COMMUNICATION BETWEEN THE OFFICE AND FIELD

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Introduction

It is vital for the success of any measurement organization to establish effective communication between the field measurement operations and the measurement office. Although technically a simple task, the lack of effective communication often leads to measurement error, increased risk of lost revenue, and increases costs. Achieving the goal of effective, efficient processes and measurement accuracy requires effective two-way communication and collaboration between the office and field organizations.

The measurement information that is retained and communicated varies depending on the task (meter inspection vs. tube inspection vs. gas sample), the fluid phase (gas vs liquid), type of meter (orifice vs. Coriolis vs ultrasonic), and requirements (company policy, contractual, regulatory, etc). The scope of this paper will be specifically addressing the communication of information.

Measurement Data

First and foremost, in the process is the creation of the measurement data itself. The first piece is to ensure proper measurement equipment is selected and installed that meets contractual and regulatory requirements. Beyond that, policies and procedures must be in place that ensure that measurement activities are completed, data is retained, and documentation is available in order to meet those same contractual and regulatory requirements.

Having measurement critical information available is essential in establishing an overall effective measurement process. With modern electronic flow meters (EFMs) that are industry standard compliant (API 21.1 for gas and API 21.2 for liquids), all necessary measurement data is retained in the device itself. Meter characteristics, historical volumetric data, composition data, meter events and meter alarms are all stored in the device. It is highly recommended to retain and gather as much of that information as possible and practical. This information can be hand collected locally and transmitted to the office, or preferably automated through modern SCADA systems that can be utilized to poll, store, and deliver a wealth of valuable operational and measurement data. In the measurement office, the measurement editing system can then be utilized to validate measurement data to detect and correct measurement errors.

Mechanical chart recorders are still used in the industry and provide the perfect example of how communication must adapt. Critical measurement information must be provided on each chart. Verifying the correct meter number, on/off dates/times and meter characteristics such as, orifice plate size, tube size, and meter ranges. Providing information such as stopped clocks, meter freezing, low or high zero, orifice plate changes, etc. is critical communication to the measurement office to ensure accurate chart integration.

Figure 1. below illustrates the advantage of processing periodic meter data through a validation and editing system. In this case, a meter freeze occurred and is easily identified. Figure 2. Illustrates related exceptions that automatically alert the measurement office of possible measurement error.

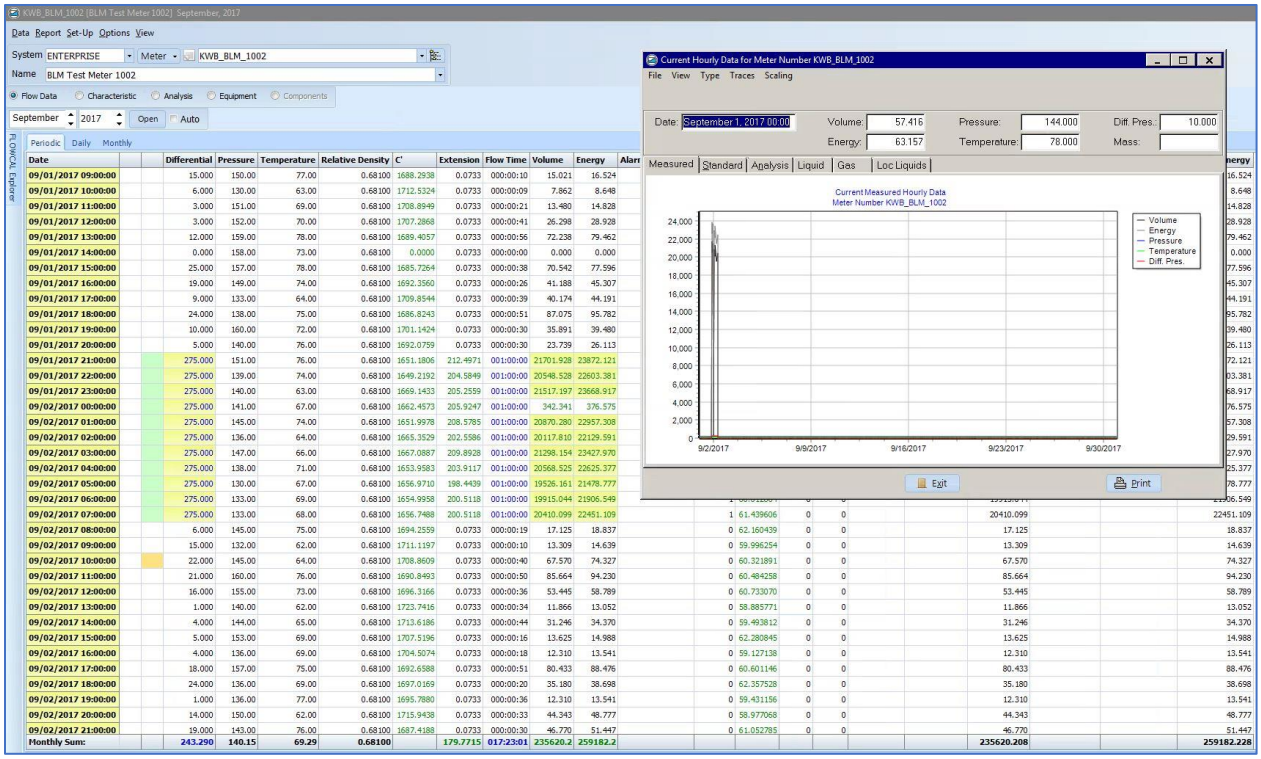

Figure 1.

Device Number	Device Name	Effective Date	Description	Exception Count	Field Value	Alarm Limit	Status
KWB_BLM_100:	BLM Test Meter 100	09/01/17 - 09/02/1:	FPC - High energy	Count: 10			Unresolved
KWB_BLM_100:	BLM Test Meter 100	09/01/17 - 09/02/1:	FPC - High volume	Count: 10			Unresolved
KWB_BLM_100:	BLM Test Meter 100	09/01/17 - 09/02/1:	FPC - High-high differential pressu	Count: 11			Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/01/2017 21:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/01/2017 22:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/01/2017 23:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 00:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 01:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 02:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 03:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 04:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 05:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 06:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved
KWB_BLM_1002	BLM Test Meter 1002	09/02/2017 07:00:00	FPC - High-high differential pressure		275.00000	250.000000	Unresolved

Figure 2.

Effective communication protocols must also be in place from the office to the field to ensure timely resolution of issues and to decrease the number of preventable issues in the future. Some examples of these might be frequent or persistent communication failures, missing data, frequent power failures during evening hours on low power installations (indicating defective battery), over-ranging of meters, incorrect meter parameters (such as orifice plate size discrepancies), transmitter failures, indications of meter freeze, density fluctuations or drive gain deviations on Coriolis meters (indicating separator or meter issues), etc. With the availability of the measurement data and use of available tools, effective communication to the field then becomes a key component towards achieving a highly functional measurement process.

As normal field measurement tasks occur, the “As Found” and “As Left” results of the task must be communicated to the office in a timely manner. Changes in meters and/or meter characteristics, gas meter inspections, orifice plate and

meter tube inspections, gas sampling information, gas chromatograph inspections, liquid meter provings are all examples of these tasks. Using orifice meters as an example, critical "As Found" measurement data will be generated during meter inspections/calibrations which include meter characteristics such as calculation methods, orifice plate size, meter tube diameter, pressure base, atmospheric pressure, and many more, as well as calibration data such as differential, static, and temperature, working pressure zero, absolute pressure zero, and test point validations. All are essential for the measurement office to determine and calculate any volumetric error. "As Left" measurement information is critical in that it serves as validation of accurate measurement from that point forward. Delays in delivery or communication of this information to the office can increase the amount and number of PPAs (prior period adjustments).

Another key function of the measurement organization is auditing. The measurement auditing function is extremely important because errors likely go straight to the company's bottom line. Although this process usually assumes sales volume auditing, it may also apply to purchases as well. The auditing process typically involves measurement field personnel witnessing the third party activities in the field, and the measurement office analyst performing measurement data audits. Communication and operational processes must be established to ensure all pertinent information is available to conduct an effective audit. Although communication involved in this process can be even more difficult, as it involves additional collaboration between the office and field, as well as communication between multiple third parties, it is well worth the effort towards the bottom line.

Scheduling Inspections and Calibrations

It is common for many of these measurement tasks to have required reoccurring schedules, either through company policy, contractual language, or government agency regulations. Common measurement technician tasks that must be scheduled are meter inspections, gas samples, test equipment certifications, witnessing…among others. A system should be maintained to ensure schedules are maintained and tasks are performed at required frequencies. Depending on the organizational structure and business requirements, scheduling could simply involve tasks for a single technician or be a more complex collaborative scheduling effort among multiple technicians across an operation area. Depending on the complexity of operations, number of technicians, number of devices, geographical coverage, and available resources, maintaining these schedules can easily become burdensome and a point of high risk. A number of tools are available that aid technicians and measurement organizations in maintaining schedules. Advanced tools allow sharing of information and schedules among multiple technicians and can greatly reduce maintenance overhead and risks of missing required tasks.

Below in Figure 3. Is an example of a tool that simplifies scheduling by presenting the technician's assigned tasks in a calendar view. Where applicable, this tool can also be used to synchronize tasks and schedules among multiple technicians, allowing all technicians to collaborate much easier. This significantly reduces the burden of communication.

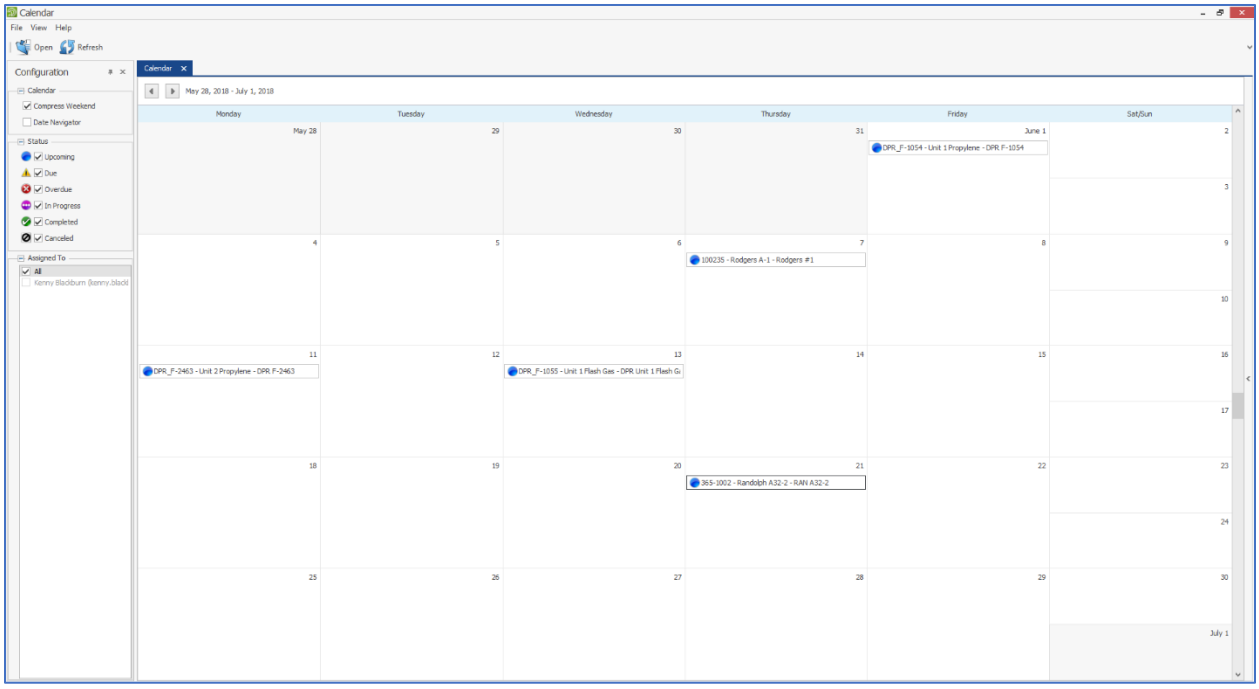

Figure 3.

Communication process must also be established to sync requirements of field personnel and expectations of the office.

Business Processes

In addition to the normal measurement information processes, effective business processes must be established to coordinate changes and new or removed meters. It is not uncommon for changes such as these to cause interruptions and errors. For example, new meters that do not get reported properly or removed meters that linger in systems. New meter setup should include all pertinent information regarding the meter itself, as well as any applicable SCADA communication requirements, scheduling requirements, specific task requirements, etc. If these are not addressed proactively, important details will be missed resulting in future issues.

Business processes must take into consideration communication to all stakeholders outside of measurement that consume measurement data. For example, it may be beneficial for new meter processes to include Operations, Telecomm, SCADA, Accounting, and/or Marketing which may all require their own unique internal processes to complete the measurement data chain inside the organization. The various methods of communication (phone, email, text, measurement systems, asset management systems, etc.) must be considered as well. Any gaps in this communication can contribute to waste and increase risk of errors. Business processes must be tailored to each organization's unique structure but should always consider all stakeholders.

Training

It is always important to establish a measurement training program that includes the communication of measurement data, from both the field perspective and the office perspective. An effective measurement training program, which includes the transfer of information, will ensure that accurate information is created and transferred throughout the organization. This becomes increasingly important over time as personnel transition takes place.

In addition to the technical knowledge, knowledge of requirements, common terminology, and knowledge of the business processes are also essential to maintain an effective process. Expectations and a clear understanding of roles and responsibilities must be included in the training program. Knowledge is the cornerstone of communication.

Conclusion

With the advancements in technology throughout the industry, the opportunity (and necessity) of gathering more information, automating delivery, detecting errors sooner, and resolving issues more timely continue to advance as well. Organizations must ensure that communication and processes are built to compliment ever aspect.

Effective measurement organizations communicate regularly and clearly, which requires the establishment of business processes that promote it. Even when a measurement organization is focused on attention to detail, it can become increasingly difficult and frustrating when effective communication processes are not in place.