QUALITY ASSURANCE IN THIRD PARTY TESTING

by

Gladys B. Berchtold
Lee Rigsby

Presented at

American Chemical Society
40th Southeast Regional Meeting

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Since my subject today is third party testing, I'll ask you for purposes of discussion to accept this definition: The third party laboratory is the referee whose analytical results arbitrate those of two other laboratories.

As a rule this function is accomplished by exchange of prepared samples or by a 3-way split of an original sample. Third party laboratories are usually chosen to arbitrate differing results on a single sample that has been subdivided and distributed to the interested parties but may be asked to evaluate the values of many analyses performed over long time periods. However, at times sampling and sample preparation are integral parts of the analytical function. In these cases the role of the third party laboratory may begin earlier, perhaps in an observer's role during the sampling process.

Third party laboratories are often used in a "watch-dog" role, providing surveillance for laboratories that have a vested interested in the analytical result. A good example is the steam coal market where price is generally based on "As Received BTU/pound," a calculation which involves use of total moisture content of the coal. Moisture in coal can be present in many forms and total moisture content varies from minute to minute from the time the coal leaves the mine to the time it is fed to the unit. It is not hard to visualize disagreements arising in this situation where the sampling processes are widely separated in space, time, and often, methodology. The third party

laboratory has a vital role to provide a highly critical auditing function in such situations. It is essential that all parties ~~should~~ agree in advance on the appropriate methodologies.

One reason for the existence of third party laboratories, then, is the superintendence of commodity trading in which they referee, resolve discrepancies, and evaluate economic worth.

Another important function of third party laboratories is in production and evaluation of comparative data used in quality control and quality assurance. Interlaboratory sample exchanges and round robin data allow methodology evaluation of other laboratories. Laboratories arrive at results using various methods and different instrumentation. The third party laboratory must be knowledgeable about deviations attributable to variations in methods and must be able to evaluate equipment performance.

Third party laboratories often function as technical consultants to solve problems between participant laboratories by auditing one or both of the other laboratories. They may be called upon for interpretation and, sometimes, are asked to train or re-train technicians for the participating laboratories.

Although this use does not exactly fit my original definition, many agencies in government choose third party laboratories as a source of unbiased monitoring to insure regulatory compliance in a variety of testing fields.

A review of the major reasons for the existence of third party laboratories then is:

1. Superintendence in commodity trading.
2. Comparative data in QA/QC methodology and evaluation.
3. Technical consultation, interpretation and training.

4. As a source of unbiased monitoring.

If these functions and others justify the existence of third party laboratories, the next question that may be asked is "How are third party laboratories qualified?" or "How does a laboratory qualify itself for the role of third party testing?"

Once not so many years ago the testing community was accepted by the general public as being unquestionably competent and ethical. Somewhere along the line somebody (or some laboratories) dropped the ball. Today a laboratory, particularly a third party laboratory, must assiduously pursue a reputation for high ethical standards. Moral integrity in business is difficult to achieve and even harder to maintain since it must be initiated at corporate levels and permeate to each and every employee. It is absolutely essential that a 3rd Party laboratory achieve a reputation for high ethical standards.

Secondly and just as importantly, the third party lab must insure the highest technical competence across the entire spectrum of services, including equipment, calibration, personnel, test methods and procedures, environment, sampling handling, internal quality systems, quality assurance programs, data handling, and reporting.

This is not to say that competence in these areas is not necessary to good laboratory practice and is not required of all operating laboratories, but to emphasize that a third party laboratory must have all these items "in spades." To be accepted as a referee, a laboratory must be equal or superior to the laboratories being checked and have records to prove consistent credibility in testing during a significant period of time.

In many instances, the third party laboratory is called upon to defend its results and the methodologies that produced them. It must have a staff capable of providing a coherent defense in all circumstances, including legal cases. In addition to maintaining quality assurance procedures specific to each test, the third party laboratory must be aware of any other method(s) used in testing for the particular parameter being analyzed and the variations and consequences of using each alternate method.

We hear a lot about accreditation of laboratories today and there is no doubt that we will be hearing a great deal more in the future. The trend toward accreditation is worldwide with most countries having governmental or quasi-governmental systems of laboratory accreditation. In the United States we have hundreds, if not thousands, of systems usually operating in narrow fields of testing or in confined geographic areas. There are only two systems that aim to accredit on a broad basis. The NVLAP program of the ~~National Bureau of Standards~~ and the American Association for Laboratory Accreditation (A2LA). There are differences in philosophy between these systems, NVLAP operating for the most part on a product-by-product basis while A2LA believes a broad assessment of testing capability coupled with an in-depth examination of those tests in which the laboratory claims competence is the appropriate and only economically viable approach.

The point to be made, however, is that any third party laboratory should be qualified and accredited by responsible auditing agents. in addition to being self certified by its past history

It behooves us also to look at some of the pratfalls that lie in wait for the third party laboratory.

* Perceived favoritism. Human nature will always suspect that the party responsible for paying the invoice will be the most influential. Even if the cost is shared, the third party laboratory will still be accused of favoritism by the laboratory furthest from the referee result. There is absolutely no way to win except by an impeccable reputation gained by years of impartial service to the testing community.

* Another problem area is the recognition of sample integrity and tampering. A sample can be compromised by intentional tampering during lack of custody. For example, a contaminant can be added or removed from the sample as it is being transported to the laboratory. Also, there can be accidental loss of integrity during lack of custody. For example, exposure to the atmosphere because of inadequate knowledge of specific methodology as mentioned earlier for moisture in coal. There can be accidental previous handling in-house. For example, blunders in data transmission. The third party laboratory must constantly be on guard against any practice that could affect the integrity of the sample even those outside their direct control.

Third party laboratories often have multiple locations which pose difficulties in centralized control. A single sample delivered to the third party by each of two testing laboratories should pose no problem but suppose the third party is required to

supervise sample increments of a heterogeneous material taken from different locations at different times when the material is composited later at a distant loading point. Timely communications and corrective actions might prove to be almost insurmountable obstacles. The manifold responsibilities and highly stressful influences that can be exerted at the local level assure Excedrin size headaches for the third party coordinator.

Another problem can be the lack of a source of comprehensive calibration standards. Highly heterogeneous materials requiring comprehensive attention to detail often are impossible to cover in a usable set of standards.

The consensus methods that have been developed by ASTM and other standards writing bodies are a great source of comfort to us in the testing industry but there are large gaps yet to be filled. However, consensus methods are not universal for many products and ores. For example, ASTM D-5 has been writing and revising the standards for coal sampling, sample preparation, and total moisture content in coal since 1904. D-5 met last September. We are still working for improvement in these standards. I suspect the D-5 meeting in 3004 will still be revising these standards in an effort to minimize the problems associated with that natural complexity we call coal. Third party laboratories are often called upon to make judgment under these circumstances.

Another competency factor must be a part of third party testing. The laboratory must be able to recognize the limitations of various methods, specifically regarding their precision and accuracy, and be able to communicate those limitations to the participant laboratories and to the controlling authority.

Quality assurance procedures must be defensible to the Nth degree to every interested party - from the layman to the technician to the legal representative and, ultimately, in a court of law.

Third party laboratories cannot be wedded to singular methods but must have comprehensive knowledge of any and all methods applicable to a given testing parameter and be able to evaluate their relative applicability.

In short, third party laboratories have an extraordinary responsibility requiring extraordinary resources and, in the end, they are guaranteed to make someone angry anyway.