



The CODE

The Newsletter of
the International Cyanide
Management Institute
www.cyanidecode.org

2nd Quarter 2019 Edition

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Welcome to the 2nd Quarter 2019 edition of *The Code*.

Auditor Roundtable Provides Input into Program

In February 2019, ICMI hosted a two-day Roundtable meeting in Los Angeles, California, attended by auditors experienced in Cyanide Code audits. The intent of the meeting was for ICMI to gain the auditors' perspectives regarding how the Cyanide Code's auditing and certification component might be refined or improved.



Seven auditors participated in the Roundtable. These auditors were invited because of their experience in conducting Cyanide Code audits, experience in conducting the different types of Cyanide Code audits (mining operations, transporter, and producer), and experience auditing in different world regions. A balance between large multinational consulting firms and small individual consulting firms was also considered. Collectively, the seven auditors and their respective firms are responsible for leading approximately 60% of the more than 800 audit reports submitted to ICMI since 2006.

The Roundtable focused on ICMI's program for Cyanide Code certification audits. This included discussions of audit documents, such as auditor guidance, that might be unclear and thus open to inconsistent interpretation, and potential program changes that might improve the safe management of cyanide. The auditors also shared their experiences regarding challenges in auditing the Code, and their observations on operational challenges in implementing and complying with the Code.

The overall discussion agreed with ICMI's view of the current state of the program, with no major deficiencies identified with the Cyanide Code, how it is applied, or how it is audited. However, discussions identified a number of items for ICMI to consider for potential improvement. For example, auditors noted that high turnover of management and workers frequently occurs at operations during the three-year audit cycle. This presents challenges to compliance in areas such as training, inspections, and record keeping. Interim compliance reviews during the three-year audit cycle were discussed as a potential means to address compliance issues caused by high turnover. It was noted that interim compliance reviews (either internal or external) are already conducted at many operations during the three-year audit cycle, and operations that have such 'health checks' typically have fewer challenges in passing audits.

Several long-term changes in industry practices were identified as having implications for operations, Cyanide Code compliance, and auditing. These included increased use of Isotainers for cyanide delivery, and jurisdictional restrictions on availability of amyl nitrite as a treatment for cyanide toxicity.

A number of 'soft spots' where the Code's expressed expectations could be enhanced or clarified were also identified and discussed. These included items such as change-management systems, mock drills, and expectations for specific types of engineered process controls such as interlocks and regulators.

Potential changes to audit documents were also deliberated, including the development of audit documents specific to consigners, supply chains, and warehouses. Roundtable participants noted that the current Transport Auditor Guidance was developed specifically for truck transportation, but as industry practice and the Code have evolved it is also used for supply chains and supply-chain components, such as warehouses, ports, marine transporters, and interim storage facilities.

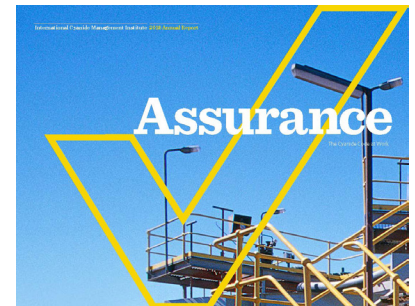
Other items discussed included developing a more concise definition of 'Significant Cyanide Incident' and embedding it in the Cyanide Code, consolidation of auditing documents, notification of ICMI by auditors when audits are scheduled so that any auditor qualification or signatory issues can be resolved in advance of an audit, and the potential for submission of auditor credentials on an annual basis rather than for each operation audited.

The rigor with which Cyanide Code audits are conducted, and the depth to which auditors go to examine operations, was highlighted. ICMI has high expectations for auditors and audits, and the level of detail and rigor with which audits are conducted appears to frequently exceed those expectations. ICMI officials believe that the Roundtable was valuable in providing direct feedback and discussion on the program. The perspective of the participating auditors was especially important because they are on the ground evaluating compliance and interacting with those implementing the Cyanide Code at multiple operations, for multiple companies, and in many different jurisdictions.

ICMI will continue to evaluate items that the Roundtable indicated as an opportunity for program benefits and seek further stakeholder input on these items. Comments on the items described above are welcome, as well as comments on any other aspect of the Cyanide Code program. Comments may be sent to info@cyanidecode.org.

2018 Annual Report

The International Cyanide Management Institute has published its 2018 annual report titled *Assurance*. The report focuses on the theme of assurance, one of the Cyanide Code's key characteristics as a voluntary industry certification program. The report identifies milestones that the Cyanide Code has achieved and provides statistics on its continued growth. The report also notes the program's evolution during 2018, discusses benefits the Cyanide Code brings to its participating companies and stakeholders, and presents the Institute's financial statement. The report can be viewed [here](#).



Signatory Fees Set for 2020

ICMI is largely sustained by the annual signatory fees paid by the Cyanide Code's participating companies. The fees are set by the organization's Board of Directors. At its April meeting, the Board decided to leave the fee rates for 2020 unchanged from the rates set in 2017. Consequently, for 2020, gold mining companies participating in the Cyanide Code will continue to be assessed at US\$0.042 per ounce of gold produced by cyanidation in 2019, with a minimum fee of US\$2,000. Silver mining companies will continue to be assessed at US\$0.042 of gold equivalent ounces produced by primary silver mines in 2017. The flat fees for signatory cyanide producers and transporters will remain at US\$6,300 and US\$1,100 respectively.

Data Mining Yields New Insights into Operational Practices

Cyanide Code audit reports are rich with information regarding operational practices, but much of this data has not yet been collated and analyzed. For example, details on operating pH ranges, use and type of cyanide destruct circuits, and typical cyanide concentrations in tailings supernatant all appear in audit reports. Recognizing that there could be value gained from a formal analysis of selected practices at Code-certified mining operations, ICMI decided to 'mine' audit reports for such information. Late last year, ICMI engaged a consultant to collect and collate selected data from the summary audit reports of currently-certified gold mines. Examples of the information collected are the form of cyanide delivered, such as liquid or briquettes, the operating pH ranges in the process leach circuit, the type of cyanide antidote kept onsite, and the WAD cyanide

concentrations in tailings effluent and supernatant.

In many cases the data has confirmed ICMI's impressions of operational characteristics, such as typical pH operating ranges for process circuits, but also identified operating pH targets as low as 8.7, which may cause high HCN generation, resulting in a need for additional management measures to protect workers. The data has also revealed characteristics that were not transparent, such as the high number of operations (44%) with cyanide destruct circuits. These can be expensive to operate and many of them are in place specifically to enable meeting the Cyanide Code's requirements for WAD cyanide concentrations limits in surface waters and in discharge. The exercise has also given ICMI insight into the market share of signatory cyanide producers and the regional distributions of cyanide sourcing, as well as the forms of cyanide delivered and types of delivery, which are germane to mining operation and transporter safety. The data also show the impacts of jurisdictional restrictions on the use of amyl nitrite as a cyanide toxicity treatment, with consequences for operational emergency response and training.

Much of this summary data was published in ICMI's 2018 annual report. ICMI will continue collating this and other data, and will periodically share new insights with its stakeholders.

Update on Cyanide Antidote Research

Availability of effective cyanide antidotes suitable for field administration has been of growing concern to the mining industry. Antidotes currently in use require intravenous injection by trained responders, making their use problematic in remote areas and during cyanide transportation. Jurisdictional restrictions on availability and use of amyl nitrite as a treatment for cyanide exposure have also diminished cyanide response capabilities at many mining operations.

Considerable research on development of new cyanide antidotes has been conducted in the past 15 years. In the United States, for instance, research on cyanide antidotes has been funded by the National Institutes of Health with the objective of developing an antidote that would be effective in mass exposure scenarios.

ICMI has been in contact with Gerry Boss, M.D., a medical researcher at the University of California, San Diego, in the United States, who has been leading a program for development of new cyanide antidotes. This research has included evaluation of the effectiveness of potential new antidotes, and evaluation of their characteristics such as solubility and storage. Dr. Boss has identified a promising antidote, cobinamide, which testing has shown to be 5 to 8 times more effective than other antidotes currently used. Recently developed formulations of cobinamide appear to be safe, making it potentially suitable for administration in cases where cyanide exposure is suspected but not certain.

Cobinamide will soon be presented for approval to the US Food and Drug Administration. If approved, commercialization could occur within about two years.

Related research has also been conducted on developing simpler methods for administering antidotes. This has included development of self-administered autoinjectors, which inject antidote directly into muscle tissue, as well as research into systems for an inhaling antidote. These systems could be self-administered and require minimal training for use, making them more practical in remote areas and for transport operations.

Please contact Eric Schwamberger (eschwamberger@cyanidecode.org) if you are interested in learning more about this research.

Code Questions

Remote Auditing

Question: Many operations have been certified multiple times, found in full compliance with no issues and demonstrated that they have systems in place to ensure continuous compliance. Could such operations be audited without a site visit to the operations?

Answer: ICMI does not believe that remote auditing would be an acceptable practice for auditing operations for compliance under the Cyanide Code.

One of the strengths of Cyanide Code certification is that it requires independent verification that operational plans and procedures are being fully implemented to meet the Code's expectations. Such independent verification would frequently be difficult, if not impossible, without direct on-site observation. For example, integrity of secondary containment, availability and condition of emergency response equipment, and maintenance of features such as eyewash stations would be difficult to

independently verify without visiting an operation. ICMI also believes that direct face-to-face interviews with management and workers at site, and in the context of what the auditor is observing, are more meaningful than remote interviews and lead to a better assessment of programs such as training, inspections, maintenance, and emergency response. Finally, some activities, such as delivery of liquid cyanide, or mixing of solid cyanide, and evaluation of the activity against written procedures can only be conducted through direct observation.

ICMI asks that audits be conducted using standard and accepted practices for health, safety and environmental audits, and does not believe that remote auditing is a standard and acceptable practice for rigorous health, safety and environmental audits.

Cyanide Deliveries in Isotainers

Question: ICMI's auditing documents for mining operations refer to liquid cyanide delivery in tanker trucks but do not discuss delivery in Isotainers. Do the protocol questions referring to liquid cyanide delivery in tanker trucks also apply to delivery in Isotainers?

Answer: In the case of ISO tank containers (also referred to as Isotainers or Isotanks), cyanide is typically transported to the mining operation as solid briquettes within the ISO tank. After arrival at the mining operation, water is added to the ISO tank to dissolve the cyanide briquettes within the tank, and the tank is then sparged or pumped to transfer the cyanide solution from the ISO tank into the mining operation's cyanide storage tank. Although ICMI's *Auditor Guidance for Use of the Mining Operations Verification Protocol* (Auditor Guidance) makes no reference to delivery in this manner, discussion in the Auditor Guidance pertaining to liquid cyanide delivery in tanker trucks does apply to delivery of cyanide in this way, as delivery is made as a liquid. For example, the expectations described in the Auditor Guidance discussion for Standard of Practice 3.1, questions 3 and 4 would apply to delivery in ISO tanks. These include expectations that liquid cyanide be unloaded on a concrete or other surface to minimize seepage to the subsurface, and expectations that the cyanide unloading area be designed and constructed to contain, recover or allow remediation of any leakage from the ISO tank during transfer of cyanide solution from the ISO tank to the mining operation.