THE USE OF X-RAY FLUORESCENCE SPECTROMETRY TO SUPPORT FIRE ASSAY HAS BEEN THE BIGGEST TECHNOLOGICAL INNOVATION IN ASSAYING DURING MY CAREER

Mike Hinds

An Interview with a Chemist

Mike Hinds, Assay Chemist at the Royal Canadian Mint, is calling time on his career in March 2020, which has spanned more than 30 years. To mark the occasion, Aelred Connelly, caught up with him to ask him about the highlights of his career and what he has planned for the future.

Before we get started, I need to acknowledge the Royal Canadian Mint (RCM) and my colleagues in the Assay Department for their excellent analytical work and collaboration throughout my career. In particular, I want to recognise Jon Forrest, my manager since 2005, and Refinery Directors Robin Entwistle (2005 – 2014) and Rob Sargent (2014 – present) for their support over the years.

HOW DID YOU END UP WORKING FOR THE MINT?

In the fall of 1988, I was a newly minted PhD analytical chemist from the University of Saskatchewan, Saskatoon looking for employment, especially since my wife Cyndy had just given birth to our daughter Brittany. One of my professors came up to me and said: "Mike, there is an ad in the paper from the Mint looking for someone like you. The ad has all the right (technical) words." It wasn't what I expected, but I applied and thought maybe I would get a trip to Ottawa for an interview. This did indeed occur and I saw a lot of potential in the position. RCM offered me a job as an Assay Chemist and we moved to Ottawa. This was a big relief because the position allowed me to stay in my chosen field and stay in Canada.

AS CHAIR OF THE REFERENCE MATERIAL PROJECT WORKING TOGETHER WITH THE OTHER MEMBERS OF THE COMMITTEE TO GET THE FIRST INDUSTRY ACCEPTED FINE GOLD AND FINE SILVER REFERENCE MATERIALS MANUFACTURED CERTIFIED AND IN THE HANDS OF ANALYSTS WORLDWIDE

The bonus was that the area has many recreational opportunities: cycling, hiking, skiing, and canoeing.

In hindsight, there were early influences: my father, who worked for a bank, often brought home slightly damaged canvas Mint coin bags, and when I lived in Winnipeg (early childhood), it was next to the future sight of the Winnipeg branch of the Mint.

WHAT IS YOUR BIGGEST ACHIEVEMENT IN YOUR CAREER?

There have been a couple of big achievements. The first has been to develop mastery of several technical subjects such as mass metrology, x-ray fluorescence spectrometry, and the manufacture and certification of precious metal reference materials. The second has been my involvement with LBMA as chair of the Reference Material Project, working together with the other members of the committee to get the first industry accepted fine gold and fine silver reference materials manufactured, certified and in the hands of analysts worldwide.

IN WHAT WAYS HAS THE MARKET CHANGED DURING YOUR CAREER?

I have observed a steady trend towards refiners receiving less pure gold and silver deposits that have higher levels of iron, nickel and deleterious elements (arsenic, cadmium, mercury, lead, selenium and tellurium).

THE INDUSTRY CONTINUES TO BE COMPETITIVE AND WE HAVE SEEN PRESSURE TO REDUCE THE COSTS OF ASSAYING/ REFINING SHORTEN TURNAROUND TIMES FOR SETTLEMENT AND TIGHTEN SPLITTING LIMITS

These types of deposits require more effort to refine and assay. The industry continues to be competitive and we have seen pressure to reduce the costs of assaying/refining, shorten turnaround times for settlement and tighten splitting limits. If these trends continue then there will be pressure on refiners/assayers to deliver more for less, which could potentially impact the viability of refiners to compete in the bullion supply chain.

Another project I have been mulling over is a textbook on fire assay. The last ones were published in the 1940s and I believe it is time for an update.

WHAT IS THE BIGGEST INNOVATION THAT YOU'VE SEEN DURING YOUR TIME IN THE MARKET?

I believe the use of x-ray fluorescence spectrometry to support fire assay has been the biggest technological innovation in assaying during my career. It provides an immediate estimate of gold, silver and other elements so that both the button fire (determination of gold and silver) and the assay fire (determination of gold) can be done simultaneously. This allows the assayer to implement alternate methods to minimise the effect of high concentrations of iron, nickel, palladium and platinum on the gold and silver assays.

HOW HAS LBMA SUPPORTED THE MARKET IN YOUR FIELD OF EXPERTISE?

The most significant support LBMA has given to the assaying community was starting the biannual Assayer and Refiner (A&R) conferences in 2005. For half my career, there was only limited contact with other assayers. The A&R conferences have provided an important platform to exchange ideas on different analytical methods and invaluable networking opportunities. In my view, we need an open interchange of methods and ideas between assayers to assist all of us in getting better assays. The initial A&R in 2005 lead to a collaboration between RCM, Rand Refinery and Teck Cominco in making a set of silver reference materials.

That collaboration provided the model for the formation of the LBMA Reference Material Project, which has produced several sets of gold and silver reference materials.

Below - Mike at the LBMA Reference Materials Steering Committee held in the old LBMA offices in Basinghall Street. Eagle eyed observers will not only recognise the recycled Board room table and furniture but also some familiar faces around the table. Left to right are Serge Gambs, Paul Bagnoud (Metalor), Neil Harby (Rand), Chen Jie, Zhang Yonghong [interpreter] (Great Wall Gold & Silver Refinery), Hitoshi Kosai , Ichimitsu Itabashi, Hiroshi Sawai, Nobuyasu Ezawa (Tanaka), Dirk Hofmans (Umicore) and Mike Hinds (RCM & Chairman).

On the Hudson river Mike up the creek with a paddle, and enough equipment for a six month vacation.

Aelred Connelly, PR Officer, LBMA
Aelred joined the LBMA in September 2011. He provides support to the Chief Executive in the administration and organisation of the Association's Public Affairs. He is responsible for Press enquiries, is the editor of the *Alchemist* as well as contributing to other LBMA publications, provision of the website and support for LBMA events.

Prior to joining the LBMA, he worked at the Bank of England for more than twenty-five years, the last five as an analyst in the Bank's gold bullion department.

THERE ARE STILL MANY PLACES IN THE WORLD WE WANT TO SEE AND LOOK FORWARD TO MANY **HIKING**, **CYCLING**, AND **CANOEING** TRIPS

DO YOU HAVE ANY PROFESSIONAL AMBITIONS STILL TO ACHIEVE?

Yes, definitely! Although I am retiring from the Mint, I am keenly interested in the whole field of precious metal analysis.

I am planning to continue chairing the Reference Material Project Committee and I hope we can produce a number of gold and silver doré reference materials for XRF and fire assay method validation. Another project I have been mulling over is a textbook on fire assay. The last ones were published in the 1940s and I believe it is time for an update. I also want to continue teaching an XRF short course with an excellent group of instructors. We have taught the course since 2005 and I hope this will continue for many years.

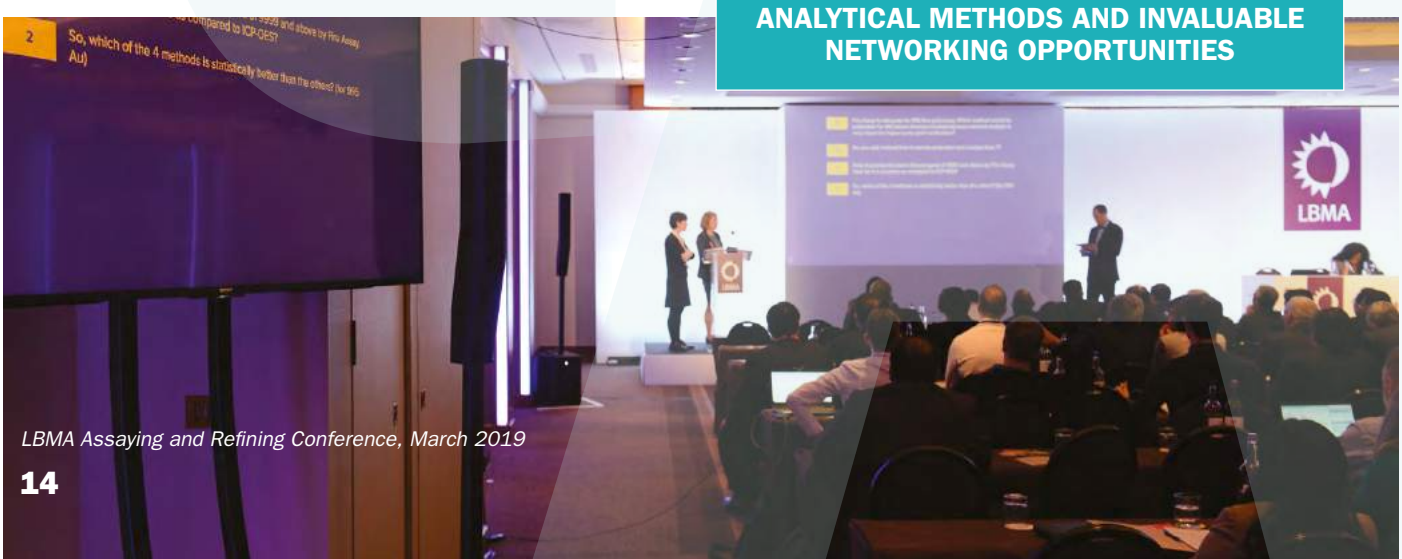
AND ANY ON A MORE PERSONAL NOTE?

With Cyndy retired, we look forward to spending more time in the western part of Canada where we have a cottage in Saskatchewan and our son Tyler has settled in Kelowna, BC. There are still many places in the world we want to see and look forward to many hiking, cycling, and canoeing trips. To balance all that activity, I want to spend more time preparing a wider range of food. Finally, I am endeavouring to be an excellent grandparent in conjunction with Cyndy to young Rowen here in Ottawa.

WHAT OPPORTUNITIES DO YOU SEE FOR THE FUTURE?

I see a very positive future for assayers in the coming years. At present, there are more opportunities for assayers to exchange ideas than I have ever seen. I expect this to continue and I hope this will expand so we can all do better assaying. There are also precious metal reference materials available that did not previously exist and I expect more types of reference materials to be produced in the coming years. This also is critical to maintaining accurate assaying methods. Fire assay continues to be an important method that will remain with us for a long time with the use of complementary spectrometric methods (such as XRF). I foresee movement to using more energy efficient furnaces and perhaps the incorporation of some automation in the processes. I also hope that the industry can work towards providing regular training for assayers.

THE A&R CONFERENCES HAVE PROVIDED AN IMPORTANT PLATFORM TO EXCHANGE IDEAS ON DIFFERENT ANALYTICAL METHODS AND INVALUABLE NETWORKING OPPORTUNITIES



LBMA Assaying and Refining Conference, March 2019