's Finding

This operation is

- in full compliance
- in substantial compliance *(see below)
- not in compliance

with the International Cyanide Management Code.

Audit Company: Wardell Armstrong LLP

Audit Team Leader: Christine Blackmore

E-mail: cblackmore@wardell-armstrong.com

Names and Signatures of Other Auditors: _____

Date(s) of Audit: Site visit 17-24 November 2018

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 Verification Protocol for Gold Mine Operations and using standard and accepted practices for health, safety and environmental audits.

Voro Gold Mine



May 2019

Voro Gold Mine



May 2019

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 with
 in substantial compliance with Practice 1.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Polymetal has contracted to purchase cyanide from Tongsoh and use the Hyosung supply chain, both are signatories of the code and have been certified. The contract is for 5 years and commenced in January 2018.

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

Standard 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 with
 in substantial compliance with Practice 2.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

A transportation Due Diligence (DD) audit was undertaken on Polymetal Voro supply chain in accordance with the Code, and submitted to the ICMI in February 2019 and is currently undergoing ICMI's Completeness Review.

The following companies were included in the DD audit.

TNT – responsible for Cyanide documentation from importation, transit and delivery.

RZD (Russian Rail) – responsible from St. Petersburg port to Nizhny Tagil railway station (good yard).

ADR Express - responsible for the collection from Nizhny Tagil station and delivery to Voro by road.



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A contract (ZSU 1/03-10444 dated 29 January 2018) was signed for 5 years supply from Tongsoh and using the supply chain of Hyosung for all Polymetal operations using cyanide. However, I do not believe it extends to St Petersburg port therefore, the Auditor undertook a DD using the Cyanide Code guidance and IMO International Maritime Dangerous Goods Code on St. Petersburg Port as far as possible. Discussions were also held with Polymetal port representative with regard to consignment notes and customs clearance. Due to the size and sensitivity of the port (Container terminals) we were not able to secure passes to enter. However, I have no reason to suspect that the port is not operated in an appropriate and responsible manner for the security and safety of cyanide. Emergency response at the port for incidents/accidents is managed by the Russian Federation Authorities Civil Defence, as in all cases to do with cyanide.

The responses to the following audit questions are provided in their detailed supply chain audit reports.

Sodium cyanide enters Russia via St Petersburg port. The port is licensed to import DGs. The cyanide is unloaded and taken to the dangerous goods storage area within the port area to await customs clearance. On completion of the documentation the cyanide is taken to the rail depot within the port boundary and loaded onto flatbed rolling stock. There is high security at the port. Patrolled 24/7 and has CCTV.

The port and its operations are well established, and St Petersburg is a major port for Russia. The Auditor is satisfied that appropriate care is paid to cyanide shipments and their onwards transit.

The Auditor was presented with the containing chain of custody notes/ consignment notes, from leaving the manufacturers to the arrival at Voro. During the site audits to TNT, RR and ADR the auditor checked the notes and verified the details. The Auditor confirms that all documentation appertaining to the transport and delivery of cyanide to site was in order and of a good administrative standard.

Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

The operation is in full compliance with
 in substantial compliance with Practice 2.2
 not in compliance with



SUMMARY AUDIT REPORT

Summarize the basis for this Finding/Deficiencies Identified:

A Due Diligence (DD) audit was undertaken on Polymetal Voro supply chain in accordance with the Code. Polymetal have registered their supply chain for Voro mine.

The following companies were included in the supply chain DD audit:

TNT – responsible for Cyanide documentation from importation, transit and delivery.

Russian Federation Rail (RZD) – responsible from St. Petersburg port to Nizhny Tagil railway station (good yard).

ADR Express - responsible for the collection from Nizhny Tagil station and delivery to Voro by road.

A contract (ZSU 1/03-10444 dated 29 January 2018) was signed for 5 years supply from Tongsoh and using the supply chain of Hyosung for all Polymetal operations using cyanide as a result Hyosung has the responsibility for cyanide.

The Auditor was presented with the files containing the chain of custody notes/consignment notes covering leaving the manufacturers to the arrival at Voro.

3. HANDLING AND STORAGE: *Protect workers and the environment during cyanide handling and storage.*

Standard of Practice 3.1: Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.

The operation is in full compliance with
 in substantial compliance with Practice 3.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Cyanide containers are stored in a purpose built fenced compound which has an HDPE/stone basal area to protect the ground surface, and any water run off drains to a sump. Any collected water is used as “top up” in the cyanide circuit. The cyanide circuit is closed loop.



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Construction validation reports have been prepared for the unloading/storage and mixing areas where cyanide is handled. Before the site is commissioned by RFA law the reports are presented to the authorities for approval prior to the issue of a permit to operate.

The cyanide storage facility has been constructed at a distance of a few Km from the nearest dwelling and surface water course. Voro have installed precautionary measures in case of spills for example the basal area is HDPE lined, covered with a stone medium, the area drains to a sump to a collection pond. This water is used for top up water for the process plant. Voro only use solid cyanide briquettes.

The area is outside, therefore well ventilated and away from any dwellings and water courses. The compound is secure and has 24/7 monitoring by security patrols and CCTV. No other chemicals are stored with the cyanide.

The cyanide mixing area has restricted access and is further limited at mixing times. The mixing tanks are on a concrete floor and have concrete bunding around. The mixing area is well ventilated and is monitored by CCTV 24/7. Prevention measures are in place to prevent the over filling of the cyanide tanks: alarm system linked to the control room and manual level gauges on the side of each tank.

Standard of Practice 3.2: 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.

The operation is in full compliance with
 in substantial compliance with Practice 3.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Procedures are in place for the safe storage, handling and mixing of cyanide. The Auditor observed and visited the cyanide storage area and mixing area and confirms that good standards of practice were implemented. All cyanide areas are monitored 24/7 by security, and maintained also by the process plant and room.

The cyanide is delivered in wooden boxes, following the use of the cyanide these are dismantled and collected by a specialised licensed carrier (RFA law). The plastic liners are rinsed and dried with deionised water. The water is collected and used in the process circuit. All shipping containers are check with a HCN gas analysers before being returned. Procedures are in place for decontaminating containers and the waste water is collected and used in the process plant as “top up”.



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Each area where cyanide is stored and used has been constructed to a high standard using best engineering practices. Areas where cyanide is stored and used are well ventilated and storage of cyanide is “off the ground” surface. Leakages/spillages should they occur have been built into the design of each of the unit areas.

Cyanide shipping containers are only stacked 2 high. Cyanide mixing takes place in the process plant in a controlled and restricted environment, this is monitored by CCTV from the control room. Two persons attend the mixing. Specialised PPE is worn for these duties, PPE checking rules are in place before mixing is allowed.

4. OPERATIONS: *Manage cyanide process solutions and waste streams to protect human health and the environment.*

Standard of Practice 4.1: *Implement management and operating systems designed to protect human health and the environment utilizing contingency planning and inspection and preventive maintenance procedures.*

The operation is in full compliance with
 in substantial compliance with Practice 4.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Procedures and management systems are in place for cyanide in order to protect the environment. The design of the facilities have been approved by the RF, this includes Voro processing plant and associated infrastructure before a permit to operate is issued. The auditor was shown a Construction Quality Assurance (CQA) validation report of the construction works. The Auditor checked relevant details relating to the elements applicable to cyanide circuit.

Voro is aware of the permit parameters they need to work to. For example: Design procedures are in place and being observed by Voro operations, such as freeboard on all the solution ponds, monitoring solution concentrations, observing the regulations for the sanitary protection zone in relation to the classification of hazard eg cyanide etc.

The cyanide process is monitored 24/7 by the control room, should there be any changes identified in the process plant and action procedures are in place. If an upset occurs in the water balance there are procedures in place for example if there is an excess of water in the system, Voro always have at least 2 of the 8 solution ponds empty should additional capacity be required.



SUMMARY AUDIT REPORT

The cyanide process facilities are inspected at the start of each shift, this is a mandatory inspection and has a systematic check list. All inspections are recorded. Daily inspections (designated workers) also include the HLP, solution ponds and the TMF, which are also recorded. In addition to daily inspections the “Chief Engineer” inspects twice a year and also annually by a specialist. All inspection reports are reviewed by the Chief Engineer who is responsible for the facilities functioning as designed and parameters of operation. All defects are recorded manually and electronically for action. A rectification process is in operation to sign off by the Chief Engineer as rectified. The facilities are also inspected once a year as per the conditions of the operating permit by the RF Authorities.

Each facility is on a “rolling” programme for maintenance. Daily inspections are undertaken and if there are any defects these are electronically recorded and maintenance order generated. The process is followed through till sign off.

Cyanide holding tanks are inspected routinely by the process plant operational staff, any defects are reported electronically for action and rectification. Mixing tanks are inspected prior to any cyanide mixing, by the operatives. Secondary containments are inspected monthly by the process manager and daily by the operating staff. Solution ponds are drained rotationally and inspected by outside specialist contractors to preserve the integrity of the lining systems.

Voro has 3 power sources to counteract any outages:

1. Mains from the national power grid;
2. Alternative mains power from another national power grid source; and
3. Diesel generators.

All piping connected with cyanide is inspected on a daily basis by operating staff and monthly by the process plant manager.

Standard of Practice 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 with
 in substantial compliance with Practice 4.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro has its own laboratory on site, capable of undertaking cyanide analysis for optimization. Samples from the cyanide circuit are taken every 2 hours for monitoring. The Auditor visited the laboratory and discussed the monitoring process and how these are recorded and actions taken when or if anomalies arise. All results are passed on to the Chief Metallurgist for recording and any actions.



SUMMARY AUDIT REPORT

Standard of Practice 4.3: Implement a comprehensive water management program to protect against unintentional releases.

The operation is in full compliance with
 in substantial compliance with Practice 4.3
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

A copy of the water balance calculations was presented to the Auditor. The water balance calculation contained all the expected inputs and outputs to support the water balance. This calculation is regularly reviewed. Climate data is collected locally to the site and analysed in order to update the calculations.

The solution ponds are inspected daily by two designated staff. The ponds work on a rotational basis, whereby a minimum of 2 ponds are kept empty (spare capacity) in case there is an upset in the water balance or overtopping needs to be controlled. The design and working parameters set for freeboard is 1.5m for each pond.

The solution ponds are inspected daily by two designated staff. The ponds work on a rotational basis, whereby a minimum of 2 ponds are kept empty (spare capacity) in case there is an upset in the water balance or overtopping needs to be controlled. The design and working parameters set for freeboard is 1.5m for each pond.

Environmental monitoring is undertaken upstream and downstream of the facilities. A surface water management scheme is in place. The Auditor is satisfied with these arrangements.

Standard of Practice 4.4: Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

The operation is in full compliance with
 in substantial compliance with Practice 4.4
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro have taken many measures to prevent wildlife from entering the solution pond areas. The Auditor visited all the ponds to confirm that sufficient fencing was in place, the gas loaded bird scarer was operational etc. The solution ponds have dedicated staff on a 24-hour basis.

To date there have been no wildlife mortalities recorded at site. The ponds are inspected daily by the process plant staff. The open water is protected by two fences and also a bird scatter cannon has been installed.



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Voro applies the cyanide to the HLP using a buried dripper system. The system falls short of the boundary of the HLP and bunded area to prevent the migration of cyanide solution.

Results have been provided to the Auditor to confirm this.

The HLP, solution collection ponds and TMF are HDPE lined. The Auditor visited all the facilities to confirm this. All process tanks and associated cyanide pipe works are in concrete bunded areas, the bunded areas are built to a capacity of 110% a recognised standard for the containment of liquids. All bunds have drainage sumps that connect to the cyanide circuit (closed loop). Boreholes have been installed around the site facilities, these are monitored on a regular basis to monitor seepage.

Monitoring results have been provided to the Auditor for January to May 2019 for the settling ponds and TMF (cake storage), these are tested every month. Testing results indicate concentrations are less than 1mg/l NaCN.

Standard of Practice 4.5: *Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.*

The operation is in full compliance with
 in substantial compliance with Practice 4.5
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro does not discharge directly to any water courses. All surface water drainage channels flows to the water treatment plant. The treatment plant is sampled daily for its effectiveness, and is further sampled at the discharge point.

The Auditor was presented with the water analysis for several samples taken over the last few years. The Auditor confirms that there were no exceedance of cyanide in any of these results.

Standard of Practice 4.6: *Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water.*

The operation is in full compliance with
 in substantial compliance with Standard of Practice 4.6
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified



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Ground water monitoring boreholes have been installed downstream of the HLP, settling ponds and TMF, these are monitored for cyanide on a monthly basis. The RFA has a trigger concentration for cyanide (0.05mg/l), which the site must comply with. The cyanide concentration has not exceeded the limit.

The HLP, solution collection ponds and TMF are HDPE lined. The Auditor visited all the facilities to confirm this.

All process tanks and associated cyanide pipe works are in concrete bunded areas, the bunded areas are built to a capacity of 110% a recognised standard for the containment of liquids. All bunds have drainage sumps that connect to the cyanide circuit (closed loop). Photos are available. Boreholes have been installed around the site facilities, these are monitored on a regular basis to monitor seepage.

Standard of Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.

The operation is in full compliance with
 in substantial compliance with Practice 4.7
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

All the infrastructure in the process plant where cyanide is used are in adequately bunded areas with sumps connected to the cyanide circuit to confirm the closed loop system.

All cyanide tanks and pipelines are in bunded areas in case of spillage. The bunds have been constructed to a capacity of 110% and have a slight gradient to a sump. Drainage from the sump is fed back into the cyanide circuit.

Spill kits and prevention procedures can be found in each area where cyanide is used. The cyanide storage area is also bunded and sump drainage.

There are no pipes or facilities close to natural waters. Any surface waters drain to surface water ditches which flows to the water treatment plant.



SUMMARY AUDIT REPORT

Standard of Practice 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 with
 in substantial compliance with Practice 4.8
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The Auditor was presented with the CQA Validation reports for the construction of the facilities relating to cyanide e.g. process plant, TMFs and solutions ponds. The CQA report included all geomembrane facility installations e.g. solution ponds, site investigation reports, construction testing e.g. concrete testing and construction materials. All CQA Validation reports are passed to the RF before the license to operate was issued.

The RFA checks facilities every 6 months for integrity and permit compliance.

Standard of Practice 4.9: *Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and ground water quality.*

The operation is in full compliance with
 in substantial compliance with Practice 4.9
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Environmental monitoring is undertaken on a monthly basis and all results are assessed and graphed to show any anomalies. Sampling and preservation protocols are in place. All information with regard to cyanide were presented to the Auditor. The Auditor confirms that a good standard of environmental monitoring is undertaken and result assessed in an appropriate manner.

Sampling procedures have been developed by a qualified laboratory manager in conjunction with the RFA. Qualifications of the laboratory staff have been presented and checked. The sampling procedure includes, taking the sample, sample locations and preservation of samples. Additionally procedures are in place for receipt of samples, analysis and reporting.



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Although samples are not taken every day, the locations are visited by site staff with a reporting procedure/check list that includes wildlife mortality.

5. DECOMMISSIONING: *Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities*

Standard of Practice 5.1: *Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.*

The operation is in full compliance with
 in substantial compliance with Practice 5.1
 not in compliance with

Standard of Practice 5.2: *Establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.*

The operation is in full compliance with
 in substantial compliance with Practice 5.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

It is not a requirement of the RFA to put funding in place until nearer a time nearer to the planned closure date. However, Voro have undertaken a cost analysis of the decommissioning and include this in the operation expenditure (Opex). This is reviewed every 2 years. Information with regard to the financial mechanism has been presented and discussed with the Auditor. Additional monies are added to the fund in conjunction with inflation.

6. WORKER SAFETY: *Protect workers' health and safety from exposure to cyanide.*

Standard of Practice 6.1: *Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce or control them.*

The operation is in full compliance with
 in substantial compliance with Practice 6.1
 not in compliance with



SUMMARY AUDIT REPORT

Summarize the basis for this Finding/Deficiencies Identified:

Procedures for each task can be found in the appropriate section of the plant, there are hard copies and also electronic copies. Copies can be found in each cyanide work section for example the storage area, mixing area, process plant etc. These procedures include worker tasks, PPE, decontamination etc.

If there are any changes at the process plant etc, procedures are updated to reflect this and the H&S manager prepares a risk assessment in case any additional measures are needed to protect workers.

Feedback and suggestion cards are available for all employees to submit to the H&S.

Standard of Practice 6.2: Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

The operation is in full compliance with
 in substantial compliance with Practice 6.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The operational parameters for pH level in the process plant is 10.5 – 11.5, this an appropriate level to prevent the generation of HCN gas. HCN gas detection monitors are fitted to all cyanide tanks and around the process plant these are monitored in the control room. Additionally, hand held HCN monitors are available these are set at the recommended 0.25ppm. All monitors are calibrated annually, certificates were provided to the Auditor.

The Process plant is a restricted area and no unauthorised persons can enter, further restrictions are applied when cyanide mixing is taking place. the process plant including the mixing area have CCTV which is linked to the control room. H&S signage is displayed in and around the process areas, all cyanide containing tanks and pipes are marked including flow directions. MSDS are available in the process plant together with ER and operating procedures. All documents are reviewed annually as part of the “management review” process. To date Voro have no recorded cyanide incidents.



SUMMARY AUDIT REPORT

Standard of Practice 6.3: Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

The operation is in full compliance with
 in substantial compliance with Practice 6.3
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Equipment is checked daily by the medical staff as is the ambulance. Voro has its own clinic, with full time Doctor and nurse. The medical centre is on call 24/7. The medical staff have a working relationship with the local RF authorities. Cyanide antidote (Amilonitrite) is kept at site and is administered by trained medical staff.

Cyanide drills are undertaken twice a year, the last one was in October 2018, however during the Auditors visit (November 2018) a further drill was undertaken. All reports were passed to the Auditor for approval.

Arrangements are in place with the Civil Defence and the local hospital. The hospital staff are aware that cyanide is used at site and have trained staff in cyanide exposure.

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

Standard of Practice 7.1: Prepare detailed emergency response plans for potential cyanide releases.

The operation is in full compliance with
 in substantial compliance with Practice 7.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro provided a very comprehensive ERP which included many Cyanide potential ER scenarios. Linked with the ERP are procedures to mitigate circumstances which include evacuation, medical care, making safe premises, reporting etc.



SUMMARY AUDIT REPORT

ER drills are undertaken twice a year for cyanide and indeed an extra drill was called during the Auditor's site visit. The Auditor is pleased to report that the standard of the ERP drill was very good and an acceptable and accurate report prepared.

Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process.

The operation is in full compliance with
 in substantial compliance with Practice 7.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro encourages its site personnel to take an active role in the preparation of the ERP and scenarios. There are ample opportunities for site personnel to contribute to its reviews, through suggestion boxes, open door discussions with Chief Metallurgist/Process plant manager.

Before Voro was constructed, the community was made aware that cyanide would be used in the process plant. Information with regard to public meetings formed part of the EIA process.

Incidents that would affect the local community would be dealt and managed by the RF CD would handle that situation. This is by RF law. Should this arise Voro would support the RF CD with resources, man power and medical attendance.

Voro H&S Manager is responsible for the review and updating of the ERP and actively seeks suggestions for consideration and discussions with Voro staff and the RFA civil defence.

Standard of Practice 7.3: Designate appropriate personnel and commit necessary equipment and resources for emergency response.

The operation is in full compliance with
 in substantial compliance with Practice 7.3
 not in compliance with



SUMMARY AUDIT REPORT

Summarize the basis for this Finding/Deficiencies Identified:

Voro have prepared a comprehensive ERP. The ERP includes emergency response co-ordinators roles and responsibilities, including call out procedures, supporting staff and all contact details in cases of emergencies. The Co-ordinators have the authority to deploy the ER teams, ER equipment and any additional equipment required. Check lists for equipment at locations around the site, including the process plant and cyanide storage areas have been prepared, there is also a check list of ER resource equipment and medical equipment (responsibility of Medical staff) on board the various vehicles used in an emergency situation eg. Ambulance, response trucks and fire tenders. Training has been provided to the co-ordinators on all ER equipment as part of their ER procedural training. The ERP also includes cyanide emergency response scenarios and mitigation procedures for on-site situations.

Local site cyanide drill are undertaken twice a year. Reports have been prepared and any actions required to update the ERP have been taken.

A major cyanide drill was undertaken 2 years ago, this included RF CD, local hospital, transportation (ADR), Voro staff.

A detailed report was prepared and circulated to all participants. The H&S Manager took the responsibility to make changes to the ERP and re-issue the plan.

Standard of Practice 7.4: Develop procedures for internal and external emergency notification and reporting.

The operation is in full compliance with
 in substantial compliance with Practice 7.4
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The ERP contains details of all contacts necessary should there be an incident. However, it is the responsibility of the RF CD to undertake liaison with the community should there be a major incident.



SUMMARY AUDIT REPORT

Standard of Practice 7.5: Incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

The operation is in full compliance with
 in substantial compliance with Practice 7.5
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Full Compliance.

Voro has procedures in place to clean up any spills necessary for solid cyanide. Debris from the clean-up is mainly put back into the cyanide circuit where the cyanide is recovered. Contaminated soils would be placed in the TMF. The ERP prohibits the use of Ferrous sulphate to treat any accidental releases of cyanide to surface waters.

Voro have identified an alternative drinking water supply in case of emergency, this is from the centralized water supply system of the Krasnoturinsk city and can be delivered by truck. Bottled water would also be available. The environmental programme has been prepared which covers the sampling methodologies and includes a monitoring location plan.

The sampling procedure and methodology was presented to the Auditor. This includes a site location map where the sampling points are. The local environmental monitoring programme which helps them to evaluate the impact of a cyanide solution on the environment. The programme describes sampling techniques and sampling sites.

Reviews of the ERP are undertaken after cyanide drills and as part of the management review.

Standard of Practice 7.6: Periodically evaluate response procedures and capabilities and revise them as needed.

The operation is in full compliance with
 in substantial compliance with Practice 7.6
 not in compliance with



SUMMARY AUDIT REPORT

Summarize the basis for this Finding/Deficiencies Identified:

Voro undertake ER cyanide drills at least twice a year and evaluate the scenario acted out. If deficiencies are identified amendments are made to the ERP.

During the Audit a cyanide drill was undertaken for the Auditor to observe, the co-ordination of the ER.

Reviews of the ERP are undertaken after cyanide drills and as part of the management review.

8. 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.

The operation is in full compliance with
 in substantial compliance with Practice 8.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Training programmes are in place for employees with regard to cyanide awareness and task training. All training is recorded for each individual. Refresher training is undertaken annually, however for those in direct contact with cyanide this is undertaken every 3 months as part of their task training and evaluation.

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.

The operation is in full compliance with
 in substantial compliance with Practice 8.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Before being allowed to work in any of the cyanide process staff are task trained. After the training the staff member is evaluated for competence in the task and then paired with an experienced members of staff before being allowed to work independently. Training materials have been prepared which includes SOPs for each cyanide task. Copies of each SOP are available in the related work station as hard copies. Electronic copies are also available.



SUMMARY AUDIT REPORT

The staff are trained by qualified managers. Managers are trained externally by the RFA and need to do undertake training courses with final examinations. On passing the examinations a certificate is provided by RFA for them to train their workers, without the certificate they are not allowed to be trainers.

Refresher training for cyanide related workers is provided every 3 months and re-evaluated for competency. Each employee has their own training record, which includes details of the task, trainer, date, location, reference to SOPs and test results etc.

Standard of Practice 8.3: Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

The operation is in full compliance with
 in substantial compliance with Practice 8.3
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Voro have designed their training programmes for cyanide worker (such as storage, process plant, TMF, HLP) undertake cyanide awareness training which includes cyanide release scenarios and de-contamination. All cyanide workers are included in cyanide drills, although these are led by the ER team/co-ordinators.

Cyanide emergency scenarios have been prepared and include the various locations where cyanide is used/stored, therefore whichever scenario is chosen for an emergency drill the workers in that location adhere to the actions they need to take.

In all emergency situations the ER team lead, but procedures are in place for workers to follow. During the audit Voro undertook an emergency drill to demonstrate that workers and procedures are being followed. The drill is followed up by a report on observations, performance and actions. If the report identifies any deficiencies actions are taken to update procedures or re-training is carried out.

Should an actual emergency arise the RFA civil defence would take control and manage the situation. The RFA civil defence are aware cyanide is used and are trained in this field. The local hospital are also aware that cyanide is used and have trained cyanide response staff. Medical staff on site are trained in cyanide response. Refresher training is provided to all staff.



SUMMARY AUDIT REPORT

9. DIALOGUE: Engage in public consultation and disclosure.

Standard of Practice 9.1: Provide stakeholders the opportunity to communicate issues of concern.

The operation is in full compliance with
 in substantial compliance with Practice 9.1
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Open public meetings are held 4 times a year where any concerns including cyanide can be discussed. There is also a community manager employed on a full-time basis, who can be contacted if there are any complaints. Contact details of the mine are displayed around the local towns and villages.

Standard of Practice 9.2: Initiate dialogue describing cyanide management procedures and responsively address identified concerns.

The operation is in full compliance with
 in substantial compliance with Practice 9.2
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Open meetings 4 times a year. There is a community liaison manager. Contact details are available and displayed locally.

Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.

The operation is in full compliance with
 in substantial compliance with Practice 9.3
 not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

No releases have occurred. The responsibility of notification to the general public lies with the Russian civil defence. This is the RF law.



SUMMARY AUDIT REPORT

Voro have a local community office and staff that aware of the management of cyanide. Information leaflets are available. The local community office organises regular meetings where any public questions or concerns can be raised. Copies of the minutes of the recent meetings were presented to the Auditor. There had not been any questions raised with regard to cyanide.

A handwritten signature in black ink, enclosed in a thin black rectangular border. The signature is stylized and appears to be 'SLO'.