

INAP Op Com Meeting

May 28, 2018

Perth, WA, Australia

Participants: Claudio Andrade – Barrick/Chair of Op Com, Ben Wither – Newcrest, Michael Davies – Teck, Richard Martin – BHP, Rynhard Kok – Newmont, Paul Ritchie – Newmont, Rosaling Green – Rio Tinto, Derek Riehm – Lundin, Bruce Kelley – INAP Australia, Tara Garrod – Newcrest, Gilles Tremblay - INAP

Welcome: Claudio Andrade welcomed all participants to the meeting. He then read the following anti-trust statement.

“As a reminder, it is the responsibility of our members to comply in all respects with federal and State antitrust laws. As such, discussion for the purpose of bringing about any understanding or agreement among members to (a) raise, lower, or stabilize prices; (b) regulate production; (c) allocate markets; (d) encourage boycotts; (e) foster unfair trade practices; (f) assist monopolization, or (g) in any way violate federal or State antitrust laws is unacceptable and will not be tolerated.

Any questions regarding the meaning or applicability of this policy, as well as any concerns regarding activities or discussions at INAP meetings, should be promptly brought to the attention of the INAP Chairman.”

Agenda and Action Items from November 9, 2018 Meeting (Banff, Alberta)

Gilles Tremblay presented the agenda and it was accepted as is.

Most of the action items from the November 9, 2018 meeting will be covered during the Technical Manager’s Report.

Gilles mentioned that, for the last action item on the list, he would be meeting with Graeme Gunn, INAP Accountant on June 1 to discuss the approach needed to ensure that INAP has enough funds in the accounts to meet 2018 commitments. These additional funds would come from the existing term deposit that is renewed late July.

ACTION: Funds for 2018 Budget: Gilles to meet with Graeme on June 1 regarding the additional funding from the existing term deposit to cover 2018 commitments.

Technical Manager’s Report: Gilles Tremblay

- Several key activities and deliverables were completed since the November meetings in Banff. Most important was the announcement of the first winners of the Best Management Practice Award to both Kinross and Rio Tinto. In addition, the Global Cover Design Guidance Document was completed and is now available on the website. The Zoom platform was confirmed for the webinars series and INAP will start offering webinars starting in 2018. Tiered membership documentation was completed and INAP welcomed two new members in that category – Detour Gold and Lundin Mining. The attributes, which facilitate discussions between prospective member representatives and their respective upper management decision makers, were also completed and distributed. SMI-ICE Chile was formerly welcomed in INAP as the new Global Alliance member for South America (SANAP) and a successful introductory workshop was held on May 9 in Santiago with more than 80 people in attendance.

- Key highlights from the report included:
 - **INAP Australia:** The 9th Australian AMD Workshop was one of the main activities in Australia during the reporting period. INAP was well represented at the AMD workshop. An INAP Australia Members meeting and a network meeting were held in Perth the week after the workshop. Excellent discussion on possible future INAP project areas were held. Bruce continues to successfully lead INAP efforts in Australia and is a member of the selection committee for INAP's Best Practice Award and was much involved in the selection of the ZOOM platform for INAP's Webinar series. He also met with SMI in January to discuss their ongoing role as INAP's Global Alliance partner for Australia and was involved in discussions regarding the 2021 ICARD bidding process. Bruce was instrumental in the establishment of the South American Network on Acid Prevention (SANAP) Chile as INAP's Global Alliance partner at SMI-ICE Chile. He also continues to have regular interactions with the Technical Manager including phone calls on an as needed basis.
 - **Global Alliance Activities**
 - **ADTI – MMS:** Volume 6 of the Series: ADTI-MMS/SME Management Technologies for Metal Mining Influenced Water: Geochemical Modeling for Mine Site Characterization and Remediation Modeling Workbook - Management Technologies for Metal Mining Influenced Water is now available via SME Bookstore. Discussion followed on the interest of INAP members to obtain copies of the various volumes. **ACTION:** Gilles to follow-up with SME on obtaining e-copies of the different volumes available for members with the intention of placing them on the INAP member website for download.
 - **IMWA-PADRE:** All of IMWA's effort since the completion of IMWA 2017 in Finland in June 2017 has been the preparation of ICARD-IMWA 2018 which is covered in a separate heading.
 - **MEND:** A draft of the "Literature Review of Biological Effects of Sub-Aqueous Disposal of Reactive Mine Tailings" was recently completed and the final report is expected to be released in 2018. The project will provide guidance for future field studies into the biology and ecology of subaqueous tailings disposal. The 24th Annual BC-MEND ML/ARD Workshop was held in November in Vancouver with over 200 participants. Case studies and technical presentations from leading practitioners were presented.
 - **SMI - Australia:** Successfully organized the 9th Australian Workshop on Acid and Metalliferous Drainage "Leading edge practice across resource cycles" in Burnie, Tasmania. Confirmed SMI interest in bidding for the 2021 ICARD conference.
 - **SMI-ICE Chile:** Confirmed as INAP's Global Alliance Partner for South America. Organized a successful SANAP Workshop in Santiago where good support was received for the establishment of a SANAP working group to formalize the Network. Information on frameworks followed by other GA groups will be provided as examples for SANAP to follow. Will start by establishing a Chilean network followed by other countries. The first official SANAP meeting is planned in conjunction with the Planning for Closure 2018 Conference in Santiago, November 7 to 9, 2018.
 - **WRC:** The Water Research Commission (WRC) has recently released an update to the South African Mine Water Atlas. They are also involved in the planning of ICARD 2018/IMWA 2018. **ACTION:** Gilles to meet with Jo Burgess of WRC during ICARD to discuss their ongoing role as the Global Alliance Partner for South Africa.
 - **Global Cover Guidance Document – O'Kane:** The Guidance Document was officially launched at a short course at the AMD 2017 workshop in Burnie by OKC personnel and is available from the INAP website. The final invoice, for \$88,360.00 USD was submitted in June

and has been sent for processing. Several presentations on the report are planned by OKC (e.g. INAP Webinar, Northern Latitudes, possibly BC MEND). In a previous meeting, it was agreed to provide the members with the electronic files used to create the figures found in Appendix A. Concept Draw's MINDMAP software program would need to be purchased to use the files.

ACTION: Electronic files used to create decision tree in report to be sent to members.

- **ARD Best Practice Award:** The first recipients of INAP's international ARD Best Practice Award are Kinross Brazil for their operation in Paracatu, Brazil and Rio Tinto's Iron Ore Pilbara operations. Both took different approaches, Kinross focusses on one site while Rio Tinto presented a corporate/regional approach with many sites included. It was acknowledged that corporate wide programs that reach far beyond individual sites is important. INAP will be presenting two awards in the future, one site specific and one at a corporate level. Gilles mentioned that a conference call is planned for the selection committee members to discuss the path forward for the awards. New criteria need to be developed as well as review of the proposed wording for the plaques. In response to a question to members, it was agreed that a plaque would be presented to the winners to acknowledge the award. Promoting the award winners is also to be discussed and the approach used by the BC AMD Task Force was noted as an excellent example that could be reviewed.

ACTION: Organize a call to discuss criteria and to finalize the 2018 ARD Best Practice Award presentations at ICARD 2018.

- **GARD Guide update.** Gilles summarized the comments received from the reviewers. Some were inserted into the various chapters and others were provided in letter format. Expert reviewers tended to look at the overall document and ways of improving user friendliness. Some reviewers found it could be intimidating for smaller mining companies that want to better understand ARD/AMD issues. Comments included but are not limited to:
 - conducting a rigorous re-organization of the entire GARD Guide
 - improving the logic, layout and accessibility of the material
 - reducing repetition
 - simple updating of each chapter.

An overarching reviewer comment was to include a summary box with key messages at the beginning of chapters with non-technical overview of contents. Others recommended the addition of a chapter that would serve as a road map to the guide (e.g. the bow-tie approach). Based on the site information the road map would take you to the pertinent chapters making the search for information/technologies much simpler. Ben (Wither) mentioned that Newcrest is working on an AMD 101 Handbook that could serve as the summary chapter that has been mentioned by the reviewers. This document will be made available to INAP once completed later this year. A Phase II is also planned following the completion of Phase I, this being a Workbook. Gilles mentioned that he would continue to review the comments and that more discussions are planned regarding the next steps to update the GARD Guide.

- **Pit Lake database project:** The 2018 budget has a \$50K USD commitment for the continuation of the pit lake database. Devin Castendyk, now with Golder, created the original database while he was at Oneida College in New York and is interested to see the project move forward. He recommended, for the first phase, that the data gathering exercise be concentrated in the state of Nevada where many metal mining pit lakes are located. Devin recently contacted Connor Newman at the Nevada Department of Environmental Protection

(NDEP) in Reno who is very interested in this project and is willing to contribute. The path forward would be for Golder to hire a student intern to work in the NDEP office to gather the information for the pit lake database. INAP would reimburse Golder for the student's time and some of Devin's time, which would be much less than the budgeted amount. Discussion then centred on how the data would be used and the various filters in the data base (e.g. geology).

ACTION: (a) Gilles to follow-up with Devin Castendyk of Golder for a proposal to further develop the pit lake database. (b) Proposal to be reviewed by select members of Op Com. Both BHP and Rio Tinto will be consulted based on their work from the Pilbara using the analogue method for pit identification.

- **Toward Environmentally Responsible Resource Extraction Network (TERRE-NET)**
INAP is a partner in TERRE-NET, a multi-institutional and multi- and trans-disciplinary research Network comprised of 15 co-investigators from 7 universities across Canada, with the overarching goal of ensuring the “environmentally responsible, socially acceptable extraction of mineral and energy resources using cutting-edge approaches and technologies”.

Claudio, INAP's representative on the TERRE-NET Board of Directors reported that some 30 to 40 projects are underway, but the major issue has been the availability/recruitment of doctorate level students to do the research work. On some projects, two master's students are selected to do the work instead of a doctorate student. It was pointed out that many member companies do have graduate student programs that are used to recruit students to their companies.

The 2nd Annual General Meeting for the network is planned for June 26-27, 2018 at the University of Ottawa. Both Gilles and Claudio are planning to attend. The Board meeting will be held on June 28.

ACTION: Abstracts of the presentations from the TERRE-NET AGM will be distributed to INAP members following the AGM.

- **11th ICARD/IMWA 2018:** Conference to be held September 10-14, 2018 at the CSIR International Convention Centre in Pretoria, SA. Planning well underway. Key INAP activities include the following:
 - INAP and GA Meeting, to be held on Monday September 10th from noon to 5 pm.
 - INAP's Plenary Session scheduled for Tuesday September 11th. A 60-minute time slot for three presentations
 - General introduction on INAP plus award presentation
 - Best Practice Award Recipients – Kinross (Alessandro) followed by Rio Tinto (Rosalind).
 - INAP sponsoring Banquet dinner “Taste of Africa” on Thursday September 13. Fluctuating currency resulted in our sponsorship being slightly higher than expected.
 - ICARD 2021 bid presentations schedule for the closing session on Friday September 14 following lunch.
 - INAP welcoming Terry and Andrea Chatwin at ICARD as a thank you gift for their 10 years with INAP.

ACTION: Copies of the three INAP papers presented at ICARD to be distributed to members.

- **12th ICARD – 2021.** Two groups have expressed interest in bidding to host the 2021 ICARD and will present during the closing ceremony in Pretoria - Australia (Brisbane) via SMI and

Canada (Halifax/Montreal) via CIM. There were some discussions on continuing INAP's collaboration with IMWA for ICARD conferences. IMWA has indicated their interest in continuing. It was pointed out that this year's ICARD was led by IMWA which made things more difficult because IMWA also continues to have annual conferences and planning for the next one does not take place until the annual conference is completed. With them leading the ICARD conference, this caused delays such as late papers etc which could be problematic. For future ICARD's, IMWA should not be the leading organizer but part of the organizing committee, which was the case in Santiago.

Gilles reported that he also received interest for hosting future ICARDs from Gecamin (Chile) while in Chile in May. Mentioned that 2027 might be the earliest date possible for a return of ICARD to Chile since it was held there in 2015.

A discussion ensued with regards to the selection process for the next ICARD host. A suggestion was made that INAP should consider selecting the next two host locations (e.g. 2021 and 2024) to allow the organizers ample preparation time.

ACTION: (a) Gilles to prepare selection criteria for the 2021 ICARD. (b) From the Banff minutes, Gilles was asked, based on his experience with the organization of previous ICARDs, to prepare a checklist of the process that could be followed to organize future ICARD conferences.

- **Webinars:** The final test trial, using the "Zoom" platform, was successful and a follow-up webinar had been planned for mid-May but was postponed. The plan forward is to develop a strategic plan for webinars and the first step for that is to canvass members for subject areas in addition to the GARD Guide and Covers report. Discussions also included the audience (e.g. INAP versus more broadly), recording and web access. SMI Australia will host the webinars and discussions are underway with SMI-ICE Chile to host from there to accommodate the North American time zones.

ACTION: (a) Members to be canvassed for their top five suggestions for webinar topics. (b) Gilles to confirm SMI-ICE Chile to host webinars for the different time zones.

- **INAP Web site:** A work in progress. The plan forward is still to have monthly additions to the site, concentrating on presentations and information on key subject areas for the members section. More time needs to be dedicated to this.
- **Membership:** Tiered membership was approved on a case by case basis in 2017 and both Detour Gold and Lundin Mining have since joined. Amendments required to the Constitution were also completed. Discussion ensued on the number of companies that INAP would accept as tiered members. Final conclusion was that there would not be a limit. Several companies were mentioned as possible members including Yamana Gold. Gilles had a brief discussion with Ross Gallinger in Santiago and will follow-up with him.

ACTION: Gilles to follow-up with Ross Gallinger of Yamana Gold re tiered membership.

Discussion was also had on INAP's link to ICMM. It was noted that several attempts had been made in the past but were not successful. Nothing more planned at this time.

Secretary's Note: On June 1 received confirmation that Agnico-Eagle Mines (AEM) are interested in joining INAP as a full member. Had telephone call with Chris Kennedy to discuss next steps and the Deed of Appointment was sent to AEM on June 18 for their approval.

Chairmen's Discussion: Claudio Andrade

○ **Board Chair Discussion**

- With the unfortunate departure of Cynthia Parnow from Newmont, Claudio mentioned that the members should give thoughts of nominating a new Chair for INAP's Board of Director's. He asked those present to consider volunteering or suggesting possible candidates. This should be done prior to the Q4 Board meeting planned for Vancouver. Gilles added that Jenni Lightowers, has agreed to act as Chair for tomorrow's Board meeting.

○ **Review of 2018 Technical Manager's Duties**

- A question on the Technical Manager's true level of effort was brought up considering that the position is "part-time". Gilles mentioned that the overall level of effort was maybe slightly more than the 50% and added that everything was fine.
- Members questioned whether administration help should be considered to assist Gilles with the more general duties such as meeting invites, etc. Gilles appreciated the concern and noted that sometimes things are better controlled when only one person is involved but would certainly consider having some help if available.
- The 2018 work plan was provided to Claudio and he has added comments and asked that it be circulated to members for final approval. Also mentioned that for future work plans a two-year period should be considered.

ACTION: Technical Manager's 2018 Work Plan to be circulated to members for feedback and final approval.

○ **Future INAP Meetings in Australia**

- Claudio proposed to have yearly Op Com and Board meetings in Australia thus acknowledging the support and the excellent work being done by the members. Gilles and Bruce will work closely to organize the meetings in conjunction with other activities (e.g. AMD Workshop in 2020).

ACTION: Bruce and Gilles to organize Australian yearly Op Com and Board meetings in conjunction with other activities, when possible.

Australian INAP Report: Bruce Kelley

- Bruce mentioned that most of the highlights were covered by Gilles' report and added just a few additional comments.
 - 9th Australian AMD Workshop, Burnie, Tasmania, November 19-23.
 - Represented INAP on the Organizing Committee and was able to help shape the workshop and have INAP involved with the short courses.
 - Moderating the closing session generated some project ideas and opportunities for possible key areas for future work.
 - 2018 ICARD
 - Gilles added that Bruce was also involved in the preparation of the INAP paper for ICARD 2018 and thanked Bruce for his support throughout the year.

Path Forward – Presentations and Discussion on Possible Future INAP Projects

Mike O'Kane (O'Kane Consultants), Jeff Taylor (Earth Systems) and Mansour Edraki (SMI) joined the meeting at this time for the presentations only.

- **Presentation: Demonstrating successful operational and closure strategies for waste rock storage facilities (Jeff Taylor/Mike O'Kane).**
- **Presentation: Update of Teck Resources Projects (Michael Davies).**

- **Presentation: Development of scale up factors for acid and metalliferous drainage prediction and management (Mansour Edraki).**
 - Presentations/proposal available.

Closed Session for INAP Members

A discussion on the path forward for the Taylor/O’Kane waste rock project took place. Members agreed that this project, focused on source control, has potential to add significant value and could be the next big INAP project. It was strongly agreed that mine planners are integral to this approach and need to be involved to better understand how relevant waste rock issues are in the long-term. The importance of demonstrating the potential long-term cost savings in support of the business plan was also discussed notably in demonstrating the long-term risk reduction and cost savings at closure to senior management. Adding other experts to the team would also benefit the project and members will be making suggestions to the proponent when they review the project scope and outline.

Recommendation from the members was for INAP (Gilles) to contact Taylor/O’Kane and request a brief outline for Phase 1 being a review and summary of technologies / methodologies.

ACTION: INAP to request a brief outline (3 to 5 pages) for Phase I of the operational and closure strategies for waste rock storage facilities project.

There was also some discussion on another element of the presentation that could be considered for a later phase and that is the concept of using historical data from operational waste rock sites and modelling to predict the performance of the waste rock pile if it was built differently. Some modelling work has been done at the National Research Council of Canada under the supervision of O’Kane Consultants.

Secretary’s note: If interested, NRC could be invited to present at next Op Com on this subject.

Mike Davies from Tech spoke briefly about their passive water treatment project in Elk Valley. Teck is seeking to move away from active water management and is now more focused on source control. They want to move from short term cost effectiveness to Life Cycle cost effectiveness. That fits nicely with the Taylor/O’Kane proposal which is also an example of better source control.

Mansour Edraki also presented on an SMI proposal on the development of scale-up factors. It was agreed that such work may be considered for subsequent phases of the waste rock storage facilities project.

Also raised during the closed session was INAP’s 5-year plan, a document that was previously used by the group to plan ahead. Gilles noted that he had not seen such a document in the files but would search the files. The members agreed that such a plan is required for INAP and hence should be prepared in the near future. Once in place, the plan would be reviewed and updated on an annual basis.

ACTION: Gilles to search for previous 5-year plan and propose a path forward at the next meeting.

Next Op Com Meeting

The next Op Com and Board meetings are planned for Vancouver, November 26 and 27. The meeting will be held at Teck’s offices, thanks to Michael Davies. Mike has also offered, if members are interested, to lead a tour of the Sullivan Mine. More details to follow regarding a date for the tour as INAP does not want to prevent members from attending the BC MEND Workshop which starts on November 28.

Claudio Andrade thanked all in attendance, formally closed the Op Com meeting.

ACTION ITEMS

- 1.** Funds for 2018 Budget: Gilles to meet with Graeme on June 1 regarding the additional funding from the existing term deposit to cover 2018 commitments.
- 2.** Gilles to follow-up with SME on obtaining e-copies of the different volumes available for members with the intention of placing them on the INAP member website for download.
- 3.** Gilles to meet with Jo Burgess of WRC during ICARD to discuss their ongoing role as the Global Alliance Partner for South Africa.
- 4.** Electronic files used to create decision tree in report to be sent to members.
- 5.** Organize a call to discuss criteria and to finalize the 2018 ARD Best Practice Award presentations at ICARD 2018.
- 6.** Pit Lake Database: (a) Gilles to follow-up with Devin Castendyk of Golder for a proposal to further develop the pit lake database. (b) Proposal to be reviewed by select members of Op Com. Both BHP and Rio Tinto will be consulted based on their work from the Pilbara using the analogue method for pit identification.
- 7.** Abstracts of the presentations from the TERRE-NET AGM will be distributed to INAP members following the AGM.
- 8.** Copies of the three INAP papers presented at ICARD to be distributed to members.
- 9.** ICARD 2021: (a) Gilles to prepare selection criteria for the 2021 ICARD. (b) From the Banff minutes, Gilles was asked, based on his experience with the organization of previous ICARDs, to prepare a checklist of the process that could be followed to organize future ICARD conferences.
- 10.** Webinars: (a) Members to be canvassed for their top five suggestions for webinar topics. (b) Gilles to confirm SMI-ICE Chile to host webinars for the different time zones.
- 11.** Gilles to follow-up with Ross Gallinger of Yamana Gold re tiered membership.
- 12.** Technical Manager's 2018 Work Plan to be circulated to members for feedback and final approval.
- 13.** Bruce and Gilles to organize Australian yearly Op Com and Board meetings in conjunction with other activities, when possible.
- 14.** INAP to request a brief outline (3 to 5 pages) for Phase I of the operational and closure strategies for waste rock storage facilities project.
- 15.** Gilles to search for previous 5-year plan and propose a path forward at the next meeting.