

Pacific Outer Continental Shelf Region

Proving Report and Run Ticket Preparation and Submittal Handbook

1998



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I. RUN TICKETS

A. Mechanical Registration Meters

30 CFR 250.1200(c)(7) states that for sales meters, i.e., meters upon which registration royalty is determined, you (the operator) must send all run tickets pulled and/or completed during a particular month to us (Regional Supervisor, Office of Development, Operations and Safety) within 15 days following the end of the month and must clearly identify all observed data, all correction factors not included in the meter factor, the net standard volume, and all calculations and factors used.

1. Run Ticket Contents

Sales meter run tickets which include gross opening and closing readings are taken from the meter register and must contain the following:

- a) Sales meter identification by either shore location and facility name or offshore area and platform; and meter serial number.
- b) Run ticket number.
- c) The opening and closing meter register readings with corresponding times and dates. (Note: Meter register readings are to be taken from the nonreset totalizer.)
- d) The difference in the opening and closing meter register readings.
- e) The observed American Petroleum Institute (API) gravity and corresponding temperature, and the API gravity corrected to 60° Fahrenheit (F).
- f) The meter factor to be applied, the identification of the factor as either a mechanical or composite meter factor, and the date of the factor, (i.e., the date of the proving which established the factor).
- g) The correction factor for liquid compressibility (C_{PL}) to be applied if the meter factor is not a composite factor, and the average pressure and temperature used in its determination.
- h) An indication of whether or not the meter is temperature compensated.
- i) The correction factor for liquid temperature (C_{TL}) to be applied if the meter is not temperature compensated, and the average temperature used in its determination. (Note: The average temperatures referenced in g and i are the same and need not be listed twice.)

- j) The basic sediment and water (BS&W) content in terms of a decimal percent (e.g., 0.2%).
- k) The net standard volume, (i.e., calculated as the product of the gross volume, all correction factors, and the meter factor).

2. Pulling of Run Tickets

30 CFR 250.1200(d)(7) states that you must pull run tickets at the time of any proving which establishes a monthly meter factor or which results in a malfunction meter factor. If a run ticket is pulled after the first day of a month and the opening number was recorded prior to the first day of that month, the run ticket must additionally indicate the meter register reading on the first day of the month.

3. Out-of-Service Meters

If for a given month there is no production measured through an approved sales meter, you must submit a run ticket for that meter within 15 days following the end of the month to us and must clearly state that no production was measured. In addition, the run ticket must list a closing meter register reading and an identical opening reading, both of which should be equal to that of the previous month's run ticket's closing reading.

4. Opening and Previous Closing Register Reading Discrepancies

If the opening meter reading of a run ticket is not equal to the closing reading of the previous run ticket, you must explain the discrepancy.

5. Malfunction Meter Factor

When a meter proving results in a malfunction factor (when the difference between the current meter factor and the previously established meter factor is greater than 0.0025), the meter factor to be applied to all production run between the time of the establishment of the previous factor and the time of the establishment of the malfunction factor must be the arithmetic average of the previous factor and the malfunction factor.

The run ticket pulled at the time of the establishment of the malfunction factor must list the aforementioned arithmetic average as the meter factor to be applied. The run ticket must also show the calculation of the average factor in which the malfunction factor is to be clearly identified.

If you pulled and submitted a run ticket prior to the establishment of the malfunction factor and the previous malfunction factor was used, then you must submit an adjustment run ticket based on the new malfunction factor. The adjustment run ticket must clearly identify itself as an adjustment run ticket, clearly identify the run ticket being adjusted, list the arithmetic average as the meter factor to be applied, show the calculation of the average factor, list all of the other information and data as they appear on the run ticket being adjusted, and show the recalculated net standard volume.

B. Tanks

30 CFR 250.1200(f) states in part that you must submit run tickets for sale tanks, (i.e., tanks in which gauging represents the basis for royalty), to us within fifteen days of being written.

1. Run Ticket Contents

Run tickets for sale tanks must contain the following:

- a. Sales tank identification by either shore location and facility name or offshore area and platform; and serial or tank number.
- b. Run ticket number.
- c. The opening and closing gauges with corresponding volumes, date, time, and seal numbers.
- d. The observed API gravity and corresponding temperature, and the API gravity corrected to 60°F.
- e. The product temperature at the time of the opening and closing gauge, and the corresponding C_{TL} correction factors.
- f. The BS&W content in terms of a decimal percent (e.g., 0.2%).
- g. The net standard volume.

2. Out-of-Service Tanks

If for a given month a sales tank is not gauged, you must submit a run ticket for the tank within 15 days following the end of the month to us and you must clearly state that no production was measured.

3. Opening and Previous Closing Seal Number Discrepancies

If the opening seal number of a run ticket is not equal to the closing seal number of the previous run ticket, an explanation of the discrepancy must accompany the run ticket.

C. Example

The following example is designed solely for the purpose of illustrating, for various situations, the types of information required, and is not intended to prescribe a particular run ticket design:

A meter is proved on January 1, 1998, during which a mechanical meter factor of 1.0002 is established. The difference between this meter factor and the previously-established meter factor is not greater than 0.0025. A run ticket is then immediately opened and production is run. The run ticket is pulled on January 15, 1998, and submitted to MMS. Another run ticket is immediately opened and production is reestablished. The meter is then proved on February 1, 1998, and a malfunction meter factor equal to 1.0028 is established. The run ticket is pulled immediately after the proving with no production running through the meter between the time that the proving is concluded and the time that the ticket is pulled. The opening and closing readings on the run tickets are taken directly from the meter register's nonreset totalizer.

The run ticket pulled on January 15, 1998, contains the following information:

1. Sales Meter Identification:

Santa Ynez Unit

Platform Harmony

Serial No. 26576

2. Run Ticket No. 1

3. Opening = 1000 bbls on January 1, 1998 6:00 a.m.

Closing = 3000 bbls on January 15, 1998 4:30 p.m.

4. Gross Volume = 2000 bbls

5. Observed API Gravity = 35.5 at 98°F

Corrected API Gravity = 32.6 at 60°F

6. Mechanical Meter Factor = 1.0002

7. Meter is not temperature compensated
8. Average Temperature = 108°F
Average Pressure = 40 psig
9. $C_{PL} = 1.0002$
10. $C_{TL} = 0.9778$
11. BS&W = 0.2 %
12. Net Standard Volume = Gross Volume x Mechanical Meter Factor x C_{PL} x C_{TL} x (1 - (BS&W%/100))
Net Standard Volume = 1,952 bbls.

(Note: If the meter were temperature compensated then the run ticket would so indicate and no C_{TL} factor would be listed.)

(Note: If the meter factor were a composite factor then the meter factor would be identified as such and no C_{PL} factor would be listed.)

The run ticket pulled on February 1, 1998, contains the following information:

1. Sales Meter Identification

Santa Ynez Unit

Platform Harmony

Serial No. 26576
2. Run Ticket No. 2
3. Opening = 3000 bbls on January 15, 1998 4:30 p.m.

Closing = 5500 bbls on January 31, 1998 6:15 a.m.
4. Gross Volume = 2500 bbls
5. Observed API Gravity = 40.0 at 100°F

Corrected API Gravity = 36.8 at 60°F

6. Mechanical Meter Factor = 1.0015

$$1.0015 = (1.0002 + 1.0028) \div 2$$

1.0028 is a malfunction meter factor established on February 1, 1998

7. Meter is not temperature compensated

8. Average Temperature = 110°F

Average Pressure = 40 psig

9. $C_{PL} = 1.0002$

10. $C_{TL} = 0.9757$

11. BS&W = 0.3 %

12. Net Standard Volume = 2,436 bbls.

Since the average factor, 1.0015, must also be applied to the gross volume shown on Ticket No. 1, an adjustment run ticket must be submitted to replace Ticket No. 1. The adjustment run ticket must contain all of the information exactly as it appears on Ticket No. 1, the ticket being replaced, with the exception of the run ticket number, meter factor, and net standard volume.

The adjustment run ticket for this example contains the following information:

1. Sales Meter Identification

Santa Ynez Unit

Platform Harmony

Serial No. 26576

*2. Run Ticket No. 1A - This run ticket replaces Run Ticket No.1.

3. Opening = 1000 bbls on January 1, 1998 6:00 p.m.

Closing = 3000 bbls on January 15, 1998 4:30 a.m.

4. Gross Volume = 2000 bbls

5. Observed API Gravity = 35.5 at 98°F

Corrected API Gravity = 32.6 at 60°F

*6. Mechanical Meter Factor = 1.0015

(This factor replaces 1.0002)

$$1.0015 = (1.0002 + 1.0028) \div 2$$

1.0028 is a malfunction meter factor established on February 1, 1998

7. Meter is not temperature compensated

8. Average Temperature = 108°F

Average Pressure = 40 psig

9. $C_{PL} = 1.0002$

10. $C_{TL} = 0.9778$

11. BS&W = 0.2 %

*12. Net Standard Volume = 1,955 bbls.

(Note: The items marked with an asterisk are the only items that differ from those on Run Ticket No. 1.)

If Run Ticket No. 1 was completed at the time the registration readings were recorded, January 15, 1998, but was held and subsequently submitted to us with Run Ticket No. 2, corrections to Run Ticket No. 1 can be made on Ticket No. 1 itself without an adjustment ticket being attached to it. You may choose, however, to attach such an adjustment ticket to Ticket No. 1.

II Meter Proving Reports

30 CFR 250.1200(d)(4) and (5) state in part that each sales meter must be proved to determine the meter factor each month with the time between determinations not to exceed 42 days and that the lessee must submit a copy of the proving report for sales meters to us monthly within 15 days following the end of the month.

A. Proving Report Contents for Pipe Prover

Proving reports for sales meters which are proved with a pipe prover must contain the following:

1. Identification of each sales meter by either shore location and facility name or offshore area and platform; and meter serial number.
2. The date of the proving and the report number.
3. The date of the previous proving, the meter factor established on that date, and the flow rate in barrels per hour during that proving.
4. The base prover volume in barrels at 60.0°F and 0 psig, internal diameter in inches, and wall thickness in inches.
5. The meter's size, manufacturer, model, and pulses per barrel (K-factor).
6. An explicit indication as to whether or not the meter is temperature compensated.
7. The flow rate used during the proving.
8. The meter register reading at the conclusion of the proving.
9. The type of liquid used in the proving, the observed API gravity and corresponding temperature, and the API gravity corrected to 60.0°F.
10. For each proving run: the prover temperature, prover pressure, meter temperature, meter pressure, and the number of pulses counted.
11. For the five proving runs used: the average prover temperature, average prover pressure, average meter temperature, average meter pressure, and average number of pulses.
12. The prover correction factor for steel temperature (C_{TS}), correction factor for effect of pressure on steel (C_{PS}), C_{TL} , C_{PL} , and the corrected prover volume shown as the product of those correction factors and the prover base volume.
13. The gross meter volume (the ratio of the average number of pulses to K-factor), meter C_{TL} if the meter is not temperature compensated, meter C_{PL} , and the corrected meter volume shown as the product of the gross meter volume, meter C_{TL} , and meter C_{PL} .
14. The mechanical meter factor shown as the ratio of the corrected prover volume to the corrected meter volume.

15. The composite meter factor, if applicable, the C_{PL} used in its calculation, and the pressure used in the calculation of the C_{PL} .
16. The remarks portion of proving reports must contain information related to the nature and dates of any repairs to or adjustments of the meter that occurred since the last proving and prior to the proving for which the report is being submitted and also with respect to malfunction meter factors. This information is very important and must be discussed in detail.

B. Inability to Prove Meter/Out-of-Service Meter

1. If, for a given month, production is measured through a sales meter and due to unforeseen circumstances the meter is not proved during that month, you must do the following:
 - a. Notify us for the purpose of obtaining a waiver from the monthly proving requirements. The above-referenced notification must be made as soon as it appears that the meter proving of an approved sales meter may not be able to be performed for a given month.
 - b. You must submit a "blank" proving report for the month to us within 15 days following the end of the month and must include detailed description of the sales meter (serial number and location), the reason the meter was not proved, the date the verbal waiver was obtained, and the name of the MMS employee from whom the waiver was obtained. The next proving report must list as the date of the previous proving that of the last actual proving and not the date of the aforementioned "blank" proving report.

Failure to obtain the referenced waiver and submit the referenced blank report with the appropriate information will constitute a violation of 30 CFR 250.1200(4) and (5), respectively.

2. As soon as it appears that no production will be measured through a sales meter for the month, we must be notified. At such time directives will be issued with respect to the proving of the meter.

C. "Prove - Repair/Adjustment - Prove" Sequence

Any in-service sales meter which is measuring production must be proved prior to any repair of and/or adjustment to the meter. After the repair and/or adjustment, the sales meter must be proved prior to its return to service. Any question or uncertainty regarding the proper course of action to be taken with respect to a "prove - repair/adjust - prove" sequence should immediately be directed to the Office of Development, Operations and Safety.

D. Malfunction Factors, Repairs/Adjustments, and Submittal of Proving Reports with Comments

If a meter proving results in the establishment of a malfunction meter factor, the proving report must state that the meter factor established is a malfunction factor and show the calculation of the arithmetic average of the malfunction factor and the previously established factor. This average factor must be applied to the production measured during the time between the establishment of the previously established factor and the malfunction factor.

The proving report, for the meter proving conducted after the establishment of a malfunction meter factor and subsequent repairs and/or adjustments, must contain a description of the repairs and adjustments and clearly indicate that the meter factor established is, by virtue of the repair and/or adjustment, a new factor, i.e., is not to be compared to a previous factor for purposes of testing the deviation criteria of 0.0025 for malfunction meter factors.

E. Example

A meter is proved using a bidirectional prover loop (pipe prover) on January 1, 1998. The proving report must contain the following information:

1. Sales Meter Identification

Santa Ynez Unit

Platform Harmony

Serial No. 26576

2. Date of Proving: 01/01/98

Report No. 1

3. Previous Proving 12/01/97

Previous Meter Factor = 1.0000

Previous Proving Flow Rate = 300 bbl/hr.

4. Prover Volume (round trip) at 60.0°F and 0 psig = 3.1589

Size (internal diameter) = 8 inches

Wall Thickness = 0.375 inches

5. Meter Information

Size = 3 inches

Manufacturer = Smith

Model = E3-S1

K-factor = 8400 Pulses/bbl

6. Meter is temperature compensated

7. Proving Flow Rate = 300 bbl/hr.

8. Meter Register Reading After Proving = 41000 bbl

9. Type Liquid Used - Product

Observed API Gravity = 40.0 at 100.0°F

Corrected API Gravity = 36.7 at 60.0°F

10. Run Data

<u>Run No.</u>	<u>Temperature, °F</u>		<u>Pressure, psig</u>		<u>Total Pulses</u>
	Prover	Meter	Prover	Meter	
1	100.0	100.0	30	35	25800
2	100.0	100.0	30	35	25805
3	100.0	100.0	30	35	25810
4	100.0	100.0	30	35	25805
5	100.0	100.0	30	35	25800

11. Average Prover Temperature = 100.0°F

Average Meter Temperature = 100.0°F

Average Prover Pressure = 30 psig

Average Meter Pressure = 35 psig

Average Number of Pulses = 25804

12. Prover $C_{TS} = 1.0007$

Prover $C_{PS} = 1.0000$

Prover $C_{TL} = 0.9806$

Prover $C_{PL} = 1.0002$

Corrected Prover Volume =

$[\text{Prover Volume} \times (C_{TS} \times C_{PS} \times C_{TL} \times C_{PL})] = 3.1005$

13. Gross Meter Volume (Avg. Pulses \div K-factor) = 3.0719

Meter $C_{PL} = 1.0002$

Corrected Meter Volume (Gross Meter Volume $\times C_{PL}$) = 3.0725

14. Mechanical Meter Factor

(Corrected Prover Volume \div Corrected Meter Volume) = 1.0091

15. Composite Meter Factor (Mech. Meter Factor $\times C_{PL}$) = 1.0093

$C_{PL} = 1.0002$ based on operating pressure of 40 psig

16. Comments - The composite meter factor 1.0093 is a malfunction factor (1.0093 - 1.0000 > 0.0025). Therefore, the average factor $(1.0093 + 1.0000) \div 2 = 1.0046$ must be applied to all production run between 12/01/97 and 01/01/98. The meter is being taken out of service until it is repaired and reproved.

III. Calculations

A. Meter Proving Reports and Run Tickets

30 CFR 250.1 and 250.1200(c)(6) state that the procedures set forth in Chapter 12.2, Second Edition, May 1995, of the API Manual of Petroleum Measurement Standards (MPMS) must be followed for all meter proving report and meter run ticket calculations. Different calculation procedures listed in a later edition of this document must be followed only after such time that the later edition is published as a rule change in the Federal Register or written approval for alternative compliance is obtained from the MMS.

B. Tank Run Tickets

Although currently there are no regulatory requirements with respect to the calculations to be followed in the preparation of sales tank run tickets nor any API MPMS chapter which explicitly defines the manner in which sales tank run tickets are to be prepared, it is suggested that the procedures described in the above-referenced Chapter 12.2 be followed to the extent applicable in the preparation of sales tank run tickets.

IV. Contacts

Run tickets and meter proving reports must be submitted to:

Minerals Management Service
Regional Supervisor
Development, Operations and Safety MS 7200
770 Paseo Camarillo
Camarillo, CA 93010

Questions concerning this handbook can be directed to the Operations, Safety and Enforcement Section at (805) 389-7581 .