

OWNER

Measurement Data, Audit Trail and Event Log Management

Procedure



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1. INTRODUCTION

1.1. PURPOSE AND SCOPE

This procedure sets out how the custody measurement data produced by flow computer FQI-110 and the gas quality analyzers will be recorded, reviewed, finalized, corrected, retained and exchanged with the receiving pipeline operator, following API MPMS Chapter 21.1. It also sets out how the Owner will monitor lost and unaccounted-for gas across the station.

Custody data are only as good as the audit trail behind them. A quantity that cannot be traced to its inputs, its configuration and every change made to it cannot be defended in a measurement dispute. The procedure therefore treats the original records as permanent, makes every correction a new, traceable record, and gives the receiving pipeline operator the same view of the data as the Owner.

1.2. REFERENCES

1. API MPMS Chapter 21.1, Flow Measurement Using Electronic Metering Systems.
2. API MPMS Chapter 13, Statistical Aspects of Measuring and Sampling.
3. API Standard 1164, Pipeline Control Systems Cybersecurity.
4. GEN-DB-001, Basis of Design.
5. MEA-RPT-001, Measurement System Design Basis and Philosophy.
6. MEA-CAL-002, Measurement Uncertainty Analysis.
7. MEA-CAL-004, Sampling System Design and Thermowell Evaluation.
8. MEA-PRC-001, Meter Verification and Series Comparison; MEA-PRC-002, Gas Chromatograph Calibration and Verification.
9. MEA-DS-008, Flow Computer FQI-110.

1.3. RESPONSIBILITIES

The Owner's measurement technician reviews the data daily, prepares corrections and signs the monthly close. The Owner's measurement supervisor approves corrections. The receiving pipeline operator receives the data, is told of every correction, and jointly approves any correction to a closed month.

2. RECORDS AND REVIEW

2.1. RECORDS PRODUCED BY THE FLOW COMPUTER

Table 2-1 lists the records that FQI-110 produces and how long each is kept. The retention period in the measurement system is set by the Interconnect Agreement (HOLD H-01); at least 3 years is recommended.

Table 2-1: Measurement Records and Retention

Record	Content	Frequency	Retention in FQI-110
Quantity transaction record, per run and station	Flow time, volume (Mscf), energy (MMBtu), average pressure, temperature, heating value, relative density, flowing and base compressibility, composition source flag, meter status	Hourly and daily	35 days hourly; 24 months daily
Configuration log	Parameter, old value, new value, user, time	On change	Life of the device
Event log	Run changes, valve positions, composition source changes, calibrations, power failure and restore, time changes, write-protect changes	On event	At least 1,000 events
Alarm log	Meter, speed of sound, pressure, temperature, analyzers, quality limits, communications	On event	At least 1,000 alarms
Analysis records	Chromatograph hourly averages, calibration reports, analyzer values	Hourly	In the chromatograph controller
Verification reports	ME-PRC-001 and PRC-002 reports, certificates	Per test	Measurement system only
Configuration baseline	Meter, FQI-110 and chromatograph configuration files at site acceptance and after each approved change	On change	Measurement system only

2.2. DAILY REVIEW

The technician reviews the previous day's data each morning against the checks in Table 2-2. The purpose is to catch a problem while it is one day old, when it is still cheap to correct.

Table 2-2: Daily Data Review

Check	Criterion	Action
Completeness	24 hourly records for each run in service, with no gaps	Investigate communications or power events
Composition source	Live chromatograph for every hour	Flag the hours on last good or fixed composition

Check	Criterion	Action
Speed of sound against AGA 10	Within ± 0.25 %	ME-PRC-001
Gas quality	Within the limits of GEN-DB-001	Notify gas control and the receiving pipeline operator
Run status	Duty run as scheduled; MOV-115 closed	Investigate any unexpected change
Station balance	Within the daily limit of Table 4-1	Investigate

2.3. CLOSING A PERIOD

Daily data become preliminary at 10:00 the following day and final at the monthly close, on the fifth working day of the next month unless the Interconnect Agreement says otherwise (HOLD H-01). Before signing the monthly close, the technician confirms that all verifications were done, all flagged hours are resolved, the composite sample comparison is complete and the station balance is within its limits.

3. CORRECTIONS

Original values are never overwritten. A correction creates a new version of the record, linked to the original, which carries the record identifier, the original value, the new value, the reason (meter failure, chromatograph failure, pressure or temperature error, calibration correction, or agreement adjustment), the method and data source, the preparer, the approver, the date and the notice to the receiving pipeline operator.

The method is chosen in this order of preference, because each is less direct than the one before it:

1. Substitution from the standby meter, if it was in series with the duty meter or can be shown to have measured correctly.
2. Correction by the error found at verification, applied from the midpoint of the interval since the last good verification or as the Interconnect Agreement specifies (HOLD H-01).
3. Substitution from the receiving pipeline operator's downstream measurement, with agreed adjustments.
4. Estimation from nominations and control valve data.

A correction to a closed month requires the joint approval of the Owner and the receiving pipeline operator.

4. LOST AND UNACCOUNTED-FOR GAS

4.1. STATION BALANCE

The Owner will monitor the station balance daily. The balance compares the Owner's upstream allocation meter at the treating facility with the gas that leaves the station through the custody meters, the fuel meter and the vents. Fuel gas is taken upstream of the custody meters and is measured by FT-163. The analyzer and sample vents release 3.6 standard liters per minute continuously, or 183 scf/d (MEA-CAL-004), to which any recorded blowdown is added.

$$L_{up} = Q_{alloc} - Q_{custody} - Q_{fuel} - Q_{vent} - \Delta Q_{pack}$$

$$L_{up}(\%) = \frac{L_{up}}{Q_{alloc}} \times 100$$

Where the receiving pipeline operator shares its downstream measurement (HOLD H-14), the custody quantity is also compared with it:

$$D_{rpo}(\%) = \frac{Q_{rpo} - Q_{custody}}{Q_{custody}} \times 100$$

4.2. INVESTIGATION LIMITS

The limits in Table 4-1 reflect the combined expanded uncertainty of the station meter, 0.40 % (MEA-CAL-002), and of the upstream allocation meter, assumed similar. They will be reviewed after the first 6 months of data, when the actual scatter of the balance is known.

Table 4-1: Station Balance Investigation Limits

Indicator	Normal	Investigation trigger
Upstream balance, daily	Within ±0.5 %	Outside ±0.5 % for 3 consecutive days, or outside ±1.0 % on any day
Upstream balance, monthly	Within ±0.3 %	Outside ±0.3 %
Comparison with the receiving operator, monthly	Within ±0.4 %	Outside ±0.4 %
Trend	No sustained bias	Same sign for 3 consecutive months

Investigations follow MEA-PRC-001 for the meters and MEA-PRC-002 for the chromatograph.

5. DATA INTERFACE, SECURITY AND AUDIT

5.1. DATA INTERFACE

The receiving pipeline operator receives real-time points through the demarcation panel (HOLD H-14), the daily quantity transaction records and monthly statements by secure file transfer, and the event and configuration logs on request. Both systems take their time from the same source, and the contract day is as defined in the Interconnect Agreement (HOLD H-01).

5.2. SECURITY AND ACCESS

Access to FQI-110 and the measurement system is by role (viewer, technician, supervisor, administrator) with unique user identities. Password changes are recorded. Remote access is only through the Owner's SCADA security zone, following API 1164. Write-protect switches are sealed and the seal numbers recorded.

5.3. AUDIT

The Owner will audit the measurement records each year. The audit recalculates a sample of 10 days independently from the raw inputs to within 50 ppm, compares the configuration with the baseline, checks that calibration certificates are current and that verifications were made at the required frequency, and reviews every correction for approval. The receiving pipeline operator may audit as the Interconnect Agreement allows.