

# **GAS CONTRACTS' IMPACT ON MEASUREMENT ACCURACY**

Ted Glazebrook

Enterprise Products LLP

## **INTRODUCTION**

Much effort is spent to achieve accurate measurement. Up to date measurement standards, modern meter station design, high quality equipment, and proper measurement operations are all necessary for measurement accuracy. Unfortunately, these processes do not assure measurement accuracy if the contract does not also support accurate measurement. The contract impacts measurement accuracy by what it addresses and what is left unaddressed. More focus needs to be applied to the measurement sections of the contracts. Hopefully this paper will help the reader better understand the relationship between the contract and accuracy.

## **CONTRACT 'GOVERNS' MEASUREMENT**

The contract establishes the rules or guidelines for measurement. Questions such as “what is the Contract Pressure Base of an MCF or BTU”, “what AGA, API or GPA standards will apply”, “what will be the spec for the Water Volume content, and what will be the limits of the CO<sub>2</sub> and N<sub>2</sub>”. A common misconception is that current measurement standards ‘govern’ measurement. The truth is that the contract actually “trumps” measurement standards. A contract should state that certain factors shall be included in the calculation, such as AGA#8 Detailed. New standards are not used if the contract acknowledges an older standard without a way of accepting anything newer. A recent trend in contracts is not to list the acceptable standard but leave it vague so the controlling party can use the standard of their choice.

## **CONTRACT VOLUMES**

Many people do not realize there are multiple volumes the contract must address. There are at least 3 different volumes the contract must address:

- ☐ Measured Volume - MCF
- ☐ Calculated Heating Value - MMBTU
- ☐ Allocated Transaction Volume

If the contract focuses on one but leaves the others vague, the final results will be compromised. Special emphasis should be applied to the “Transaction Volume” because it is the actual volume that is used by accounting for all business functions.

## **MEASURED VOLUME – MCF**

The first volume that should be addressed is the measured MCF. There are several items regarding the MCF that the contract must deal with. Otherwise, the parties will work under assumptions.

Definitions such as MCF, pressure base, temperature base, atmosphere pressure, Contract hour, day and month are just some of the items that must be defined.

Applicable Standards – What standards and versions of the standard will be used for volume calculation? As stated earlier, many contracts are not stating the exact standard or version but leave it up to the controlling party. This can compromise the accuracy and not leave any way to correct it.

Equipment Installation – What guidelines will be used for the type of equipment and how it is installed? Many contracts say to use “industry accepted” equipment. What does this mean? If one company uses it, is it ‘industry accepted’? It is frequently beneficial to include schematics or matrixes in the appendices that define who will be responsible for providing separation, dehydration, flow control, and custody transfer responsibilities.

Meter Operations – How is the meter to be operated? How often is it to be calibrated? Can both parties be involved? What happens when a problem is found, how will adjustments to equipment be made and documented? Contracts today are either extending the test frequency or using vague language that leaves it to the prerogative of the controlling party. Is this the best way to handle the cash register?

Calculations – What equations or factors will be used for calculation? What items will be considered in the equation? What assumptions will be allowed? Also to be considered is whether all equations in a standard will be used or can the party pick the equation based on their equipment and measurement systems?

Corrections – When will volume corrections be required or allowed? What are the rules for corrections? What are the time limits to corrections? Many contracts restrict how far back corrections can go.

Audit / Review – What rights do the other contractual parties have regarding review and audit? What limitations apply?

As stated above, if these items are not adequately addressed then the parties will make assumptions in the calculation of the volumes and adjustments.

The actual process is much more complicated than the simple equation makes it look. Several items must be defined and stated to ensure the accurate MMBTU is calculated. Definitions such as BTU, MMBTU, and water vapor adjustment must be fully defined.

Standards and Guidelines – As in the MCF, what standards and versions of the standard are to be used for BTU determination.

Sampling – Type and Frequency – What type of sample will be required and when is it taken? Will it be a spot, composite or online GC? The Contract language needs to cover whatever sample types will be allowed. The sample frequency should also be defined based on daily or monthly flow volumes.

Quality Determination – Composition, density, BTU – Once the sample is taken how is the analysis calculated? What results are used for MCF calculation? What results (W, D or ASD) are used for MMBTU determination?

Adjustment for Water Vapor – Water vapor in the gas stream must be addressed. What will be the allowable percent? Allowable Water Vapor content will vary depending on whether the gas is wellhead, in a wet or a dry system, or on a pipeline interconnect. Gas contains water vapor unless it is physically removed. Since it is impractical to determine the water vapor content for wellhead gas, the contract must address how to calculate the water vapor when it is not measured. The industry has adjusted the BTU for water vapor in the gas but has not always recognized the impact of water vapor on the composition, GPM, density, and compressibility. The contract needs to adequately cover all aspects of this issue.

Analysis Effective Date – When does the sample become effective? Will it be used prospectively in future months, or require recalculating the current month volumes in the Office Measurement system. Contract wording should address how the analysis will be applied. The effective date will be different for spot samples and composite samples.

Almost all contracts in effect today deal with the MMBTU rather than the MCF for final transactions.

## **TRANSACTION VOLUME**

The transaction volume is the volume to be used for purchase, sales, transport, or whatever the contract covers. One of the biggest misunderstandings regarding volumes and measurement is the wrong assumption that the measured MCF and MMBTU for wellhead meters are the volumes used for contractual transactions. Very seldom is the calculated MMBTU used for the transaction volume. Almost all measured wellhead volumes are adjusted in some way for transaction purposes. Many field technicians do not understand that the volume they work so hard to make accurate can be changed because of the contract. This must be recognized and addressed to maintain accuracy or to understand why the volumes are changed.

Measured volumes may be adjusted for system fuel, system loss and unaccounted for, treating, system allocations, and other reasons. The contract needs to address these carefully and completely. Limits for fuel and system losses need to be considered and stated. Much focus needs to be put on these components that impacts measurement accuracy and ultimately the overall revenue.

Definitions – define all items that are used in the determination of the transaction volume. Items such as fuels, usage gas, shrinkage, unaccounted for gas, and L&U are some items that should be defined fully.

Changes to the measured MCF and calculated MMBTU – State what will change the transaction volume. Also fully explain how the adjustments are calculated.

Allocations – Are volumes to be adjusted for system or plant allocations? If so, just how is this to be calculated? The contract must make it clear what constitutes the allocation system. It also needs to spell out what is included in any allocation.

Limitations – Each of the items that impact the transacted volume should be evaluated to determine if there are limits. Can a company allocate a 10% system loss or is there a limit?

The transaction volume section is possibly the most important focus of the contract in regards to measurement. Measurement personnel need to be more aware and included in the development of this part of the contract.

## **CONTRACT VAGUENESS**

Many times the contract writers will try to leave certain subjects vague or unaddressed. This makes it easier for the controlling company. However, it can and will have a major impact on the final volume and volume accuracy. Both parties need to review all segments of the contract to make sure the measured MCF, measured MMBTU, and the calculated transaction volume are properly addressed and fully explained. This reduces the questions and controversies because of misinterpretation.

## **MEASUREMENT DISPUTE RESOLUTION**

Disagreements and misunderstandings sometimes occur between companies. These may include differences in sampling and analysis, configuration selections, or equipment design. When this happens, it is essential to have a way to resolve these differences. By inserting a clause that allows for the selection of a third party subject matter expert, an outside lab or industry recognized third party service company to review and recommend a resolution as a mediator will expedite the resolution of an issue to the satisfaction of both parties.

## **MEASUREMENT ACCURACY**

As stated at the beginning of this paper, the contract has a major impact on the desired measurement accuracy. We spend time and money on equipment, processes, and standards. We also need to spend adequate time upfront in the negotiation process to insure that the contract is complete and encompassing of all aspects needed to insure good accurate measurement, addresses the standards and processes to be used, and defines how adjustments and disputes will be handled in the future.