LBMA Assaying and Refining Seminar

By Stewart Murray, Chief Executive, LBMA

The LBMA's third Assaying and Refining Seminar was held at Armourers Hall, London from 23-25 March. The week was a busy one for the more technical and physical aspects of the LBMA's work in that there was also a meeting of the Reference Materials Project Steering Committee on 23 March as well as a meeting of the LBMA Referees on the afternoon of 25 March.

The LBMA has always recognised the importance of allowing participants in the Seminar to network and so, as on previous occasions, the Seminar was initiated at a welcome cocktail reception the evening before the delegates got down to the serious business of the various technical presentations. As with the seminars held in 2005 and 2007, participation was free of charge for all Members, Associates and Good Delivery refiners. The almost 100 delegates who attended heard a range of presentations on analytical methods, reference materials, casting and weighing. The focus on casting in part reflected changes made in the LBMA's Good Delivery rules during the past year, including the phasing out of casting in closed (or gated) moulds and the concerns expressed by LBMA vaults about button type defects on the bottom surfaces of gold and silver bars. The meeting also included presentations from LBMA representatives about various aspects of the Good Delivery system, including an update on the proactive monitoring scheme.

The seminar was chaired by the LBMA Chief Executive. In his opening remarks, he highlighted one important ramification of the recessionary conditions that were currently gripping the markets. This was that industrial demand for precious metals had suffered a significant decline whereas, by contrast, investment demand had strengthened. As a result, some refiners which traditionally produced grain for industrial customers were turning to the production of large bars, which eventually found their way into the London vaults (which were, as a result, experiencing extreme levels of activity). This in turn emphasised the need for refiners to be able to cast good quality bars. For its part, the LBMA has been keen to do everything possible to assist refiners in meeting the high standards expected of them, including the publication of a visual guide to Good Delivery bars, which was the subject of a separate presentation.

Keynote Speech

The keynote speech for the conference was presented by Professor Michael Thompson of Birkbeck College, London University. Apart from his academic career, Professor Thompson has spent much time assisting industry with various chemical analytical procedures. One of his areas of specialisation has been the proficiency testing of the analyses carried out in various laboratories and he described how such systems could be used in the precious metals business (Figure 1). He noted that compared with the existing proactive monitoring system introduced by the LBMA in 2004, proficiency testing differed in a number of ways.

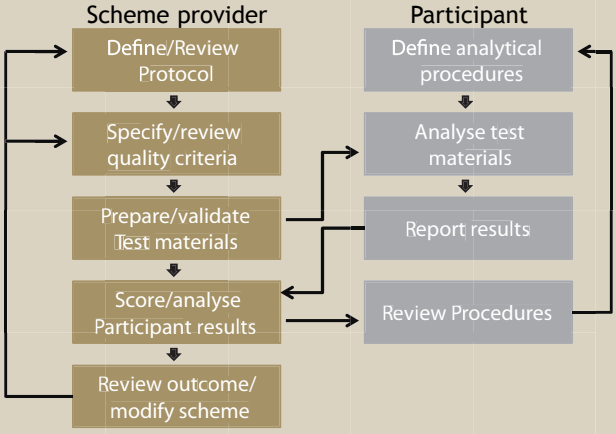
- It should be carried out at least annually, comparing the assays or analysis of a group of laboratories.
- The analysis or assay should be done on a routine basis rather than attempting to produce the most accurate possible result.
- The results of all participants should be shown in the report without identifying each of them. In fact it is important that results are submitted confidentially.
- The aim of proficiency testing is to demonstrate to participating laboratories whether they have a high or low bias compared with their peer group. Professor Thomson also described the concept of Fitness for Purpose as it applied to analytical techniques.

Good Delivery Developments

A review of recent developments affecting the Good Delivery List was then given by Peter Smith of JP Morgan Chase, who has been the Chairman of the LBMA's Physical Committee since 1992. He stressed the importance of the Good Delivery rules and their observance by refiners to the global OTC market for gold and silver, which was focussed on the loco London contract. There was never any shortage of applicants for Good Delivery accreditation. At present, there were three active applicants and an additional nine companies who had made serious enquiries about the possibility of submitting an application. He noted the tendency for the geographical breakdown of the companies on the List to move eastwards from Europe so that Japan, China and Russia had become increasingly important while there were fewer Good Delivery refiners in Europe and the Americas than in the past. Market developments in the past year highlighted the importance of the Good Delivery system, especially recently with the flood of Good Delivery bars into London and their being held there on behalf of investors. This was a reflection of the increasing preference for precious metals to be used as collateral in financial obligations as well as the growing quantity of metal held on behalf of exchange traded funds.

The next presentation was an update on the LBMA's Proactive Monitoring system by Douglas Beadle, who noted that in the first three-year cycle, several gold refiners and one silver refiner had had to undergo some form of retesting or technical training following the proactive monitoring procedures. However, in the second three-year cycle, which was now halfway through, no companies had experienced such problems. This very much validated the approach, which the LBMA adopted for ensuring that the highest possible standards of assaying were being maintained in the refining industry. The LBMA was very

Figure 1: Organisation of a proficiency testing scheme



grateful to the refiners for the cooperation which they had shown during the carrying out of the monitoring procedures and also to the supervisors and referees whose work was a vital element in the overall system.

The LBMA Chief Executive then gave a presentation on the work of the referees in the Good Delivery system. This included a brief account of the history of the LBMA since its establishment in 1987 and the early arrangements for testing applicants for Good Delivery accreditation. Then, in 2001, the LBMA decided to expand its panel of referees and to transform the application system to a double blind basis, meaning that neither the applicant nor the referee involved in testing it was aware of the identity of the other party. An important part of the process of expanding the panel of referees was to ensure that they had the highest possible standards of assaying as well as the ability to manufacture high quality, homogenous, reference samples, which are used both for testing applicants and as part of the proactive monitoring procedures.

Analytical Methods

Analytical procedures were covered by two papers at the seminar. The first was given by Pascal Cassagne of Metalor, who gave a comparative review of the methods that can be used for assaying and analysis of Good Delivery gold alloys (995 fineness and above for gold and 999 and above for silver). This covered both direct and indirect methods and focussed on issues such as the choice of corrections and the removal of bias. The paper also described the accuracy and precision obtainable from indirect versus direct methods and the fineness levels at which they were respectively applicable.

The second paper in the analytical section of the programme was from Dr. Michael Steffen of Aurubis (the former Norddeutsche Affinerie). This covered the use of x-ray fluorescence methods in the production control of silver from anode slimes to silver doré. The paper concentrated on the requirements of effective calibration needed to ensure that the method will give reliable results.

Reference Materials

The following session was devoted to reference materials, beginning with a survey of the available materials by Dirk Hofmans of Umicore. This began by differentiating those reference materials which were certified from those which were not and described what the certificate would normally include. The organisations that provide certified reference materials were described. It was notable that there was a very limited offering of reference materials for silver and gold. The paper also reviewed a survey of Good Delivery refiners, which had been carried out in advance of the seminar to find out their views on how they would use reference materials (for instance by dissolution of the materials or by direct use, e.g. in spark spectrometers).

Neil Harby of the Rand Refinery then reviewed a joint project carried out by his company, the Royal Canadian Mint and Teck Cominco Metals to produce high-purity silver reference materials. The project had provided valuable insights into how such an intercompany project could be carried out. It also described the approach to manufacture, homogeneity testing and the calculation of the final concentrations that was used.

Dr. Mike Hinds gave a presentation on the current LBMA Reference Materials Project, covering the purpose of these materials, the timeline of the project commencing in March 2007 at the last LBMA seminar, and the various stages of implementing the project (further details are given on page 18). It was obvious that the critical point in such a project lay in successfully accomplishing a rigorous homogeneity test, which involved both making the right choices about where to analyse and also selecting the most appropriate statistical treatment of the analytical data.

Dr. Hinds concluded his presentation by asking the meeting for feedback on whether a continuation of this work should be recommended to the LBMA, perhaps by looking at different alloys, e.g. with impurities not included in the current project or with the same impurities but at higher concentrations. Other possibilities included the development of reference materials for lower purity gold and silver, such as doré or carat alloys used in jewellery, silverware, etc.

A detailed account of the manufacture and testing of gold reference materials at Tanaka KK for the current LBMA project was given by Ichimitsu Itabashi and Hiroshi Sawai. The presentation showed all the stages of initial master alloy manufacture, ingot melting and casting, surface shaving, cutting and marking of the materials as well as the assaying of the samples taken for homogeneity testing.

Casting and Testing of Good Delivery Bars

The second day of the seminar began with Stewart Murray reviewing the contents of the current version of the Visual Guide to Good Delivery bars. He stressed that this was a work in progress and that, in due course, further editions would be circulated with additional content especially for silver bars. It was very difficult to depict physical defects on large bars photographically, but the LBMA felt that this was a better solution than simply using words to describe the defects which had to be avoided. Neither the LBMA vaults nor depositors could be happy if bars were being rejected because of physical defects, and the purpose of the Guide was to help companies which refine gold and silver, or which deposit bars in London, to avoid this.

David Stokes, who formerly was responsible for the production of refined gold and silver at Johnson Matthey's Royston plant, gave an overview on how to produce good quality castings in gold and silver. Motivation and involvement of the staff in quality control were key aspects as were the maintenance of moulds and the use of appropriate mould dressings.

Michele Genel of PAMP then presented a paper on the use of ultrasonic analysis for the quality control of large gold bars. This demonstrated the equipment which could be used and the types of defects which could be detected. These included layering, gas bubbles, inclusions and even the possibility of counterfeit bars. The method could be applied quickly and easily and could certainly contribute to enhancing product quality as part of the quality control system.

The final presentation moved on to a different subject, namely the London approach to weighing. It was given by Tony Dean and Terry Wooster of HSBC. It covered in detail the way that beam balances were used in the London market and how they produced the London weighing in units of 0.025 troy ounces for gold and 0.1 troy ounce for silver. The presentation included a description of the system of weighing as part of the vaults' acceptance of metal and the precautions necessary to ensure that weight measurements were always as accurate as possible. The final part of the paper reviewed the LBMA's current project to find an acceptable electronic alternative to the use of the beam balance. Because of its high accuracy, the beam balance was difficult to match, but it was hoped that electronic scales currently being examined would prove to have a high enough accuracy and reproducibility for them to be recommended as an alternative. There was no doubt that with the reduced processing time and the ability of automating the results, the London market would welcome an electronic scale which had the necessary accuracy, though it was likely that the beam balance would continue to be used as the standard in the market for some time to come.

The seminar finished with a panel discussion, which ranged over all the topics which had been covered. Copies of all the papers presented at the Seminar can be found on the LBMA website (www.lbma.org.uk) and a transcript of this discussion will also shortly be added. A further seminar will take place in 2011. Suggestions for topics to be included should be sent to the LBMA Chief Executive, stewart.murray@lbma.org.uk. ■