MEMO NO. 4-61

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

MEMORANDUM

TO: ALL OPERATORS

FROM: A. L. PORTER, Jr., Secretary-Director

SUBJECT: PROPOSED RULE CHANGES AND COMMINGLING MANUAL

The attached proposed changes in the New Mexico Oil Conservation Commission Rules 303 and 309-B are to be considered at the August 16, 1961, regular hearing, along with a proposed "Manual for the Installation and Operation of Commingling Facilities." Copies of the proposed manual are available at the following addresses:

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. BOX 2045
HOBBS, NEW MEXICO

NEW MEXICO OIL CONSERVATION COMMISSION
DRAWER DD
ARTESIA, NEW MEXICO

NEW MEXICO OIL CONSERVATION COMMISSION
1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO

JULY 5, 1961

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PROPOSED REVISIONS - RULE 303 AND RULE 309-B

RULE 303 SEGREGATION OF PRODUCTION FROM POOLS

(a) Same as existing rule.

(b) 1st paragraph: Same as existing rule, but add on at end of 1st paragraph "in accordance with the applicable provisions of the Commission 'Manual for the Installation and Operation of Commingling Facilities,' then current."

2nd paragraph: Same as existing rule.

3rd paragraph: Revise to read as follows:

Applicant shall furnish proof of the fact that all parties owning any interest in the subject lease were notified by registered mail of his intent to commingle production from the separate common sources of supply.

4th paragraph: Same as existing rule.

RULE 309-B ADMINISTRATIVE APPROVAL, LEASE COMMINGLING

The Secretary-Director of the Commission shall have authority to grant exceptions to Rule 309-A to permit the commingling of production from two or more separate leases in a common tank battery without notice and hearing, provided application has been filed in triplicate with the Commission and is accompanied by plats of the leases showing thereon the wells on the leases and the formations in which they are completed, and schematic diagrams of the commingling facility, showing it to be of an acceptable design in accordance with the Commission "Manual for the Installation and Operation of Commingling Facilities" then current, and provided further that:

1. All production is from the same common source of supply, or an exception to Rule 303 (a) has been obtained.

2. Adequate facilities will be provided for accurately determining production from each well at reasonable intervals.

3. All parties owning an interest in the leases and all operators of adjoining leases have consented in writing to the commingling of production from the separate leases.

4. In lieu of paragraph 3 of this rule, the applicant may furnish proof of the fact that said parties were notified by registered mail of his intent to commingle production from the separate leases.

The Secretary-Director may approve the application if, after a period of 20 days following receipt of the application, no party has made objection to the application.

5. In addition to the foregoing requirements for administrative approval to commingle production from two or more separate leases, the following requirements shall also apply:

(a) To commingle production from two or more separate leases in a common tank battery without first separately measuring the production from each such lease, the ownership of the leases must be common throughout. This shall include working interest ownership, royalty ownership and overriding royalty ownership.

(b) To commingle the production from two or more separate leases in a common tank battery where there is a diversity of ownership (whether in working interest, royalty interest, or overriding royalty interest) the hydrocarbon production from each lease shall be accurately measured and determined in accordance with the applicable provisions of the Commission "Manual for the Installation and Operation of Commingling Facilities" then current.

July 5, 1961

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MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Texaco, Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

Benson-Montin-Greer Drilling
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Atlantic Refining Company
P. O. Box 1610
Midland, Texas
Attention Mr. H. T. Frost

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

June 2, 1961

Subject: Report of Industry Study Committee
Commingling of Crude Oil

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

This report, which represents the combined efforts of all the members of the subject Committee, is presented for the purpose of providing the New Mexico Oil Conservation Commission with recommendations concerning commingling installations which are as foolproof as possible. However, it was recognized early in the work of the Committee that the design of a completely "foolproof" system would be impossible; therefore, primary consideration was given to the design of systems which would minimize the possibilities of failures or accidental mismeasurements and which would facilitate detection of purposeful mismeasurements of commingled crude oil. The final report and recommendations are not in every phase the unanimous opinion of all Committee members, instead, it represents the majority opinion of the members. This fact is mentioned inasmuch as there is considerable difference of opinion among industry representatives regarding the strictness of regulations that should and could be imposed on commingling authorizations.

The report consists of two parts. Part I, which is enclosed as Attachment No. 1, covers several proposals for the assembly and design of commingling installations, utilizing a variety of equipment and layouts, and intended for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. These designs include what the Committee considers are minimum requirements. In these designs the actual liquid measuring facilities are shown by the symbol (M), and the requirements of this metering equipment, method of proving, and method of production allocation is covered in Part II.

Part II, which is enclosed as Attachment No. 2, covers proposals for metering equipment, method of proving, sampling equipment, and production allocation for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. Where possible API Standards were used, or referred to, in the preparation of the recommendations.

In the preparation of these recommendations not too much consideration was given to existing commingling installations nor how they might be modified to comply with the recommendations, because it was believed that such installations, if changed, would have to be considered individually. These recommendations, therefore, apply primarily to installations which might be approved in the future. In addition, the Committee believes that these or other commingling requirements which might be adopted should be reviewed periodically to ascertain whether changes are needed in view of new developments in equipment.

The Committee sincerely hopes that the recommendations concerning commingling of crude oil will be useful to the New Mexico Oil Conservation Commission staff in clarifying some of the problems involved and in the preparation of sound and reasonable regulations governing such commingling.

Very truly yours,

SHELL OIL COMPANY

R. L. Elkins
Committee Chairman

Enclosures

ATTACHMENT NO. 1

PART I

Drawings A-1 through A-8

ATTACHMENT NO. 2

PART II

Liquid Measuring Facilities

I ZONE METERING (Common Royalty)

A. WITH ALL ZONES METERED

(1) Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from individual zones to a central tank battery. The counter and meter registering mechanism shall be readily sealable.

(2) Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall be of sufficient volume to store the sample for one month. Both the sampler and sample container are to be readily sealable.

(3) Zone Production Allocation

a/ If a sampler is utilized, or if BS&W content is less than 2%, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized and BS&W content is 2% or more, the net zone production shall be determined by correcting the gross meter reading for meter factor only. If a sampler is installed on any one zone, then a sampler shall be installed on all zones metering fluid containing 2% or more BS&W.

b/ If the summation of the net production from all zones does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the difference will be apportioned to each zone by the ratio that each net zone production bears to the summation of net production from all zones. (See III-B, for Allocation Formula)

(4) Meter Provers and Procedures of Calibration

a/ Any of the following types of provers can be used for calibrating zone meters:

i. Strapped storage tank
ii. Serphin tank
iii. Master meter
iv. Piston displacement meter
v. Any prover facility that is developed having accuracies equivalent to 1-4.

b/ Each zone meter shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part in 100 (1%).

d/ If prover device is not automatically temperature compensated, the prover volume shall be corrected for temperature by correcting the initial and final volumes to 60°F.

B. WITH ALL BUT ONE ZONE METERED (Subtraction Method)

(1) Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from the individual zones to a central tank battery. The counter and meter registering mechanisms shall be readily sealable.

(2) Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall be of sufficient volume to store the sample for one month. Both the sampler and sampler container are to be readily sealable.

Samplers shall be required on all metered zones if the zones are metered prior to treatment for BS&W; however, samplers will not be required on the metered zones that have individual treating systems for removal of BS&W prior to metering.

(3) Zone Production Allocation

If a sampler is utilized, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized, the net zone production shall be determined by correcting the gross meter reading for meter factor only. The unmetered zone production will be equal to the net pipeline runs, with beginning and ending stock adjustments, minus the summation of the net production from all metered zones corrected for meter factor and if a sampler is utilized, a correction for BS&W will be applied.

(4) Meter Provers and Procedures of Calibration

a/ The meter shall be calibrated into any vessel which simulates actual run conditions. The prover volume shall be weathered as long as the oil is normally retained in storage, not to exceed 24 hours.

b/ Each zone meter shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part of 100 (1%).

d/ Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60°F.

II LEASE OR ZONE METERING (Royalty not common)

A. GENERAL REQUIREMENTS

Metering facilities for the transfer of liquid hydrocarbons between individual leases or zones to a central tank battery shall provide proper means for quality determination (where required), net volume determination, fail-safe operation, and shall meet the requirements listed below. The overall accuracy of the system must equal or surpass the present hand gauging methods used in oil custody transfer.

(1) Meter Equipment

Any meter that has been previously authorized for use in an automatic custody transfer system by the New Mexico Oil Conservation Commission can be used for the transfer of liquid hydrocarbons from individual leases to a central tank battery. The counter and meter registering mechanism shall be readily sealable. All measured volumes shall be corrected to a base temperature of 60°F. Temperature compensation for temperature-corrected meters shall conform with ASME-API Code 1101. Temperature measurement for correction of volume measured by tank or un-temperature-compensated meter to standard temperature shall be made in accordance with API Standard 2500, "Part IV - Automatic Temperature Devices".

All types of meter installations must meet certain fundamental requirements. These include accurate proving facilities; adequate protective devices, such as strainers, relief valves, and air or vapor eliminators; and dependable pressure and flow controls. A further fundamental installation requirement is that physical conditions during proving should simulate actual operating conditions.

Each positive displacement meter system shall be equipped with the following auxiliary equipment, except the items indicated as optional. (See drawing on positive-displacement meter system.)

a/ BS&W Monitor and Reroute Control Valve (Both items optional)

b/ Strainer - A strainer shall be installed to remove from the liquid entrained particles which could stop or cause premature wear of the metering mechanism. However, where the liquid is clean, or where the type of meter installed does not require or warrant protection, the elimination of a strainer may be possible.

c/ Air and Gas Eliminator - (Optional) The system shall be installed in such a manner as to prevent passage of air or vapor through the meter. Combination air eliminators and strainers can be used.

d/ Sample Probe - Refer to section entitled "Sampling Equipment" for more detailed information on the sample probe.

e/ P. D. Meter - The meter shall be equipped with a non-reset counter registering in barrels.

f/ Proving Connections - See section entitled "Meter Provers and Procedures of Calibration" for more detailed information on proving requirements.

g/ Flow-Rate Controller - It is essential that the system be so designed as to provide an adequate head at the meter and to provide a sufficiently constant flow through the meter to insure that the rate of flow is in accurate range of the meter. An automatic device such as a flow-rate controller or restricting orifice shall be installed down-stream from the meter to prevent flows in excess of the maximum rated capacity of the meter. Where a pressure-reducing means is required on the inlet side of a meter, it shall be installed as far upstream of the meter as possible. It shall be adjusted so that sufficient pressure will be maintained on the outlet side of the meter to prevent any vaporization of the metered liquid.

h/ Dump Valve - In intermittent flow installations, the outlet control valve or dump valve must provide a positive shut-off to prevent drainage of the separator or treating system. Single-seated valves are recommended for this service. In continuous flow installations, pilot-operated or mechanically float-operated valves can be used. Pilot-operated valves shall be of the snap-acting, normally closed type; i.e., closing with pilot supply failure. The meter will be installed in the stream between the separator and its dump valve to maintain adequate pressure on the liquid while metering.

A positive volume or dump meter system shall be equipped with a sample probe, dump meter and proving connections. (See the following sections on "Sampling Equipment", meter provers and procedures of calibration for further details on the sample

(4) Meter Provers and Procedures of Calibration

a/ Each meter shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

b/ The proving system shall provide good flexibility, and in all cases the proving of meters shall, as nearly as possible, simulate actual operating conditions. When open proving equipment is used, a meter-proving connection shall be installed and suitably valved so that flow may be diverted into the prover and still maintain the normal operating meter pressure and flow rate. Where closed proving equipment is used, a meter-proving connection may be installed upstream or down-stream of the liquid outlet control valve; however, means shall be provided to maintain the normal operating meter pressure and flow rate. Any of the following types of provers can be used for calibrating lease meters.

i. Positive displacement master meter: refer to API Standard 1101, Section III, Paragraphs 3036 and 3037. The master meter shall be proved at least every six months by a licensed company with proving equipment that has been approved by at least two pipeline carriers. The minimum time for proving a lease meter with a master meter is the time required to produce at least 30 barrels or a maximum duration of 24 hours.

ii. Strapped storage tank - A surge tank or storage tank may be used as the prover tank if the following described conditions can be met. A suitable portion of the surge tank should be equipped with sight glasses, graduated scales and thermometers. The surge tank portion to be so used should be calibrated by water displacement or other methods yielding equivalent accuracy. The minimum surge tank capacity so used is established by two factors. First, the diameter should be sufficient to provide the required volume within limits fixed by the second factor; namely, that the value of the maximum gauge-glass reading error, when expressed as a percentage of error by volume ratio in terms of depth of surge tank so used, shall not exceed 0.05% by volume, thus establishing the minimum depth of surge tank required. (In general, it is suggested that the minimum surge tank capacity so used should be not less than 10 times the maximum rated volume delivered per minute by the largest meter to be proved. It is also suggested that if the surge tank is to be calibrated by field-strapping methods, the portion of the surge tank used should be free insofar as possible from appreciable

changes in volume per increment, caused by items such as manhole boxes, significant intermediate dead-wood displacement, etc.)

iii. All proving devices described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met. The proving device shall be calibrated and inspected annually until adequate history of performance warrants extension of the calibration and inspection interval.

c/ If prover device is not automatically temperature compensated the prover volume shall be corrected to 60°F.

III GENERAL REQUIREMENTS FOR ALL METERING SYSTEMS

A. The operator shall be required, for each metering system, to submit monthly with the C-115 Form or as an alternate keep records of the following items for a period to be specified by the Oil Conservation Commission.

(1) Beginning and ending readings of non-reset meter counter.

(2) Meter factor

(3) Percent BS&W

(4) Load oil movements and/or power oil

(5) Remarks (Explain load oil movements and/or meter or counter malfunctions.)

B. ALLOCATION FORMULA

$$Z'_1 = \frac{Z_1 \times A}{\Sigma Z's}$$

Where:

Z'_1 = Net zone production chargeable to the zone allowable.

Z_1 = Net zone production corrected for meter factor and BS&W, if applicable.

$\Sigma Z's$ = Summation of all zones corrected for meter factor and BS&W, if applicable.

A = Net pipe runs with beginning and ending stock adjustments

Example: 3 Zones

Z_1 = 500 bbls.

Z_2 = 500 bbls.

Z_3 = 500 bbls.

$\Sigma Z's$ = 1500 bbls.

A = 1530 bbls.

Then:

$$Z'_1 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

$$Z'_2 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

$$Z'_3 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

REPORT OF MINIMUM STANDARDS FOR COMMINGLING CRUDE OIL BY THE INDUSTRY STUDY COMMITTEE

June 21, 1961

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

Presented herewith is the final report representing the combined efforts of the members of the Industry Study Committee on Commingling of Crude Oil. It is presented for the purpose of providing the New Mexico Oil Conservation Commission with recommendations concerning commingling installations which are as foolproof as possible. It was recognized early in the work of the Committee that the design of a completely "foolproof" system would be impossible; therefore, primary consideration was given to the design of systems which would minimize the possibilities of failures or accidental mismeasurements and which would facilitate detection of purposeful mismeasurements of commingled crude oil. The final report and recommendations are not in every phase the unanimous opinion of all Committee Members; instead, it represents the majority opinion of the members. This fact is mentioned inasmuch as there is considerable difference of opinion among industry representatives regarding the strictness of regulations that should and could be imposed on commingling authorizations.

The attached report of "Minimum Standards for Commingling Crude Oil" was prepared in two sections by two separate Sub-committees. The first section is a written description which covers proposals for metering equipment, sampling equipment, production allocation and procedures of meter calibration for use in commingling production from different zones having the same royalty interest (Part I) and from different zones or leases having different royalty interest (Part II). General requirements for zones and leases with common or different royalty are covered in Part III. API Standards were used, or referred to, where possible.

The second section of the report is the appendix which covers several proposals for the assembly and design of commingling installations utilizing a variety of equipment and layouts. It is intended for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. These designs include what the Committee considers are minimum requirements. In these designs the actual metering facilities are shown by the symbol (MF), and the requirements of this metering equipment, sampling equipment, method of proving, and method of production allocation are covered in the written section.

In the preparation of these recommendations, not too much consideration was given to existing commingling installations nor to how they might be modified to comply with the recommendations because it was believed that such installations, if changed, would have to be considered individually. These recommendations, therefore, apply primarily to installations which might be approved in the future. In addition, the Committee believes that these or other commingling requirements which might be adopted should be reviewed periodically to ascertain whether changes are needed in view of new developments in equipment.

The Committee sincerely hopes that the recommendations concerning commingling of crude oil will be useful to the New Mexico Oil Conservation Commission Staff in clarifying some of the problems involved and in the preparation of sound and reasonable regulations governing such commingling.

Very truly yours,

R. L. Sumerwell

R. L. Sumerwell
Committee Chairman

MEMBERS OF COMMITTEE ON COMMINGLING OF CRUDE OIL

Officers:

R. L. Elkins (Chairman)	Shell Oil Company
R. L. Sumerwell (Alternate to R. L. Elkins)	Shell Oil Company
C. M. Bumpass (Sub-committee Chairman)	Gulf Oil Corporation
W. M. O'Reilly (Sub-committee Chairman)	Humble Oil & Refining Company

Members:

H. T. Frost	Atlantic Refining Company
N. McCaskill (Alternate to H. T. Frost)	Atlantic Refining Company
A. Greer	Benson-Montin-Greer Drilling Company
A. J. Inderrieden	Pan American Petroleum Corporation
J. E. York (Alternate to A. J. Inderrieden)	Pan American Petroleum Corporation
Y. T. Lyon	Continental Oil Company
D. S. Nutter	New Mexico Oil Conservation Commission
J. E. Robinson, Jr.	Texaco Inc.
R. D. Schropp	Phillips Petroleum Company
C. E. Storm	Carper Drilling Company
J. Yuronka	Texas Pacific Coal & Oil Company

MINIMUM STANDARDS FOR COMMINGLING CRUDE OIL

I ZONE COMMINGLING (Common Royalty)

A. MARGINAL ZONES

Zone commingling without metering will be permitted where all wells in the zones to be commingled are below top allowable. Individual zone production will be determined by periodic well tests.

B. ZONES WITH TOP ALLOWABLE WELLS (All zones metered)

1. Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from individual zones to a central tank battery. The counter and meter registering mechanism shall be readily sealable.

2. Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and sample container are to be readily sealable.

3. Zone Production Allocation

a/ If a sampler is utilized, or if BS&W content is less than two per cent, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized and BS&W content is two per cent or more, the net zone production shall be determined by correcting the gross meter reading for meter factor only. If a sampler is installed on any one zone, then a sampler shall be installed on all zones metering fluid containing two per cent or more BS&W.

b/ Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to the determination of net zone production.

c/ If the summation of the net production from all zones does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the net pipeline runs, with beginning and ending stock adjustments, will be apportioned to each zone by the ratio that each net zone production bears to the summation of net production from all zones. (See III-B for Allocation Formula.)

4. Meter Provers and Procedures of Calibration

a/ Any of the following types of provers can be used for calibrating zone meters:

(1) Strapped storage tank

(2) Top-and-bottom graduated-neck prover

(3) Master meter

(4) Piston displacement meter

(5) Any prover facility that is developed having accuracies equivalent to (1)-(4)

b/ Each meter used in zone accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part in 100 (1%).

d/ If prover device is not automatically temperature compensated, the prover volume shall be corrected for temperature by correcting the initial and final volumes to 60°F.

C. ZONES WITH TOP ALLOWABLE WELLS (All but one zone metered - Subtraction Method)

1. Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from the individual zones to a central tank battery. The counter and meter registering mechanisms shall be readily sealable.

2. Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and sample container are to be readily sealable.

Samplers shall be required on all metered zones if the zones are metered prior to treatment for BS&W; however, samplers will not be required on the metered zones that have individual treating systems for removal of BS&W prior to metering.

3. Zone Production Allocation

If a sampler is utilized, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized, the net zone production shall be determined by correcting the gross meter reading for meter factor only. The unmetered zone production will be equal to the net pipeline runs, with beginning and ending stock adjustments, minus the summation of the net production from all metered zones corrected for meter factor and if a sampler is utilized, a correction for BS&W will be applied.

4. Meter Provers and Procedures of Calibration

a/ The meter shall be calibrated into any vessel which simulates actual run conditions. The prover volume shall be weathered as long as the oil is normally retained in storage, not to exceed 24 hours.

b/ Each meter used in zone accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part of 100 (1%).

d/ Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60°F.

II LEASE OR ZONE COMMINGLING (Royalty not common)

A. GENERAL REQUIREMENTS

The word "lease" used hereinafter shall mean any lease or zone where the royalty is not common. Metering facilities for the transfer of liquid hydrocarbons between individual leases or zones to a central tank battery shall provide proper means for quality determination (where required), net volume determination, fail-safe operation, and shall meet the requirements listed below. The overall accuracy of the system must equal or surpass the present hand-gauging methods used in oil custody transfer.

1. Meter Equipment

Any meter that has been previously authorized for use in an automatic custody transfer system, or otherwise approved by the New Mexico Oil Conservation Commission, can be used for the transfer of liquid hydrocarbons from individual leases to a central tank battery. The counter and meter registering mechanism

shall be readily sealable. The meter shall be equipped with a non-reset counter. All measured volumes shall be corrected to a base temperature of 60°F. Temperature compensation for temperature corrected meters shall conform with ASME-API Code 1101. Temperature measurement for correction of volume measured by tank or nontemperature-compensated meter to standard temperature shall be made in accordance with API Standard 2500, "Part IV - Automatic Temperature Devices".

All types of meter installations must meet certain fundamental requirements. These include accurate proving facilities; adequate protective devices, such as strainers, relief valves, and air or vapor eliminators; and dependable pressure and flow controls. A further fundamental installation requirement is that physical conditions during proving should simulate actual operating conditions.

a/ Each positive displacement meter system shall be equipped with the following auxiliary equipment, except the items indicated as optional. (See Drawing A-9 on positive-displacement meter system.)

(1) BS&W Monitor and Reroute Control Valve (Both items optional).

(2) Strainer - A strainer shall be installed to remove from the liquid, entrained particles which could stop or cause premature wear of the metering mechanism. However, where the liquid is clean, or where the type of meter installed does not require or warrant protection, the elimination of a strainer may be possible.

(3) Air and Gas Eliminator (Optional) - The system shall be installed in such a manner as to prevent passage of air or vapor through the meter. Combination air eliminators and strainers can be used.

(4) Sample Probe - Refer to section entitled "Sampling Equipment" for more detailed information on the sample probe.

(5) P. D. Meter - The meter shall be equipped with a counter registering in barrels.

(6) Proving Connections - See section entitled "Meter Provers and Procedures of Calibration" for more detailed information on proving requirements.

(7) Flow-Rate Controller - It is essential that the system be so designed as to provide an adequate head at the meter and to provide a sufficiently constant flow through the meter to insure that the rate of flow is in accurate range of the meter.

(8) Dump Valve - In intermittent flow installations, the outlet control valve or dump valve must provide a positive shut-off to prevent drainage of the separator or treating system. Single-seated valves are recommended for this service. In continuous flow installations, pilot-operated or mechanically float-operated valves can be used. Pilot-operated valves shall be of the snap-acting, normally closed type; i.e., closing with pilot supply failure. The meter will be installed in the stream between the separating vessel and its dump valve to maintain adequate pressure on the liquid while metering.

b/ A positive volume or dump meter system shall be equipped with a sample probe, dump meter and proving connections. (See the following sections on "Sampling Equipment" and "Meter Provers and Procedures of Calibration" for further details on the sample probe and proving connections.) The internal walls of the dump meter should be as self-cleaning as possible in order that corrosion products, paraffin, and foreign matter will not collect inside the tank. Provision must be made for accurate determination in the recording of uncorrected volume and average temperature, or of temperature-corrected volume.

2. Sampling Equipment

Provision shall be made for representative sampling of the fluid transferred from each individual lease for determination of the BS&W content and, if needed, for the determination of API Gravity. The lease oil handling arrangement must remove gas and sufficient free water prior to metering to insure that the oil, when measured, is sufficiently free from volatile fractions and water to permit accurate measurement and sampling. Since acceptable automatic samplers may be designed and constructed in a variety of shapes and forms, no attempt has been made to limit the mechanical design or materials employed to accomplish a satisfactory result. However, when the metering and sampling system is installed prior to treatment for removal of BS&W, a continuous type sampler shall be employed. A continuous sampler is defined as one which is designed and operated so as to transfer equal increments of liquid from the metered stream to the sample container at a uniform rate.

The sample probe and sample container shall meet requirements of API Standard 2500, Part V, Paragraph 1402 through 1403.2; either a closed or atmospheric type container can be used unless determination of API Gravity is necessary, in which case a closed container shall be used. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as approved by the Commission and

shall be equipped with gauge glasses or some other suitable device for visually determining the amount of sample at any time during the month. Both the sampler and sample container shall be readily sealable.

3. Lease Production Allocation

Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to determination of net lease production. Net lease production shall be determined by correcting the gross meter reading for BS&W content, meter factor and for temperature if an automatic temperature compensator is not utilized. If the summation of the net production of all leases does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the net pipeline runs, with beginning and ending stock adjustments, will be apportioned to each lease by the ratio that each net lease production bears to the summation of net production from all leases (Refer to Formula in III-B).

4. Meter Provers and Procedures of Calibration

a/ Each meter used in lease accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

b/ The proving system shall, as nearly as possible, simulate actual operating conditions. When open proving equipment is used, a meter-proving connection shall be installed and suitably valved so that flow may be diverted into the prover and still maintain the normal operating meter pressure and flow rate. Where closed proving equipment is used, a meter-proving connection may be installed upstream or downstream of the liquid outlet control valve; however, means shall be provided to maintain the normal operating meter pressure and flow rate. Any of the following types of provers can be used for calibrating lease meters.

(1) Positive Displacement Master Meter - Refer to API Standard 1101, Section III, Paragraphs 3036 and 3037. The master meter shall be proved at least every six months. The minimum time for proving a lease meter with a master meter is the time required to produce at least 30 barrels or a duration of 24 hours.

(2) Calibrated Storage Tank - A suitable portion of the tank equipped with sight glasses, graduated scales and thermometers, and calibrated by the water displacement method or by precise strapping methods outlined in applicable API Standard may be used as a prover tank. The minimum capacity of the calibrated section of such prover should be ten times the maximum volume delivered per minute by the largest meter to be proved. The distance between the opening and closing levels and the provision for determining the opening and closing reading should be sufficient to detect variations of 0.05%.

(3) All proving devices described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met.

c/ If prover device is not automatically temperature compensated, the prover volume shall be corrected to 60°F.

III GENERAL REQUIREMENTS FOR ALL METERING SYSTEMS

A. The operator shall be required to submit monthly with the C-115 Form, or as an alternate, keep records of the following items for each meter used for accounting for a period to be specified by the Oil Conservation Commission.

1. Beginning and ending readings of non-reset meter counter

2. Meter factor

3. Per cent BS&W

4. Load oil movements and/or power oil

5. Remarks (Explain load oil movements and/or meter or counter malfunctions.)

B. ALLOCATION FORMULA AND EXAMPLE

1. Allocation Formula

$$Z_1' = \frac{Z_1 \times A}{\Sigma Z's}$$

Where:

Z_1' = Adjusted net zone or lease production chargeable to the zone or lease allowable.

Z_1 = Net zone or lease production corrected for meter factor and BS&W, if applicable.

$\Sigma Z's$ = Summation of all zones or leases corrected for meter factor and BS&W, if applicable.

A = Net pipeline runs with beginning and ending stock adjustments.

2. Example - 3 zones or leases

Given:

Z_1 = 9,100 barrels

Z_2 = 6,330 barrels

Z_3 = 4,562 barrels

$\Sigma Z's$ = 19,992 barrels

A = 20,021 barrels

Then:

$$Z_1' = \frac{9,100 \times 20,021}{19,992} = 9,113$$

$$Z_2' = \frac{6,330 \times 20,021}{19,992} = 6,339$$

$$Z_3' = \frac{4,562 \times 20,021}{19,992} = 4,569$$

C. Net power oil and/or net bad oil recycled shall be subtracted after the lease or zone meter is corrected for meter factor and BS&W.

D. Meter proving facilities shall discharge downstream of any meter used in accounting.

E. If the piping arrangement submitted with the commingling application does not conform with the piping arrangement actually installed, a drawing showing the revised piping arrangement shall be submitted to the Commission for approval.

F. No connecting lines between zones or leases other than those shown in Drawings A-1 through A-8 or lines around meters shall be permitted.

A P P E N D I X

SHELL OIL COMPANY

P. O. Box 845
Roswell, New Mexico

March 22, 1961

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr.

Gentlemen:

The designation of a Shell representative to serve as Chairman of the Commingling Study Committee was referred to this office and Mr. R. L. Elkins has been designated as our representative. In accordance with our discussions with you, Mr. Elkins plans to meet with members of the Commission staff on March 28, 1961, at 9:00 a.m. in Santa Fe to discuss the organization of the Committee and its primary aims.

Very truly yours,

R. L. Rankin

R. L. Rankin
Division Production Manager

cc: Mr. Oliver Seth
Seth, Montgomery, Federici & Andrews
P. O. Box 828
Santa Fe, New Mexico

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. A. Shellshear
DISTRICT MANAGER
F. O. Mortlock
DISTRICT EXPLORATION MANAGER
M. I. Taylor
DISTRICT PRODUCTION MANAGER
H. C. Vivian
DISTRICT SERVICES MANAGER

April 3, 1961

P. O. Drawer 1938
Roswell, New Mexico

State of New Mexico
Oil Conservation Commission
Post Office Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

Gulf Oil Corporation appreciates the invitation to be a member of the committee on commingling installations in New Mexico.

Our nominee to serve on the committee is Mr. C. M. Bumpass of Hobbs, New Mexico.

Very truly yours,

M. I. Taylor

MIT:bc

cc: Mr. R. L. Elkins
Shell Oil Company
Post Office Box 845
Roswell, New Mexico

NOTICE OF CHANGE OF ADDRESS

EFFECTIVE APRIL 1, 1961

GULF OIL CORPORATION
ROSWELL PRODUCTION DISTRICT OFFICE

Old Address: Post Office Box 669
Roswell, New Mexico

New Address: Post Office Box 1938
Roswell, New Mexico

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

April 3, 1961

Subject: Industry Study Committee
Commingling of Crude Oil

Committee Members
(See attached mailing list)

Gentlemen:

The first meeting of the subject study committee will be held at 9:00 a.m. on Friday, April 7, 1961, in the Oil Conservation Commission's Conference Room at Hobbs, New Mexico. Attendance of a representative from each company on the Committee at this first meeting would be appreciated inasmuch as the problems encountered in commingling and the purpose and aims of the Study Committee will be discussed.

Very truly yours,

SHELL OIL COMPANY

R. E. Wilkinson

Committee Chairman

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Benson-Montin-Greer Drlg.
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

Texaco Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

New Mexico Oil Conservation
Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 24, 1961

Mr. R. L. Elkins
P. O. Box 845
Roswell, New Mexico

Dear Mr. Elkins:

I was very much pleased to learn that your company has designated you as their representative on our industry commingling study committee. You of course will serve as chairman. The other committee members, as designated by their companies, are as follows:

Pan American
A. J. Inderrieden
P. O. Box 268
Lubbock, Texas

Continental Oil Co.
Mr. V. T. Lyon
Box 68
Eunice, New Mexico

Texas Pacific Coal & Oil Co.
Mr. John Yuronka
P. O. Box 4067
Midland, Texas

Humble Oil & Refining Co.
Mr. W. M. O'Reilly
P. O. Box 1600
Midland, Texas

Benson-Montin-Greer Drlg.
Mr. Al Greer
405½ West Broadway
Farmington, New Mexico

Texaco Inc.
Mr. J. E. Robinson, Jr.
P. O. Box 3109
Midland, Texas

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

Carper Drilling
Marshall Rowley
Carper Building
Artesia, New Mexico

Phillips Petroleum Co.
R. D. Schropp
Production Department
Bartlesville, Oklahoma

The Commission staff and I will be looking forward to meeting with you next Tuesday morning - March 28, 1961, in our offices here.

The Commission will have available for committee meetings, the conference rooms in either of our offices at Hobbs, Artesia or Santa Fe, if you desire to use them.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

FORM 470 2-57

PAN AMERICAN PETROLEUM CORPORATION

P. O. Box 268
Lubbock, Texas
March 20, 1961

File: AJI-2509-986.510

Subject: Industry Commingling Committee

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

Your letter of March 17, 1961, requested Pan American Petroleum Corporation's acceptance of the appointment to an industry committee charged with the responsibility of studying all phases of commingling and recommending proposed future installation standards. This will constitute our acceptance of your appointment.

It is requested that all correspondence be directed to Mr. A. J. Inderrieden, P. O. Box 268, Lubbock, Texas, our designated representative. Mr. James E. York is hereby appointed as alternate representative, and will represent the Company during certain phases of the study.

Yours very truly,

Neil S. Whitmore
District Superintendent

AJI:js

TEXAS PACIFIC COAL AND OIL COMPANY

GENERAL OFFICES
FORT WORTH 1
TEXAS

R. W. HINES
VICE PRESIDENT, PRODUCTION

March 20, 1961

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
State of New Mexico
P. O. Box 871
Santa Fe, New Mexico

Dear Mr. Porter:

We have your letter of March 17, 1961 concerning the appointment of an industry committee to study commingling and we wish to advise you of our acceptance of the appointment to serve on this committee.

Our Company will be represented on this committee by Mr. John Yuronka, Division Engineer, West Texas-New Mexico Division, Texas Pacific Coal and Oil Company, P. O. Box 4067, Midland, Texas.

Yours very truly,

TEXAS PACIFIC COAL AND OIL COMPANY

By R. W. Hines

R. W. Hines
Vice President, Production

RWH:B

CONTINENTAL OIL COMPANY
FAIR BUILDING
FT. WORTH 2, TEXAS

R. G. PARKER
REGIONAL MANAGER OF PRODUCTION
SOUTHWESTERN REGION

March 20, 1961

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention of Mr. A. L. Porter, Jr.

Gentlemen:

Continental Oil Company accepts with pleasure its appointment as a member of the proposed committee to study all phases of commingling.

I would like to nominate Mr. V. T. Lyon, who is District Engineer of our Eunice, New Mexico, District, to represent our company on the committee. His address is Box 68, Eunice, New Mexico.

Mr. Lyon is available now to serve on this committee.

Very truly yours,

R. G. Parker

RGP-DM

PRODUCTION DEPARTMENT
WESTERN AREA

R. R. McCARTY
MANAGER

J. S. BOLDRICK
OPERATIONS SUPERINTENDENT

H. L. HENSLEY
OPERATIONS SUPERINTENDENT

H. E. MEADOWS
ENGINEERING COORDINATOR

A. J. BEDFORD
ADMINISTRATIVE COORDINATOR

HUMBLE OIL & REFINING COMPANY

HUMBLE DIVISION
P. O. BOX 1600
MIDLAND, TEXAS

March 20, 1961

State of New Mexico
Oil Conservation Commission
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

Please refer to your letter of March 17, 1961, concerning the appointment of an industry committee to study all phases of commingling. Humble will be pleased to serve on this committee and has appointed Mr. W. M. O'Reilly, P. O. Box 1600, Midland, Texas, as our representative.

We will be ready to participate in this assignment upon the call of Shell Oil Company as Chairman.

Very truly yours,

HUMBLE OIL & REFINING COMPANY

R. R. McCARTY

By
Henry E. Meadows

HEM/enk
cc: Shell Oil Co.

TEXACO
INC.

PETROLEUM PRODUCTS

DOMESTIC PRODUCING DEPARTMENT
MIDLAND DIVISION

P. O. BOX 3109
MIDLAND, TEXAS

March 21, 1961

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attn: Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

Your letter of March 17, 1961 advises us of an industry committee that is being appointed for the purpose of proposing an acceptable system for commingling of oil.

TEXACO Inc. is pleased to accept an appointment on this committee. Mr. J. E. Robinson, Jr. is designated to represent Texaco. Mr. Robinson's address is P. O. Box 3109, Midland, Texas, Phone MU 2-0541.

Yours very truly,

J. H. Markley

J. H. Markley
Division Manager

RW-DL

cc: Shell Oil Company
Box 1509
Midland, Texas
Attn: Mr. Hughston

PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

PRODUCTION DEPARTMENT

March 21, 1961

Mr. A. L. Porter, Jr.
Oil Conservation Commission
State of New Mexico
P. O. Box 871
Santa Fe, New Mexico

Industry Committee on Commingling -
State of New Mexico

Dear Mr. Porter:

Please refer to your letter of March 17, 1961, to Mr. Jack Tarner of this office, in which you invite Phillips Petroleum Company to appoint a member to the proposed commingling committee. We appreciate very much being given the opportunity to serve on this committee. Our representative will be Mr. R. D. Schropp, Phillips Petroleum Company, Production Department, Bartlesville, Oklahoma. All further communications regarding the activity of this committee may be sent directly to Mr. Schropp.

Very truly yours,

L. E. Fitzjarrald

L. E. Fitzjarrald

JT:dr

CARPER DRILLING COMPANY, INC.

OIL PRODUCTION AND DRILLING

EMERY CARPER, PRESIDENT
STANLEY CARPER, EXEC. VICE-PRES. & TREAS.
MARSHALL ROWLEY, VICE-PRES.

ARTESIA, NEW MEXICO
CARPER BUILDING
SHERWOOD 6-2783

March 25, 1961

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter

Gentlemen:

Reference is made to your letter of March 17, 1961 regarding the Commission's intention to appoint an industry committee to study all phases of commingling.

Our company hereby accepts your invitation to appoint a member of the proposed Committee. We designate Mr. Clark Storm, Production Superintendent, to represent us on this committee.

Yours very truly,

CARPER DRILLING COMPANY, INC.

J Marshall Rowley

MR:cc Marshall Rowley

cc: Shell Oil Company
P. O. Box 1509
Midland, Texas

Atten: Mr. Hughston

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Benson-Montin-Greer Drlg.
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

Texaco Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

April 12, 1961

Subject: Minutes of April 7 Meeting
Industry Study Committee
Commingling of Crude Oil

Committee Members
(See attached mailing list)

Gentlemen:

The first meeting of the Industry Study Committee on Commingling of Crude Oil was held in Hobbs, New Mexico, April 7, 1961. The attendance is shown below:

Mr. A. L. Porter, Jr.	New Mexico Oil Conservation Commission
Mr. D. S. Nutter	New Mexico Oil Conservation Commission
Mr. R. A. Utz	New Mexico Oil Conservation Commission
Mr. J. D. Ramey	New Mexico Oil Conservation Commission
Mr. E. F. Engbrecht	New Mexico Oil Conservation Commission
Mr. C. E. Storm	Carper Drilling Company, Inc.
Mr. V. T. Lyon	Continental Oil Company
Mr. C. M. Bumpass	Gulf Oil Corporation
Mr. W. M. O'Reilly	Humble Oil & Refining Company
Mr. A. J. Inderrieden	Pan American
Mr. J. E. York	Pan American
Mr. R. D. Schropp	Phillips Petroleum Company
Mr. F. C. Morgan	Phillips Petroleum Company
Mr. R. L. Sumerwell	Shell Oil Company
Mr. R. L. Elkins	Shell Oil Company
Mr. J. E. Robinson, Jr.	Texaco Inc.
Mr. John Yuronka	Texas Pacific Coal & Oil Company
Mr. P. W. Perryman	Indiana Oil Purchasing
Mr. Glen Shoemaker	Indiana Oil Purchasing

As the first order of business a discussion was held concerning the purpose and aims of the Committee. Specifically, the Committee has been appointed for the purpose of preparing designs of commingling installations which minimize the possibilities of illegal transfer of oil between zones or leases, whether accidental or intentional, and which assure reasonable accuracies of measurement. In addition, it would be beneficial if the Committee could prepare standard drawings of these installations, using standard symbols for valves, piping, etc., which might be used by companies in requesting authority to commingle. It would also be beneficial if the Committee could specify measures which might be taken to facilitate the inspection of completed installations for conformity to the plans submitted for approval.

The various types of commingling systems, with their attendant problems, were discussed next. These systems and problems are outlined below:

I. Commingling production from two or more zones on the same lease, with no difference in royalty ownership.

A. Where none of the wells from either zone is capable of producing top allowable.
PROBLEMS - No significant problems were noted in this case. It appears that commingling on the basis of individual well tests would be satisfactory.

B. Where one or more wells in only one zone are capable of producing top allowable. In this case it is assumed that the production from the top allowable zone only is continuously metered.
PROBLEMS -

1. Possibility of by-passing the zone meter through lines which connect the various headers ahead of the meters.

2. Possibility of by-passing the zone meter through lines which are directly or indirectly connected around the meter.

3. Possibility of measurement and recording errors when oil is rerouted back through a zone meter, thereby requiring that this volume be deducted to determine zone production.

4. Use of meters which have only a reset counter, or which have a counter which can be easily disconnected from the meter.

5. Shrinkage which occurs after zone metering and before transfer to the pipeline could introduce an error.

6. What method can be used to positively limit monthly allowable production from the top allowable zone?

7. Improper routing of gas from a common test separator might occur.

In addition to the above problems, specifications are needed, as listed below, concerning the metering accuracies which should be required.
ACCURACIES -

1. Degree of accuracy needed from meter, and sampler if that is used. Method to use in proving meters, proving interval, maximum permissible fluctuation in meter factor between provings, and maximum permissible meter factor deviation.

2. Conditions requiring the use of a fluid sampler.

3. Requirements of a sampler.

C. Where wells in both zones are capable of producing top allowable. In this case it is assumed that the production from both zones is continuously metered. However, consideration should be given to the possibility of metering production from only one zone and determining production from the other by the subtraction method.
PROBLEMS - See 1 thru 7 above.

ACCURACIES - See 1 thru 3 above.

II. Commingling production from the same zone from two or more separate leases having different royalty owners. In this case it is assumed that the production from each lease is continuously metered.
PROBLEMS - See 1 thru 7 above.

ACCURACIES - See 1 thru 3 above.

III. Commingling production from two or more zones and from two or more separate leases having different royalty owners.
PROBLEMS -
1. See 1 thru 7 above

2. When commingling in this manner there might be an added problem of determining crude oil gravities by leases.

ACCURACIES - See 1 thru 3 above.

In the discussion of the various commingling systems and problems, the question was raised whether the Committee should also consider the alternative of commingling top allowable producing zones on the basis of individual well tests. It was concluded that this method of commingling offered practically no safeguard against illegal transfer of production between the zones and for that reason should not receive consideration by the Committee. The question was then raised whether the Committee should consider the possibility of commingling two top allowable zones by metering production from one zone and determining production from the other by the subtraction method. This appears to offer sufficient possibilities to merit further consideration by the Committee.

In order to expedite the work of the Committee and to give each member an opportunity to express his ideas, the members were asked to study all phases of the problems and come to the next meeting prepared to offer proposed solutions to each of these problems. Diagrams and sketches would be beneficial. At that meeting each member is to present his proposed solutions for the review of the entire Committee.

The second meeting of the Committee was set at 9:00 a.m. on April 20, 1961, in the Oil Conservation Commission Conference Room at Hobbs, New Mexico.

If the work at that meeting cannot be completed in one day, the Committee Meeting will continued through April 21.

Very truly yours,

SHELL OIL COMPANY

R. L. Elkins
Committee Chairman

Attachment

PEARL QUEEN FIELD
METER & SAMPLE ACCURACY

Month & Year	Indicated Lease Production (14 Lease Meters)	ACT Production	Barrels Difference	% Diff.
February 1959	19,108	19,119	-11	0.058
March 1959	Missing	-	-	-
April 1959	22,099	22,155	-56	0.253
May 1959	23,759	23,707	+52	0.219
June 1959	24,365	24,367	-2	0.0082
July 1959	24,490	24,469	+21	0.086
August 1959	22,879	22,973	-94	0.409
September 1959	21,766	21,810	-44	0.202
October 1959	24,040	24,029	+11	0.0457
November 1959	Missing	-	-	-
December 1959	Missing	-	-	-
January 1960	31,667	31,786	-119	0.376
February 1960	30,787	30,849	-62	0.201
March 1960	34,952	34,908	+44	0.126
April 1960	33,156	33,258	-102	0.307
May 1960	34,423	34,489	-66	0.191
June 1960	33,730	33,905	-175	.51
July 1960	34,861	34,954	-93	.26
August 1960	33,540	33,527	+13	.03
September 1960	31,958	32,272	-314	.97
October 1960	32,435	32,666	-231	.71
November 1960	31,213	31,233	-20	.06
December 1960	30,623	30,518	+105	.34
January 1961	32,641	32,602	+39	.12
February 1961	28,125	28,240	-115	.41
Total for 22 months	636,617	637,836	-1219	.191

INDIANA OIL PURCHASING COMPANY

POST OFFICE BOX 591

TULSA 2, OKLAHOMA

P. W. PERRYMAN
ATTORNEY AND SECRETARY

April 21, 1961

Mr. D. S. Nutter
Chief Engineer
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Dear Mr. Nutter:

Although we as a purchaser are extremely interested in the study being conducted by the committee on commingling problems, we did not attend the meetings held April 20 and 21 inasmuch as it is my understanding those meetings would be devoted to standard drawings of automatic transfer installations.

We are, of course, highly interested in the problems under Items 2 and 3 of the discussion notes of April 7, 1961, and I would appreciate receiving word from you when these problems come up for further discussion.

Yours very truly,

P. W. Perryman

PWP:ib

NOTES FOR DISCUSSION AT APRIL 7, 1961
MEETING OF INDUSERY STUDY COMMITTEE
COMMINGLING OF CRUDE OIL

The New Mexico Oil Conservation Commission has appointed the subject committee for the purpose of preparing designs of commingling installations which minimize the possibilities of illegal transfer of oil, whether accidental or intentional, and which assure reasonable accuracies of measurement. In addition, it would be beneficial if the committee could prepare standard drawings of these installations, using standard symbols for valves, piping, etc., which might be used by the companies in requesting authority to commingle. It would also be beneficial if the committee could specify measures which might be taken which would facilitate the inspection of completed installations for conformity to plans submitted for approval.

The various types of commingling systems, with a listing of problems encountered in each type, are outlined below:

I. Commingling of two or more zones on the same lease.

A. Where none of the wells are top allowable.
PROBLEMS - No serious problems were noted here. It appears that commingling on the basis of monthly well tests would be satisfactory.

B. Where one or more wells in only one zone are top allowable producers. (Assuming production from the top allowable zone only is metered.)
PROBLEMS - 1. Possibility of by-passing meter through lines which connect the various headers ahead of meters.

2. Possibility of by-passing meter through lines which are connected around the meter.

3. Possibility of error when bad oil from ACT unit is rerouted through the meter, thereby requiring that this volume be deducted to determine zone production.

4. Use of meters which have only a reset counter, or which have a counter which can be easily disconnected from the meter.

5. Shrinkage which occurs after zone metering and before transfer to the pipeline introduces an error.

6. What degree of accuracy should be required of meter (and sampler if that is used)?

7. What conditions require the use of a sampler?

8. Is a temperature compensated meter needed?

9. What method can be used to positively limit monthly allowable production from the top allowable zone?

10. What method should be used in proving the meter? What proving interval is needed? What maximum fluctuation in meter factor between provings, and what maximum deviation from a meter factor of 1.0 should be permitted?

11. How is gas from test separator routed back to the correct zone production?

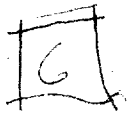
C. Where one or more wells in both zones are top allowable producers. (Assuming production from both zones is separately metered.)
PROBLEMS - 1. See 1 thru 11 above.

II. Commingling of production from the same zone from two or more leases with different royalty owners.

PROBLEMS - 1. See 1 thru 11 above.

III. Commingling of production from two or more zones and from two or more leases with different royalty owners.

PROBLEMS - 1. See 1 thru 11 above.



2. When commingling several leases and two or more zones there might be a problem of crude gravity determination by leases.

want to take a vote
on loc + time of
next mtg?

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

May 2, 1961

Subject: Minutes of April 20 Meeting
Industry Study Committee
Commingling of Crude Oil

Committee Members
(See attached mailing list)

Gentlemen:

The second meeting of the Industry Study Committee on Commingling of Crude Oil was held in Hobbs, New Mexico, April 20 and 21, 1961. Those attending are listed below:

Mr. A. S. Nutter	New Mexico Oil Conservation Commission
Mr. J. M. Ramey	New Mexico Oil Conservation Commission
Mr. E. S. Engelrecht	New Mexico Oil Conservation Commission
Mr. H. T. Priest	Atlantic Refining Company
Mr. C. E. Storm	Carper Drilling Company, Inc.
Mr. V. T. Lyon	Continental Oil Company
Mr. C. M. Bumpass	Gulf Oil Corporation
Mr. W. M. O'Reilly	Humble Oil & Refining Company
Mr. J. E. York	Pan American Petroleum Corporation
Mr. R. D. Schropp	Phillips Petroleum Company
Mr. R. E. Swarzell	Shell Oil Company
Mr. R. L. Elkins	Shell Oil Company
Mr. J. E. Robinson, Jr.	Texaco, Inc.
Mr. John Yuronka	Texas Pacific Coal & Oil Company

The meeting was begun with a review of the minutes of the first meeting, and Committee members were asked if there were any comments regarding these minutes. A statement was read by Gulf Oil Corporation's representative concerning that Company's opinion on commingling of production from several zones where the royalty interests are common, and a motion was made that this statement be included in the minutes. After discussing the motion it was voted on by the Committee and defeated.

Each of the Committee members presented ideas and proposals concerning the design and layout of equipment for commingling installations, and the entire Committee then discussed each of these. The installations incorporated a variety of equipment and layouts. For example, both individual zone heater treaters and commingled treating systems were proposed. A variety of headers and automatic diverting valves were presented. In summary, it was concluded that a number of designs of commingling installations merit consideration and can probably be recommended for use.

Next, the problem of metering equipment and metering accuracies were discussed and it was concluded that these accuracies should be equal to, or better than, that now obtained with conventional tankage and tank gauging methods. In order to define possible inaccuracies with conventional tankage the possible errors were listed and discussed. These possible inaccuracies are listed below:

1. Use of inaccurate gauge line and gauging tolerance of nearest 1/4 inch.
2. Effect of tank tilt or out of roundness.
3. Error in determination of oil termperature.
4. Use of ASTM Table #7 for volume correction.
5. Stress on tank shell with change in liquid head.
6. Bottom flexing with change in liquid head.
7. Change in BS&W line.
8. Wax incrustation on inside walls of tank.
9. Tolerance allowed in circumference measurements.
10. Tolerance allowed in shell thickness measurements.
11. Strapping a tank when steel is cold, or hot.

In view of the amount and complexity of the work to be done the Committee was divided into two Sub-Committees, one to prepare proposed designs of equipment layouts for commingled batteries and to select suitable valves, etc., and the other Sub-Committee to prepare proposed designs of metering, sampling, and monitoring assemblies and to select suitable equipment for this purpose. These Sub-Committees will prepare designs, specifications and selection of equipment and made recommendations to the entire Committee at the next meeting. The Sub-Committees are organized as shown below:

Sub-Committee on Assembly-Design

Chairman	W. M. O'Reilly
Members	J. E. York
	John Yuronka
	J. E. Robinson, Jr.
	R. D. Schropp
	H. T. Frost

Sub Committee on Measuring Methods

Chairman	C. M. Bumpass
Members	R. L. Sumerwell
	V. T. Lyon
	Clark Storm

The third meeting of the Committee was set at 9:00 a.m. on May 18 and 19, 1961, in the Oil Conservation Commission Conference Room at Hobbs, New Mexico. In the interim, the Sub-Committees will complete their proposed designs, specifications and equipment selections for presentation at the May 18th meeting.

Very truly yours,

SHELL OIL COMPANY

R. L. Elkins
Committee Chairman

Attachment

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

May 22, 1961

Subject: Minutes of May 18 Meeting
Industry Study Committee
Commingling of Crude Oil

COMMITTEE MEMBERS

Gentlemen:

The third meeting of the Industry Study Committee on Commingling of Crude Oil was held in Hobbs, New Mexico, on May 18 and 19, 1961. Those attending are listed below:

Mr. D. S. Nutter	New Mexico Oil Conservation Commission
Mr. J. D. Ramey	New Mexico Oil Conservation Commission
Mr. E. F. Engbrecht	New Mexico Oil Conservation Commission
Mr. H. T. Frost	Atlantic Refining Company
Mr. C. E. Storm	Carper Drilling Company, Inc.
Mr. V. T. Lyon	Continental Oil Company
Mr. C. M. Bumpass	Gulf Oil Corporation
Mr. H. F. Bridges	Gulf Oil Corporation
Mr. W. M. O'Reilly	Humble Oil & Refining Company
Mr. J. E. York	Pan American Petroleum Corporation
Mr. A. J. Inderrieden	Pan American Petroleum Corporation
Mr. R. D. Schropp	Phillips Petroleum Company
Mr. R. L. Sumerwell	Shell Oil Company
Mr. R. L. Elkins	Shell Oil Company
Mr. J. A. Stanzione	Shell Oil Company
Mr. J. E. Robinson, Jr.	Texaco, Inc.
Mr. John Yuronka	Texas Pacific Coal & Oil Company

During the two-day meeting, reports and recommendations were presented by both the Sub-Committee on Assembly Design and the Sub-Committee on Measuring Methods. The entire Committee reviewed and discussed these reports and made recommendations for changes which appeared necessary. The Sub-Committees plan now to revise their reports and transmit them to the Committee Chairman by June 1, 1961, for reproduction and transmittal to all Committee members for their final review.

The fourth and final meeting of the Committee was set at 9:30 a.m. on June 15 and 16, 1961, in the Oil Conservation Commission Offices at Santa Fe, New Mexico. At this meeting the Committee will review the entire report and recommendations and then discuss the report with members of the New Mexico Oil Conservation Commission.

Very truly yours,

SHELL OIL COMPANY

R. L. Lumerwell

for R. L. Elkins
Committee Chairman

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Texaco, Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

Benson-Montin-Greer Drilling
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Atlantic Refining Company
P. O. Box 1610
Midland, Texas
Attention Mr. H. T. Frost

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

June 19, 1961

Subject: Minutes of June 15 Meeting
Industry Study Committee
Commingling of Crude Oil

COMMITTEE MEMBERS

Gentlemen:

The fourth and final meeting of the Industry Study Committee on Commingling of Crude Oil was held in Santa Fe, New Mexico, on June 15 and 16, 1961. Those attending the meeting are listed below:

Mr. D. S. Nutter	New Mexico Oil Conservation Commission
Mr. J. D. Ramey	New Mexico Oil Conservation Commission
Mr. Neal McCaskill	Atlantic Refining Company
Mr. C. E. Storm	Carper Drilling Company, Inc.
Mr. C. M. Bumpass	Gulf Oil Corporation
Mr. W. M. O'Reilly	Humble Oil & Refining Company
Mr. J. E. York	Pan American Petroleum Corporation
Mr. A. J. Inderrieden	Pan American Petroleum Corporation
Mr. R. D. Schropp	Phillips Petroleum Company
Mr. J E. Robinson, Jr.	Texaco, Inc.
Mr. John Yuronka	Texas Pacific Coal & Oil Company
Mr. P. W. Perryman	Indiana Oil Purchasing
Mr. G. L. Shoemaker	Indiana Oil Purchasing
Mr. Wayne A. Harthorn	Shell Oil Company
Mr. R. L. Sumerwell	Shell Oil Company

During the two-day meeting, the report was reviewed by the entire Committee. A number of recommendations were made for additions and deletions to the preliminary report. Most of the changes were minor and were made in an attempt to clarify and simplify various sections of the report.

The revised preliminary report was presented to the New Mexico Oil Conservation Commission along with a brief discussion of various phases of the report. Mr. A. L. Porter, Jr. indicated that he had reviewed the report and that he was pleased by the Committee Members' work in devising minimum standards for commingling installations. Mr. Porter also disclosed that the Commission planned to call for a rule change on its own motion to incorporate the report as a manual which could be referred to from the Rules and Regulations of the New Mexico Oil Conservation Commission. He said that the request for a rule change would probably be done during the July or August Statewide Hearing.

The changes recommended by the Committee during the meeting in Santa Fe are now being made and the final report will be transmitted to all members by June 23, 1961.

Very truly yours,

SHELL OIL COMPANY

R. L. Sumerwell

R. L. Sumerwell
Committee Chairman

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Benson-Montin-Greer Drlg.
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. A. O'Reilly

Texaco Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

Atlantic Refining Company
P. O. Box 1610
Midland, Texas
Attention Mr. [illegible]

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

file

May 12, 1961

Subject: Third Meeting
Industry Study Committee
Commingling of Crude Oil

Committee Members

Gentlemen:

The third meeting of the subject committee will be held at 9:00 a.m. on May 18 and 19, 1961, in Shell Oil Company's Office building at the corner of Bender Boulevard and Grimes Street, Hobbs, New Mexico. This change has been made from the location designated in the Minutes of the April 20 meeting inasmuch as the Oil Conservation Commission Conference Room will not be available.

Very truly yours,

SHELL OIL COMPANY

R. L. Elkins
Committee Chairman

SHELL OIL COMPANY

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Benson-Montin-Greer Drlg.
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

Texaco Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

Atlantic Refining Company
P. O. Box 1610
Midland, Texas
Attention Mr. H. T. Frost

MAILING LIST

Industry Study Committee
Commingling of Crude Oil

New Mexico Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico
Attention Mr. J. D. Ramey

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico
Attention Mr. D. S. Nutter

Pan American
P. O. Box 268
Lubbock, Texas
Attention Mr. A. J. Inderrieden

Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas
Attention Mr. John Yuronka

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico
Attention Mr. C. M. Bumpass

Texaco, Inc.
P. O. Box 3109
Midland, Texas
Attention Mr. J. E. Robinson, Jr.

Carper Drilling Company
Carper Building
Artesia, New Mexico
Attention Mr. Clark Storm

Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma
Attention Mr. R. D. Schropp

Benson-Montin-Greer Drilling
405 1/2 West Broadway
Farmington, New Mexico
Attention Mr. Al Greer

Atlantic Refining Company
P. O. Box 1610
Midland, Texas
Attention Mr. H. T. Frost

Continental Oil Company
P. O. Box 68
Eunice, New Mexico
Attention Mr. V. T. Lyon

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas
Attention Mr. W. M. O'Reilly

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

Mr. R. D. Schropp
Phillips Petroleum Company
Production Department
Bartlesville, Oklahoma

Dear Mr. Schropp:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

June 23, 1961

Mr. J. E. Robinson, Jr.
Texaco, Inc.
P. O. Box 3109
Midland, Texas

Dear Mr. Robinson:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

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Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

COPY

Mr. V. T. Lyon
Continental Oil Company
P. O. Box 68
Eunice, New Mexico

Dear Mr. Lyon:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

Mr. A. J. Inderrieden
Pan American Petroleum Corporation
P. O. Box 268
Lubbock, Texas

Dear Mr. Inderrieden:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

June 23, 1961

Mr. H. T. Frost
Atlantic Refining Company
P. O. Box 1610
Midland, Texas

Dear Mr. Frost:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

June 23, 1961

Mr. W. M. O'Reilly
Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas

Dear Mr. O'Reilly:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

COPY

Mr. C. M. Bumpass
Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico

Dear Mr. Bumpass:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

June 23, 1961

Mr. R. L. Sumerwell
Shell Oil Company
P. O. Box 1858
Roswell, New Mexico

Dear Mr. Sumerwell:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Yours very truly,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

COPY

Mr. John Yuronka
Texas Pacific Coal & Oil Company
P. O. Box 4067
Midland, Texas

Dear Mr. Yuronka:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

June 23, 1961

Mr. Clark Storm
Carper Drilling Company
Carper Building
Artesia, New Mexico

Dear Mr. Storm:

Please accept the sincere thanks of the Oil Conservation Commission for your help as a member of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 28, 1961

Mr. R. L. Elkins
Shell Oil Company
50 West 50th Street
New York 20, New York

Dear Randy:

Please accept the sincere thanks of the Oil Conservation Commission for your help as chairman of the industry committee appointed to study the problems and possible solutions of such problems connected with the commingling of crude oil.

The committee's report will be reproduced and made available to any interested party prior to our regular hearing on August 16, 1961, at which time a case will be heard to consider the adoption of the report and the revision of our rules to broaden the administrative procedure having to do with commingling.

Although we missed you, Bob Sumerwell did an excellent job of filling in for you. We have been wondering how an old boy from the wide open spaces is fareing in New York City. I've had one brief visit in New York, and although it is very interesting, I doubt seriously if I would like to be there all the time. Anyway we were happy that you were chosen for this experience and I am sure that it will be worthwhile both to you and your company.

With best wishes, I am

Sincerely yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

MEASURING METHODS COMMITTEE

15-116

I. ZONE METERING

1. Meter Equipment

May use any meter, ~~dump-sealer~~ equipped with non-reset counter. The counter and the ~~meter~~ registering mechanism to be readily sealable.

2. Sampling Equipment

May use any sampler with sampler container having ample volume for a month's sampling. The sampler and the sampler container to be readily sealable. If a sampler is installed on any zone, ~~then all~~ other zones in the system shall be equipped with samplers.

A. If a sampler is utilized, the gross meter reading shall be corrected for BS&W content and meter factor; however, if a sampler is not utilized, the gross meter reading shall be corrected for meter factor only. The meter reading corrected as defined above shall be charged against the zone allowable. The Committee realizes that without sampling there can be conditions because of meter production whereby this will allow the Operator under procedure "B" to misallocate production among zones; however, it would result in loss of production and the Operator would install a sampler as soon as possible.

B. The difference between net pipeline sales, with beginning and ending stock adjustments, and the sum of the net individual zone metered volumes shall be apportioned back to the individual meters in the ratio that the individual meter reading bears to the sum of all such zone meter readings.

$$\text{Difference} \times \frac{\text{Ind. Zone Meter}}{\text{Summation of Ind. Meter}}$$

C. The operator will be required to submit monthly ~~on~~ the C-115 form.

Report cumulative reading of non-reset counter End _____
Start _____

Zone Meter Factor _____
Percent BS&W from Sampler _____
Load Oil Volume _____
Remarks _____

I. ZONE METERING (Continued)

3. Meter Calibration

Frequency -- proven monthly until adequate history of performance has been established to merit extension of proving frequency.

Methods - (a) Strapped storage tank.
(b) Serphin tank.
(c) Master Meter.
(d) Piston displacement meter
(e) Or any other prover facility that is developed having accuracies equivalent to (a) through (d)

4. Procedures of Calibration

(a) The minimum volume during test shall be sufficient to read volume in prover to the degree of 1 part in 100 (1%).

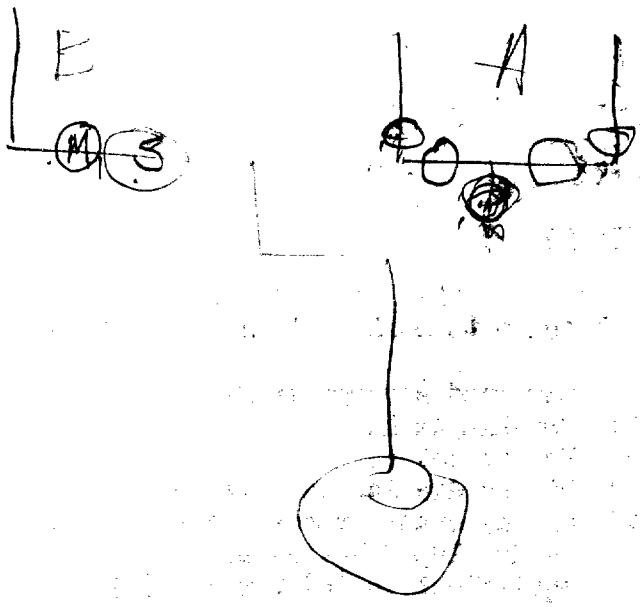
(b) Correct prover volume for temperature by correcting initial volume and final volume, if prover device is not automatically temp compensated.

5. Recommend

Change in "Master Meter Proving Data Report for a System"

(a) Column 11 should be omitted.

(b) Temperature of meter, Column 7, ~~should be omitted~~.


E
N
W
S

SM-32-1 (Rev. 9-57) REFERENCE

SHELL OIL COMPANY

DATE JUNE 26, 1961

TO SUB-COMMITTEE CHAIRMEN
MEASURING METHODS - C. M. BUMPASS
ASSEMBLY DESIGN - W. M. O'REILLY

FROM R. L. SUMERWELL
COMMITTEE CHAIRMAN

SUBJECT INDUSTRY STUDY COMMITTEE
COMMINGLING OF CRUDE OIL

Gentlemen:

This letter is in reference to our telephone conversation of June 26, 1961, concerning the presentation of the Report on Minimum Standards for Commingling Crude Oil at the Statewide hearing scheduled for August 16, 1961. As you know, the Commission has requested that the Committee testify at the hearing in behalf of the report. Rather than try to cover the whole report, I should like to call on you, as Sub-committee Chairmen, to testify in behalf of your respective sections of the report.

The Commission has made Mr. R. S. Morris available to serve as attorney for the Committee. In order to discuss our presentation of the report, it is planned that Messrs. R. S. Morris and D. S. Nutter will fly to Midland on the morning of July 25 and pick up myself and Mr. Bumpass enroute. Due to the necessary travel time, it is planned that the meeting be held at 11:00 a.m. CST, July 25, 1961, in the tenth floor conference room of the Shell Building in Midland. I should appreciate your letting me know if the 25th of July is a convenient date for you to attend the meeting.

Very truly yours,

R. L. Sumerwell

R. L. Sumerwell

RLS/dhv

cc: Mr. A. L. Porter, Jr.
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

cc: Mr. D. S. Nutter ← FOR
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

cc: Mr. R. S. Morris
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

SINCLAIR OIL & GAS COMPANY

MIDLAND SAVINGS & LOAN BLDG

P. O. Box 1470

MIDLAND, TEXAS

LEGAL DEPARTMENT

June 13, 1961

Mr. A. L. Porter
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Sir:

Various departments of my company have made inquiries regarding the report to be made by the Commingling Committee. If the report is distributed by the Commission or the New Mexico Oil & Gas Association through the usual channels, each interested person will receive a copy. If the report is not to be generally distributed, I would appreciate very much receiving six copies at the earliest available time.

Very truly yours,

Horace N. Burton

HNB/id

Horace N. Burton

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 1421
Order No. R-1172

IN THE MATTER OF THE HEARING CALLED
BY THE OIL CONSERVATION COMMISSION
OF NEW MEXICO ON ITS OWN MOTION TO
AMEND RULE 309 OF THE COMMISSION RULES
AND REGULATIONS.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 16, 1958, at Roswell, New Mexico, before the Oil Conservation Commission of the State of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 5th. day of May, 1958, the Commission, a quorum being present, having considered the evidence adduced and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That Rule 309 of the Commission Rules and Regulations should be revised to permit the production of as many as sixteen units into a common tank battery.

(3) That Rule 309 of the Commission Rules and Regulations should be further revised to permit the commingling of production from separate contiguous oil and gas leases in a common tank battery in the absence of objection by offset operators, provided all production is from the same common source of supply and provided further that the ownership of said leases is common throughout.

IT IS THEREFORE ORDERED:

That Rule 309 of the Commission Rules and Regulations be and the same is hereby revised to read as follows:

RULE 309. CENTRAL TANK BATTERIES

(a) Oil shall not be transported from a lease until it has been received and measured in tanks located on the lease. Common tankage may be used to receive the production from as many as sixteen

proration units on the same basic lease, provided adequate tankage and other equipment is installed so that the production from each unit can be accurately determined at reasonable intervals.

(b) The Secretary-Director of the Commission shall have authority to grant exceptions to Rule 309 (a) to permit the commingling of production from two or more separate State, Federal, Indian, or patented oil and gas leases in a common tank battery, without notice and hearing, provided application has been filed in due form and provided further that

1. The leases are contiguous.

2. All production is from the same common source of supply.

3. No more than sixteen units will be produced into a common tank battery and adequate facilities will be provided for accurately determining production from each well at reasonable intervals.

4. The ownership of the leases is common throughout.

5. All persons owning an interest in the leases (including royalty owners) have consented in writing to the commingling of production from the separate leases. Consent must also be obtained from the State Land Commissioner in the case of State lands and from the Regional Supervisor of the U. S. Geological Survey in the case of Federal or Indian lands.

6. All owners of adjoining oil and gas leases have consented in writing to the commingling of production from the separate leases.

7. In lieu of paragraph 6 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to commingle production from the separate leases. The Secretary-Director of the Commission may approve the application if, after a period of 20 days following the mailing of said notice, no operator has made objection to the application.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

Signed by: Edwin L. Mechem, Chairman; Murray E. Morgan, Member; A. L. Porter, Jr., Member & Secretary
ir/

50 WEST 50TH STREET
NEW YORK 20, N.Y.

July 14, 1961

Mr. A. L. Porter, Jr.
State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Dear Pete:

I appreciated your letter very much, and would like to say that I thoroughly enjoyed serving as Chairman of the Industry Committee. I sincerely hope that the work of the Committee will assist both the Commission and the operators in their commingling efforts.

I had to chuckle a little about your wondering how an old boy from the wide open spaces is faring in New York City. I will confess that it is big, crowded and confusing. However, there are many good aspects; my job is interesting, and Shell has many well informed and interesting people working in the New York office. I have also managed to find a home far from the crowded city. We have rented a very attractive home in Westport, Connecticut. The yard contains 2-3/4 acres, most of which is dense woods, and the wild life abounds, even deer. I have about an hour ride by train to get to the office, and this time I use in reading the newspaper or technical bulletins.

As you can see we are comfortably settled and enjoying the life. I, too, doubt that I would like to be here all the time, but I believe our stay here will be very pleasant. Of course, when I finish the assignment, I would like nothing better than returning to New Mexico. We have never lived in a place where we had as many good friends as we did there.

Best wishes, Pete, and if you are ever in New York I would like very much for you to call me and let me show you some of the sights.

Sincerely yours,

R. L. Elkins

SHELL OIL COMPANY

P. O. Box 1858
Roswell, New Mexico

June 2, 1961

Subject: Report of Industry Study Committee
Commingling of Crude Oil

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

This report, which represents the combined efforts of all the members of the subject Committee, is presented for the purpose of providing the New Mexico Oil Conservation Commission with recommendations concerning commingling installations which are as foolproof as possible. However, it was recognized early in the work of the Committee that the design of a completely "foolproof" system would be impossible; therefore, primary consideration was given to the design of systems which would minimize the possibilities of failures or accidental mismeasurements and which would facilitate detection of purposeful mismeasurements of commingled crude oil. The final report and recommendations are not in every phase the unanimous opinion of all Committee members, instead, it represents the majority opinion of the members. This fact is mentioned inasmuch as there is considerable difference of opinion among industry representatives regarding the strictness of regulations that should and could be imposed on commingling authorizations.

The report consists of two parts. Part I, which is enclosed as Attachment No. 1, covers several proposals for the assembly and design of commingling installations, utilizing a variety of equipment and layouts, and intended for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. These designs include what the Committee considers are minimum requirements. In these designs the actual liquid measuring facilities are shown by the symbol (M), and the requirements of this metering equipment, method of proving, and method of production allocation is covered in Part II.

MF

Part II, which is enclosed as Attachment No. 2, covers proposals for metering equipment, method of proving, sampling equipment, and production allocation for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. Where possible API Standards were used, or referred to, in the preparation of the recommendations.

In the preparation of these recommendations not too much consideration was given to existing commingling installations nor how they might be modified to comply with the recommendations, because it was believed that such installations, if changed, would have to be considered individually. These recommendations, therefore, apply primarily to installations which might be approved in the future. In addition, the Committee believes that these or other commingling requirements which might be adopted should be reviewed periodically to ascertain whether changes are needed in view of new developments in equipment.

The Committee sincerely hopes that the recommendations concerning commingling of crude oil will be useful to the New Mexico Oil Conservation Commission staff in clarifying some of the problems involved and in the preparation of sound and reasonable regulations governing such commingling.

Very truly yours,

SHELL OIL COMPANY

R. L. Elkins
Committee Chairman

Enclosures

MEMO NO. 2-61

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

MEMORANDUM:

TO: ALL OPERATORS

FROM: A. L. PORTER, Jr., Secretary-Director

SUBJECT: COMMINGLING INSTALLATIONS

The Commission has always been aware that in most instances where commingling has been approved (both between leases and between pools) the mechanical installation is such that it is physically possible for production from one lease or from one pool to be charged to another lease or pool.

Recently it has come to the Commission's attention that abuses of the commingling privilege are probably occurring.

In order to eliminate such abuses in commingling installations which are presently authorized, as well as in those which may be authorized in the future, the Commission is definitely of the opinion that standards for such installations must be established which will eliminate the possibility of abuses.

To this end, the Commission will, in the very near future, appoint an industry committee to study all phases of commingling with the objective of proposing an installation which will be as foolproof as is physically possible.

It is the Commission's thought that this Committee should consult not only with equipment manufacturers but with the Commission engineering staff, and should, within ninety (90) days after appointment, file a written report and recommendation for minimum standards for commingling installations.

The Commission contemplates that after reviewing the Committee's report and recommendation, it will establish certain minimum standards for all commingling installations, including those already authorized, in order to prevent abuses.

Any abuse discovered will, of course, lead to prosecution of the violator.

March 16, 1961
ir/

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Continental Oil Company
Fair Building
Fort Worth, Texas

Attention: Mr. R. G. Parker

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

Humble Oil & Refining Company
P. O. Box 1600
Midland, Texas

Attention: Mr. W. M. O'Reilly

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

Humble Oil & Refining Company

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Carper Drilling Company
Artesia, New Mexico

Attention: Mr. Rowley

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Shell Oil Company
Box 1509
Midland, Texas

Attention: Mr. Hughston

Gentlemen:

We appreciate very much your acceptance of the chairmanship of an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

In addition to Shell, the following companies have agreed to serve on the committee, along with a Commission representative: Benson-Montin-Greer Drilling Corporation, Pan American, Phillips, Humble, Texaco, T. P. Coal & Oil Company, Continental, and Carper Drilling Company. All of these companies have been requested to notify the Commission as soon as possible as to the name and address of their designated representative. This information will be passed along to you upon receipt.

The other members of the committee have been advised that you will notify them as to the time and place of the first meeting. We would like to request that copies of notices of meeting, etc., be sent to the Commission.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

cc: To all member companies

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Pan American Petroleum Corporation
P. O. Box 268
Lubbock, Texas

Attention: Mr. N. S. Whitmore

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Benson-Montin-Greer Drilling Corporation
405½ West Broadway
Farmington, New Mexico

Attention: Mr. Al Greer

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Phillips Petroleum Company
Phillips Building
Bartlesville, Oklahoma

Attention: Mr. Jack Tarner, Production Department

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Texaco, Inc.
P. O. Box 3109
Midland, Texas

Attention: Mr. Markley

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as fool proof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 17, 1961

Texas Pacific Coal & Oil Company
P. O. Box 2110
Fort Worth 1, Texas

Attention: Mr. W. Hines

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir
Enclosure

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

March 30, 1961

Gulf Oil Corporation
Box 669
Roswell, New Mexico

Attention: Mr. Madison I. Taylor, District Production Manager

Gentlemen:

The attached memorandum sets out the Commission's intention to appoint an industry committee to study all phases of commingling with the objective of proposing an installation that will be as foolproof as possible.

Your company is hereby appointed as a member of the proposed committee. We will appreciate very much your acceptance of this appointment and your advice at an early date as to the name of the person designated to represent your company.

Shell Oil Company has been named as chairman of the committee and the Shell representative will notify all members as to the time and place of the first meeting.

The committee will be expected to report to the Commission not later than June 30, 1961, earlier if possible.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir
cc: Mr. R. L. Elkins

REPORT OF MINIMUM STANDARDS
FOR COMMINGLING CRUDE OIL
BY THE INDUSTRY STUDY COMMITTEE

June 21, 1961

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Committee's EXHIBIT No. 1
CASE 2356

State of New Mexico
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention Mr. A. L. Porter, Jr.
Secretary-Director

Gentlemen:

Presented herewith is the final report representing the combined efforts of the members of the Industry Study Committee on Commingling of Crude Oil. It is presented for the purpose of providing the New Mexico Oil Conservation Commission with recommendations concerning commingling installations which are as foolproof as possible. It was recognized early in the work of the Committee that the design of a completely "foolproof" system would be impossible; therefore, primary consideration was given to the design of systems which would minimize the possibilities of failures or accidental mismeasurements and which would facilitate detection of purposeful mismeasurements of commingled crude oil. The final report and recommendations are not in every phase the unanimous opinion of all Committee Members; instead, it represents the majority opinion of the members. This fact is mentioned inasmuch as there is considerable difference of opinion among industry representatives regarding the strictness of regulations that should and could be imposed on commingling authorizations.

The attached report of "Minimum Standards for Commingling Crude Oil" was prepared in two sections by two separate Sub-committees. The first section is a written description which covers proposals for metering equipment, sampling equipment, production allocation and procedures of meter calibration for use in commingling production from different zones having the same royalty interest (Part I) and from different zones or leases having different royalty interest (Part II). General requirements for zones and leases with common or different royalty are covered in Part III. API Standards were used, or referred to, where possible.

The second section of the report is the appendix which covers several proposals for the assembly and design of commingling installations utilizing a variety of equipment and layouts. It is intended for use in commingling production from different zones having the same royalty interest and from different zones or leases having different royalty interests. These designs include what the Committee considers are minimum requirements. In these designs the actual metering facilities are shown by the symbol (MF), and the requirements of this metering equipment, sampling equipment, method of proving, and method of production allocation are covered in the written section.

In the preparation of these recommendations, not too much consideration was given to existing commingling installations nor to how they might be modified to comply with the recommendations because it was believed that such installations, if changed, would have to be considered individually. These recommendations, therefore, apply primarily to installations which might be approved in the future. In addition, the Committee believes that these or other commingling requirements which might be adopted should be reviewed periodically to ascertain whether changes are needed in view of new developments in equipment.

The Committee sincerely hopes that the recommendations concerning commingling of crude oil will be useful to the New Mexico Oil Conservation Commission Staff in clarifying some of the problems involved and in the preparation of sound and reasonable regulations governing such commingling.

Very truly yours,

R. L. Sumerwell

R. L. Sumerwell
Committee Chairman

MEMBERS OF COMMITTEE ON COMMINGLING OF CRUDE OIL

Officers:

R. L. Elkins (Chairman)	Shell Oil Company
R. L. Sumerwell (Alternate to R. L. Elkins)	Shell Oil Company
C. M. Bumpass (Sub-committee Chairman)	Gulf Oil Corporation
W. M. O'Reilly (Sub-committee Chairman)	Humble Oil & Refining Company

Members:

H. T. Frost	Atlantic Refining Company
N. McCaskill (Alternate to H. T. Frost)	Atlantic Refining Company
A. Greer	Benson-Montin-Greer Drilling Company
A. J. Inderrieden	Pan American Petroleum Corporation
J. E. York (Alternate to A. J. Inderrieden)	Pan American Petroleum Corporation
V. T. Lyon	Continental Oil Company
D. S. Nutter	New Mexico Oil Conservation Commission
J. E. Robinson, Jr.	Texaco Inc.
R. D. Schropp	Phillips Petroleum Company
C. E. Storm	Carper Drilling Company
J. Yuronka	Texas Pacific Coal & Oil Company

MINIMUM STANDARDS FOR COMMINGLING CRUDE OIL

I ZONE COMMINGLING (Common Royalty)

A. MARGINAL ZONES

Zone commingling without metering will be permitted where all wells in the zones to be commingled are below top allowable. Individual zone production will be determined by periodic well tests.

B. ZONES WITH TOP ALLOWABLE WELLS (All zones metered)

1. Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from individual zones to a central tank battery. The counter and meter registering mechanism shall be readily sealable.

2. Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and sample container are to be readily sealable.

3. Zone Production Allocation

a/ If a sampler is utilized, or if BS&W content is less than two per cent, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized and BS&W content is two per cent or more, the net zone production shall be determined by correcting the gross meter reading for meter factor only. If a sampler is installed on any one zone, then a sampler shall be installed on all zones metering fluid containing two per cent or more BS&W.

b/ Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to the determination of net zone production.

c/ If the summation of the net production from all zones does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the net pipeline runs, with beginning and ending stock adjustments, will be apportioned to each zone by the ratio that each net zone production bears to the summation of net production from all zones. (See III-B for Allocation Formula.)

4. Meter Provers and Procedures of Calibration

a/ Any of the following types of provers can be used for calibrating zone meters:

(1) Strapped storage tank

(2) Top-and-bottom graduated-neck prover

(3) Master meter

(4) Piston displacement meter

(5) Any prover facility that is developed having accuracies equivalent to (1)-(4)

b/ Each meter used in zone accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part in 100 (1%).

d/ If prover device is not automatically temperature compensated, the prover volume shall be corrected for temperature by correcting the initial and final volumes to 60°F.

C. ZONES WITH TOP ALLOWABLE WELLS (All but one zone metered - Subtraction Method)

1. Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from the individual zones to a central tank battery. The counter and meter registering mechanisms shall be readily sealable.

2. Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and sample container are to be readily sealable.

Samplers shall be required on all metered zones if the zones are metered prior to treatment for BS&W; however, samplers will not be required on the metered zones that have individual treating systems for removal of BS&W prior to metering.

3. Zone Production Allocation

If a sampler is utilized, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized, the net zone production shall be determined by correcting the gross meter reading for meter factor only. The unmetered zone production will be equal to the net pipeline runs, with beginning and ending stock adjustments, minus the summation of the net production from all metered zones corrected for meter factor and if a sampler is utilized, a correction for BS&W will be applied.

4. Meter Provers and Procedures of Calibration

a/ The meter shall be calibrated into any vessel which simulates actual run conditions. The prover volume shall be weathered as long as the oil is normally retained in storage, not to exceed 24 hours.

b/ Each meter used in zone accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part of 100 (1%).

d/ Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60°F.

II LEASE OR ZONE COMMINGLING (Royalty not common)

A. GENERAL REQUIREMENTS

The word "lease" used hereinafter shall mean any lease or zone where the royalty is not common. Metering facilities for the transfer of liquid hydrocarbons between individual leases or zones to a central tank battery shall provide proper means for quality determination (where required), net volume determination, fail-safe operation, and shall meet the requirements listed below. The overall accuracy of the system must equal or surpass the present hand-gauging methods used in oil custody transfer.

1. Meter Equipment

Any meter that has been previously authorized for use in an automatic custody transfer system, or otherwise approved by the New Mexico Oil Conservation Commission, can be used for the transfer of liquid hydrocarbons from individual leases to a central tank battery. The counter and meter registering mechanism

shall be readily sealable. The meter shall be equipped with a non-reset counter. All measured volumes shall be corrected to a base temperature of 60°F. Temperature compensation for temperature corrected meters shall conform with ASME-API Code 1101. Temperature measurement for correction of volume measured by tank or nontemperature-compensated meter to standard temperature shall be made in accordance with API Standard 2500, "Part IV - Automatic Temperature Devices".

All types of meter installations must meet certain fundamental requirements. These include accurate proving facilities; adequate protective devices, such as strainers, relief valves, and air or vapor eliminators; and dependable pressure and flow controls. A further fundamental installation requirement is that physical conditions during proving should simulate actual operating conditions.

a/ Each positive displacement meter system shall be equipped with the following auxiliary equipment, except the items indicated as optional. (See Drawing A-9 on positive-displacement meter system.)

(1) BS&W Monitor and Reroute Control Valve (Both items optional).

(2) Strainer - A strainer shall be installed to remove from the liquid, entrained particles which could stop or cause premature wear of the metering mechanism. However, where the liquid is clean, or where the type of meter installed does not require or warrant protection, the elimination of a strainer may be possible.

(3) Air and Gas Eliminator (Optional) - The system shall be installed in such a manner as to prevent passage of air or vapor through the meter. Combination air eliminators and strainers can be used.

(4) Sample Probe - Refer to section entitled "Sampling Equipment" for more detailed information on the sample probe.

(5) P. D. Meter - The meter shall be equipped with a counter registering in barrels.

(6) Proving Connections - See section entitled "Meter Provers and Procedures of Calibration" for more detailed information on proving requirements.

(7) Flow-Rate Controller - It is essential that the system be so designed as to provide an adequate head at the meter and to provide a sufficiently constant flow through the meter to insure that the rate of flow is in accurate range of the meter.

(8) Dump Valve - In intermittent flow installations, the outlet control valve or dump valve must provide a positive shut-off to prevent drainage of the separator or treating system. Single-seated valves are recommended for this service. In continuous flow installations, pilot-operated or mechanically float-operated valves can be used. Pilot-operated valves shall be of the snap-acting, normally closed type; i.e., closing with pilot supply failure. The meter will be installed in the stream between the separating vessel and its dump valve to maintain adequate pressure on the liquid while metering.

b/ A positive volume or dump meter system shall be equipped with a sample probe, dump meter and proving connections. (See the following sections on "Sampling Equipment" and "Meter Provers and Procedures of Calibration" for further details on the sample probe and proving connections.) The internal walls of the dump meter should be as self-cleaning as possible in order that corrosion products, paraffin, and foreign matter will not collect inside the tank. Provision must be made for accurate determination in the recording of uncorrected volume and average temperature, or of temperature-corrected volume.

2. Sampling Equipment

Provision shall be made for representative sampling of the fluid transferred from each individual lease for determination of the BS&W content and, if needed, for the determination of API Gravity. The lease oil handling arrangement must remove gas and sufficient free water prior to metering to insure that the oil, when measured, is sufficiently free from volatile fractions and water to permit accurate measurement and sampling. Since acceptable automatic samplers may be designed and constructed in a variety of shapes and forms, no attempt has been made to limit the mechanical design or materials employed to accomplish a satisfactory result. However, when the metering and sampling system is installed prior to treatment for removal of BS&W, a continuous type sampler shall be employed. A continuous sampler is defined as one which is designed and operated so as to transfer equal increments of liquid from the metered stream to the sample container at a uniform rate.

The sample probe and sample container shall meet requirements of API Standard 2500, Part V, Paragraph 1402 through 1403.2; either a closed or atmospheric type container can be used unless determination of API Gravity is necessary, in which case a closed container shall be used. The sample container shall normally be of sufficient volume to store the sample for one month or such lesser time as approved by the Commission and

shall be equipped with gauge glasses or some other suitable device for visually determining the amount of sample at any time during the month. Both the sampler and sample container shall be readily sealable.

3. Lease Production Allocation

Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to determination of net lease production. Net lease production shall be determined by correcting the gross meter reading for BS&W content, meter factor and for temperature if an automatic temperature compensator is not utilized. If the summation of the net production of all leases does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the net pipeline runs, with beginning and ending stock adjustments, will be apportioned to each lease by the ratio that each net lease production bears to the summation of net production from all leases (Refer to Formula in III-B).

4. Meter Provers and Procedures of Calibration

a/ Each meter used in lease accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

b/ The proving system shall, as nearly as possible, simulate actual operating conditions. When open proving equipment is used, a meter-proving connection shall be installed and suitably valved so that flow may be diverted into the prover and still maintain the normal operating meter pressure and flow rate. Where closed proving equipment is used, a meter-proving connection may be installed upstream or downstream of the liquid outlet control valve; however, means shall be provided to maintain the normal operating meter pressure and flow rate. Any of the following types of provers can be used for calibrating lease meters.

(1) Positive Displacement Master Meter - Refer to API Standard 1101, Section III, Paragraphs 3036 and 3037. The master meter shall be proved at least every six months. The minimum time for proving a lease meter with a master meter is the time required to produce at least 30 barrels or a duration of 24 hours.

(2) Calibrated Storage Tank - A suitable portion of the tank equipped with sight glasses, graduated scales and thermometers, and calibrated by the water displacement method or by precise strapping methods outlined in applicable API Standard may be used as a prover tank. The minimum capacity of the calibrated section of such prover should be ten times the maximum volume delivered per minute by the largest meter to be proved. The distance between the opening and closing levels and the provision for determining the opening and closing reading should be sufficient to detect variations of 0.05%.

(3) All proving devices described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met.

c/ If prover device is not automatically temperature compensated, the prover volume shall be corrected to 60°F.

III GENERAL REQUIREMENTS FOR ALL METERING SYSTEMS

A. The operator shall be required to submit monthly with the C-115 Form, or as an alternate, keep records of the following items for each meter used for accounting for a period to be specified by the Oil Conservation Commission.

1. Beginning and ending readings of non-reset meter counter

2. Meter factor

3. Per cent BS&W

4. Load oil movements and/or power oil

5. Remarks (Explain load oil movements and/or meter or counter malfunctions.)

B. ALLOCATION FORMULA AND EXAMPLE

1. Allocation Formula

$$Z'_1 = \frac{Z_1 \times A}{\Sigma Z's}$$

Where:

Z'_1 = Adjusted net zone or lease production chargeable to the zone or lease allowable.

Z_1 = Net zone or lease production corrected for meter factor and BS&W, if applicable.

$\Sigma Z's$ = Summation of all zones or leases corrected for meter factor and BS&W, if applicable.

A = Net pipeline runs with beginning and ending stock adjustments.

2. Example - 3 zones or leases

Given:

Z_1 = 9,100 barrels

Z_2 = 6,330 barrels

Z_3 = 4,562 barrels

$\Sigma Z's$ = 19,992 barrels

A = 20,021 barrels

Then:

$$Z'_1 = \frac{9,100 \times 20,021}{19,992} = 9,113$$

$$Z'_2 = \frac{6,330 \times 20,021}{19,992} = 6,339$$

$$Z'_3 = \frac{4,562 \times 20,021}{19,992} = 4,569$$

C. Net power oil and/or net bad oil recycled shall be subtracted after the lease or zone meter is corrected for meter factor and BS&W.

D. Meter proving facilities shall discharge downstream of any meter used in accounting.

E. If the piping arrangement submitted with the commingling application does not conform with the piping arrangement actually installed, a drawing showing the revised piping arrangement shall be submitted to the Commission for approval.

F. No connecting lines between zones or leases other than those shown in Drawings A-1 through A-8 or lines around meters shall be permitted.

APPENDIX

PROPOSED REVISIONS - RULE 303 AND RULE 309-B

RULE 303 SEGREGATION OF PRODUCTION FROM POOLS

(a) Same as existing rule.

(b) 1st paragraph: Same as existing rule, but add on at end of 1st paragraph "in accordance with the applicable provisions of the Commission 'Manual for the Installation and Operation of Commingling Facilities,' then current."

2nd paragraph: Same as existing rule.

3rd paragraph: Revise to read as follows:

Applicant shall furnish proof of the fact that all parties owning any interest in the subject lease were notified by registered mail of his intent to commingle production from the separate common sources of supply.

4th paragraph: Same as existing rule.

RULE 309-B ADMINISTRATIVE APPROVAL, LEASE COMMINGLING

The Secretary-Director of the Commission shall have authority to grant exceptions to Rule 309-A to permit the commingling of production from two or more separate leases in a common tank battery without notice and hearing, provided application has been filed in triplicate with the Commission and is accompanied by plats of the leases showing thereon the wells on the leases and the formations in which they are completed, and schematic diagrams of the commingling facility, showing it to be of an acceptable design in accordance with the Commission "Manual for the Installation and Operation of Commingling Facilities" then current, and provided further that:

1. All production is from the same common source of supply, or an exception to Rule 303 (a) has been obtained.

2. Adequate facilities will be provided for accurately determining production from each well at reasonable intervals.

3. All parties owning an interest in the leases ~~and all operators of adjoining leases~~ have consented in writing to the commingling of production from the separate leases.

4. In lieu of paragraph 3 of this rule, the applicant may furnish proof of the fact that said parties were notified by registered mail of his intent to commingle production from the separate leases.

The Secretary-Director may approve the application if, after a period of 20 days following receipt of the application, no party has made objection to the application.

5. In addition to the foregoing requirements for administrative approval to commingle production from two or more separate leases, the following requirements shall also apply:

(a) To commingle production from two or more separate leases in a common tank battery without first separately measuring the production from each such lease, the ownership of the leases must be common throughout. This shall include working interest ownership, royalty ownership and overriding royalty ownership.

(b) To commingle the production from two or more separate leases in a common tank battery where there is a diversity of ownership (whether in working interest, royalty interest, or overriding royalty interest) the hydrocarbon production from each lease shall be accurately measured and determined in accordance with the applicable provisions of the Commission "Manual for the Installation and Operation of Commingling Facilities" then current.

July 5, 1961

ir/

WEATHERING TEST

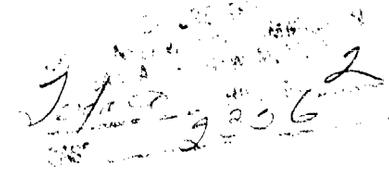
TEXACO Inc. C. E. PENNY NCT-4 LEASE JUSTIS ELLENBURGER & JUSTIS MCKEE POOLS

Date & Time	Hours	Gauge	Temperature	Observed Gravity	Tank Chart Volume (Bbls.)	Gravity @ 60°F.	Volume @ 60°F (Bbls)	% Change in Initial Volume @60°F.
6-3-61 1:20 a.m.		7'-6-4/8"	73	46.0	156.19	44.9	155.17	
3:55 a.m.	0	8'-11-7/8"	71	45.5	185.61	44.6	184.59	
4:55 a.m.	1	8'-11-7/8"	70	45.5	185.61	44.6	184.68	⁄.0487
6:15 a.m.	2:20	8'-11-6/8"	68	44.5	185.40	44.8	184.66	⁄.0379
7:30 a.m.	3:35	8'-11-6/8"	74	46.0	185.40	44.8	184.10	-.2654
8:30 a.m.	4:35	8'-11-6/8"	75	46.0	185.40	44.7	184.01	-.3142
12:10 p.m.	8:15	8'-11-5/8"	81	46.5	185.19	44.7	183.26	-.7205
4:00 p.m.	12:05	8'-11-4/8"	87	47.0	184.98	44.6	182.50	-1.1322
6-4-61 5:00 a.m.	25:05	8'-11-3/8"	76	46.0	184.77	44.6	183.29	-.7042
6-5-61 4:40 a.m.	48:45	8'-11-2/8"	78	46.0	184.56	44.4	182.92	-.9047

WEATHERING TEST

TEXACO Inc. STATE OF NEW MEXICO "L" & "M" LEASES VACUUM POOL

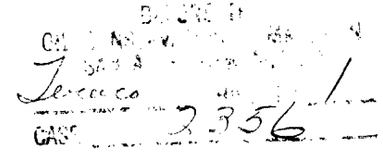
Date & Time	Hours	Gauge	Temperature	Observed Gravity	Tank Chart Volume (Bbls.)	Gravity @ 60°F	Volume @ 60°F (Bbls)	% Change in Initial Volume @60°F.
6-1-61 9:00 a.m.	0	7'-4-15/32"	79	38.7	244.43	37.3	242.13	
10:00 a.m.	1	7'-4-15/32"	83	39.0	244.43	37.3	241.64	-.2023
11:00 a.m.	2	7'-4-15/32"	82	38.8	244.43	37.1	241.76	-.1528
12:00 a.m.	3	7'-4-15/32"	84	38.9	244.43	37.1	241.52	-.2519
1:00 p.m.	4	7'-4-15/32"	83	39.0	244.43	37.3	241.64	-.2023
5:00 p.m.	8	7'-4-17/32"	84	39.0	244.61	37.2	241.69	-.1817
9:00 p.m.	12	7'-4-17/32"	81	39.0	244.61	37.4	242.06	-.0289
6-2-61 9:00 a.m.	24	7'-4-16/32"	82	39.0	244.52	37.3	241.85	-.1156
6-3-61 9:00 a.m.	48	7'-4-13/32"	80	38.8	244.26	37.3	241.84	-.1197



WEATHERING TESTS

TEXACO Inc. STATE OF NEW MEXICO "G" LEASE MONUMENT POOL

Hours	Gauge	Temperature	Observed Gravity	Tank Chart Volume (Bbls)	Gravity @ 60°F	Volume @ 60°F (Bbls)	% Change in Initial Volume @ 60°F
- 2.5	13'-5-12/16"	81	33.2	445.45	31.8	441.75	
0	14'-7-12/16"	90	34.0	483.97	31.9	478.21	
1	14'-7-11/16"	96	34.4	483.79	31.9	476.87	-.2802
2	14'-7-11/16"	101	35.2	483.79	32.3	475.95	-.4725
4	14'-7-11/16"	100	34.6	483.79	31.8	476.15	-.4307
8	14'-7-11/16"	98	34.3	483.79	31.7	476.53	-.3513
12	14'-7-10/16"	80	33.1	483.45	31.7	479.63	+.2969
24	14'-7-4/16"	83	33.5	482.60	31.9	478.21	0
48	14'-7-1/16"	85	33.6	482.08	31.9	477.31	-.1882



MEMO NO. 10-61

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

MEMORANDUM

TO: ALL OPERATORS

FROM: A. L. PORTER, Jr., Secretary-Director

SUBJECT: RULES 303 AND 309-B AND COMMINGLING MANUAL

Attached herewith is Order No. R-2060, entered by the Commission September 13, 1961. This order amends Rules 303 and 309-B, to broaden the administrative authority of the Secretary-Director in order to eliminate the necessity for hearings on practically all types of commingling installations.

The order also adopts the New Mexico Oil Conservation Commission "Manual for the Installation and Operation of Commingling Facilities," which outlines standards and procedures governing commingling installations.

In order that the Commission's proration and statistical sections can be apprised of the commingling installations previously authorized by the Commission and in actual use as of October 1, 1961, it is requested that all operators of such installations submit to the Commission by November 24, 1961, a list of all such facilities in use as of that date. Said list shall include pool name and also the name of each lease produced into each facility. If more than one pool is involved, the name of each shall also be given. In addition, the October 1 status of each pool underlying each lease shall also be reported, i.e., whether in balance so far as production vs allowable is concerned, or underproduced or overproduced. If overproduced, the amount of overproduction should be given. A similar report of status on the date the installation is put into actual use will be required for facilities installed after October 1.

A check of the above data will be made to determine whether the operators' records and the Commission's records coincide.

It is expected that the Monthly Statistical Report, compiled and edited by the Oil Conservation Commission and printed and distributed by the New Mexico Oil and Gas Engineering Committee, will, in the near future, carry the actual status of each pool and each lease in a commingled battery, as well as a composite status for the battery as a whole. Operators will, of course, be expected to observe any pool and/or lease's cumulative overproduced status when programming production for the ensuing month.

September 13, 1961

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2356
Order No. R-2060

APPLICATION OF THE OIL CONSERVATION
COMMISSION ON ITS OWN MOTION TO
CONSIDER THE ADOPTION OF A MANUAL
ESTABLISHING MINIMUM STANDARDS FOR
COMMINGLING INSTALLATIONS AND TO
CONSIDER REVISIONS OF RULES 303 AND
309-B.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 16, 1961, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 13th day of September, 1961, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the Commission should establish standards applicable to commingling installations which should prevent, in so far as possible, improper measurement and allocation of production.

(3) That to this end, the Commission should adopt a manual specifying measuring methods to be used, accuracies to be attained, and acceptable physical arrangements for commingling installations.

(4) That the report of the Industry Study Committee on Commingling, with certain modifications, should be adopted as such a manual, entitled "Manual for the Installation and Operation of Commingling Facilities."

(5) That Rules 303 and 309-B should be revised to provide administrative procedures for obtaining permission to commingle in conformance with said manual.

(6) That said manual also should serve as a criterion for the approval of commingling installations considered after notice and hearing.

(7) That the adoption of said manual and the revision of said rules will promote the interests of conservation and the protection of correlative rights.

IT IS THEREFORE ORDERED:

(1) That the Manual for the Installation and Operation of Commingling Facilities, attached to this order as Attachment A, is hereby adopted.

(2) That Rule 303 of the Commission Rules and Regulations is hereby revised to read in its entirety as follows:

RULE 303. SEGREGATION OF PRODUCTION FROM POOLS

(a) Each pool shall be produced as a single common source of supply and the wells therein shall be completed, cased, maintained, and operated so as to prevent communication, within the well bore, with any other specific pool or horizon, and the production therefrom shall at all times be actually segregated, and the commingling or confusion of such production, before marketing, with the production from any other pool or pools is strictly prohibited.

(b) The Secretary-Director of the Commission shall have the authority to grant an exception to Rule 303(a) to permit the commingling in common facilities of the commonly owned production from two or more common sources of supply, without notice and hearing, provided that the liquid hydrocarbon production from each common source of supply is to be accurately measured or determined prior to such commingling in accordance with the applicable provisions of the Commission "Manual for the Installation and Operation of Commingling Facilities," then current.

Applications for administrative approval to commingle the production from two or more common sources of supply shall be filed in triplicate with the Santa Fe office of the Commission. The application must contain detailed data as to the gravities of the liquid hydrocarbons, the values thereof, and the volumes of the liquid hydrocarbons from each pool, as well as the expected gravity and value of the commingled liquid hydrocarbon production; a schematic diagram of the proposed installation; a plat showing the location of all wells on the applicant's lease and the pool from which each well is producing. The application shall also state specifically whether the actual commercial value of such commingled production will be less than the sum of the values of the production from each common source of supply and, if so, how much less.

Where State or Federal lands are involved, applicant shall furnish evidence that the Commissioner of Public Lands for the State of New Mexico or the Regional Supervisor of the United States Geological Survey has consented to the proposed commingling.

(3) That Rule 309-B of the Commission Rules and Regulations is hereby revised to read in its entirety as follows:

RULE 309-B. ADMINISTRATIVE APPROVAL, LEASE COMMINGLING

The Secretary-Director of the Commission shall have authority to grant exceptions to Rule 309-A to permit the commingling of production from two or more separate leases in a common tank battery without notice and hearing, provided application has been filed in triplicate with the Commission and is accompanied by plats of the leases showing thereon the wells on the leases and the formations in which they are completed, and schematic diagrams of the commingling facility, showing it to be of an acceptable design in accordance with the Commission "Manual for the Installation and Operation of Commingling Facilities," then current, and provided further that:

1. All production is from the same common source of supply, or an exception to Rule 303(a) has been obtained.

2. Adequate facilities will be provided for accurately determining production from each well at reasonable intervals.

3. All parties owning an interest in the leases and the purchaser of the commingled production therefrom have consented in writing to the commingling of production from the separate leases.

4. In lieu of paragraph 3 of this rule, the applicant may furnish proof of the fact that said parties were notified by registered or certified mail of his intent to commingle production from the separate leases. The Secretary-Director may approve the application if, after a period of 20 days following receipt of the application, no party has made objection to the application.

5. In addition to the foregoing requirements for administrative approval to commingle production from two or more separate leases, the following requirements shall also apply:

(a) To commingle production from two or more separate leases in a common tank battery without first separately measuring the production from each such lease, the ownership of the leases must be common throughout. This shall include working interest ownership, royalty ownership and overriding royalty ownership.

(b) To commingle production from two or more separate leases in a common tank battery where there is a diversity of ownership (whether in working interest, royalty interest, or

overriding royalty interest) the hydrocarbon production from each lease shall be accurately measured and determined in accordance with the applicable provisions of the Commission "Manual for the Installation and Operation of Commingling Facilities," then current.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

New Mexico
Oil Conservation Commission

MANUAL
FOR THE
INSTALLATION AND OPERATION
OF
COMMINGLING FACILITIES

SEPTEMBER 13, 1961

ACKNOWLEDGEMENT

The New Mexico Oil Conservation Commission wishes to express its appreciation to the following men who devoted much time and effort to the task of formulating the Industry Study Committee Report on Commingling which served as the basis for this manual:

C. M. Bumpass, Gulf Oil Corporation
R. L. Elkins, Shell Oil Company
H. T. Frost, The Atlantic Refining Company
A. Greer, Benson-Montin-Greer Drilling Corporation
A. J. Inderrieden, Pan-American Petroleum Corporation
V. T. Lyon, Continental Oil Company
N. McCaskill, The Atlantic Refining Company
D. S. Nutter, New Mexico Oil Conservation Commission
W. M. O'Reilly, Humble Oil & Refining Company
J. D. Ramey, New Mexico Oil Conservation Commission
J. E. Robinson, Texaco Inc.
R. D. Schropp, Phillips Petroleum Company
C. E. Storm, Carper Drilling Company
R. L. Sumerwell, Shell Oil Company
J. E. York, Pan-American Petroleum Corporation
J. Yuronka, Texas Pacific Coal & Oil Company

A. L. Porter, Jr.,
Secretary-Director

I GENERAL RULES

The New Mexico Oil Conservation Commission recognizes two basic concepts of commingling as being practical and which, if the facilities are properly designed and operated, provide a reliable and economic means for receiving, measuring, and storing of liquid hydrocarbons.

The first of these is where two or more pools or zones underlying a single basic lease and having identical ownership are commingled in a single marketing facility (tank battery or LACT system) and the production attributed to the various wells and pools on the basis of well tests, metering facilities, samplers, etc. Such commingling of the production from more than one pool under a given lease is permitted only as an exception to Commission Rule 303, which requires complete segregation of the production from each pool.

The second basic concept of commingling provides for the handling of production from one or more pools underlying two or more leases in a single marketing facility in exception to Commission Rule 309, which requires complete segregation of the production from each lease. If more than one pool is involved, an exception to Rule 303 is also required.

Exceptions to Rule 303 and to Rule 309 may be granted administratively by order of the Secretary-Director of the Commission, or may be granted by order of the Commission after public notice and hearing.

This Manual for the Installation and Operation of Commingling Facilities in New Mexico sets forth minimum standards which must be met for an installation to be eligible for administrative approval. It is also offered by the Commission as a guide for the design of facilities for which hearings may be requested, inasmuch as it will serve as a criterion for the approval of such installations. Certain of the operating standards and procedures must be followed whether the installation is approved administratively or after hearing. Failure to install and to operate commingling facilities in accordance with these standards may result in an order by the Oil Conservation Commission cancelling the commingling authority and requiring regular single-zone or single-lease measurement and storage of liquid hydrocarbons.

It will be noted that the standards provide various degrees of accuracy in metering, sampling, and testing of commingled production, as well as in proving meters, depending upon whether marginal production or top allowable production is being commingled, whether oil from a single lease or from two leases with identical ownership is being commingled, or whether oil from two or more leases with varying ownership is being commingled. The Commission is of the belief that there is little room for flexibility of accuracies, particularly in the latter case where the division of monies, including royalties, is dependent upon the reliable measurement of production from each lease.

It will also be noted that while the various types of installations may differ in design as well as operational procedure, certain basic rules apply to all installations. These include:

Production Tolerances and Bookkeeping

Each lease and/or zone or pool producing into a commingling facility, and every well connected thereto, shall be produced within their assigned allowables, subject to the daily and monthly tolerances permitted by Rules 502 I and 502 II.

Individual lease and/or zone production shall be accounted for on a monthly basis and records thereof kept as though no commingling were occurring. Throughput for a lease or zone meter (after correction for meter factor) during a given month shall be limited to the monthly allowable subject to the above tolerances and less any necessary reduction for past overproduction from said lease or zone plus the permitted allowances for BS&W content and for load oil, power oil, net bad oil recycled, etc., wherever applicable.

The operator of a commingling facility shall submit a record of the following items each month with Form C-115 covering the lease:

1. Beginning and ending readings of non-reset meter counter.

2. Meter factor.

3. Per cent BS&W.

4. Gravity (where oil of different gravity from two or more pools underlying separate leases is being commingled).

5. Load oil movements with explanation.

6. Power oil movements if subsurface hydraulic pumping equipment is used.

7. Bad oil recycled from stock tanks through zone or lease treater and commingled with new production going through same facility (including gross barrels fluid recycled, BS&W content both in per cent and in barrels, and net oil recycled).

8. Explanation of meter and/or counter malfunctions.

As an alternative to submitting a record of the above items each month, the operator may keep such records available for inspection on the lease for a period of not less than two years.

Allocation Formula

If the summation of the net production from all zones or

leases does not agree with the net pipeline runs from the commingling installation plus any increase in storage during the month (or less any decrease in storage), the difference between said summation and said pipeline runs with adjustment for change in storage shall be proportionately distributed to each zone and/or lease in accordance with the following formula:

$$Z_1' = \frac{Z_1 \times A}{\Sigma Z's}$$

Where:

Z_1' = The adjusted net production chargeable to the zone or lease allowable.

Z_1 = The net production from a zone or lease. (Gross meter reading corrected for meter factor, BS&W if applicable, power oil, etc.)

$\Sigma Z's$ = The summation of net production from all zones or leases.

A = Net pipeline runs plus change in storage during month. (Add increase in storage, subtract decrease in storage.)

Example: Three zones or leases

Given:

Z_1 = 9,100 barrels

Z_2 = 6,330 barrels

Z_3 = 4,562 barrels

$\Sigma Z's$ = 19,992 barrels

A = 20,021 barrels

Then:

$$Z_1' = \frac{9,100 \times 20,021}{19,992} = 9,113$$

$$Z_2' = \frac{6,330 \times 20,021}{19,992} = 6,339$$

$$Z_3' = \frac{4,562 \times 20,021}{19,992} = 4,569$$

Power Oil and/or Recycled Bad Oil

Net power oil used for subsurface hydraulic pumping and net bad oil recycled (total recycled fluid less BS&W as determined from bad oil sampler) from stock tanks through a zone or lease treater and meter shall be subtracted from the gross meter reading after said reading is corrected for meter factor and, if applicable, BS&W content.

Installation and Removal of Meters

The operator shall notify the appropriate district office of the Commission in writing as to the date of installation and initial meter reading and the date of removal and final meter reading for any meter used in a commingling facility.

Meter Proving

All meters used for zone or lease production accounting shall be proved for accuracy monthly until adequate history of performance has been established to merit extension of the proving frequency.

The Secretary-Director of the Commission may approve such extension upon application from the operator, which application should be accompanied by a tabulation of all meter factors and the dates they were obtained, and a graph of such factors plotted versus time.

Meters shall be proven in accordance with the instructions in this manual governing specific types of commingling installations. Meter proving facilities shall discharge downstream of any meter used in production accounting.

Piping and Diagrams

No connecting lines between zones or leases other than those shown in Figures 1 through 8 will be permitted. No lines around meters or connections for such lines will be permitted.

All piping in a commingling installation shall be installed and maintained above ground. If an operator desires to bury any lines, he may do so only after the system has been inspected by a representative of the Commission.

If the piping arrangement actually installed in any system does not conform with the piping arrangement submitted with the application, a drawing of the revised piping arrangement shall be submitted to the Commission for approval prior to use of the installation.

All schematic diagrams, whether submitted with an application for administrative approval, or as exhibits at a hearing, shall employ standardized symbols as used on the drawings contained herein.

II COMMINGLING BETWEEN POOLS OR ZONES

Where ownership of all zones is identical, commingling of hydrocarbons from one or more separate pools or zones in a single marketing facility will be permitted providing an exception to Rule 303 has been obtained and the commingling facilities are installed and operated in accordance with the following:

1. Marginal Zones

If all wells in each pool to be commingled on a given lease are marginal and are physically incapable of producing top unit allowable for their respective pools, commingling will be permitted without separately measuring the production from each pool. Instead, the production from each well and from each pool may be determined from well tests conducted periodically as the Commission may prescribe in the order authorizing the commingling. This shall not include those cases where wells can produce an amount of oil equal to top allowable for the pool but are restricted because of high gas oil ratios. Applications to so commingle marginal pools without separately measuring the production therefrom shall be accompanied by a tabulation of production showing that the average daily production over a 60-day period has been below top allowable for the subject pools.

The operator of any such marginal commingling installation shall notify the Commission at any time any well so commingled without separate measurement becomes capable of producing top allowable for its pool, at which time the Commission may require separate measurement.

2-A. Zones with Top Allowable Wells (All zones metered)

If any well in any pool to be commingled on a given lease is physically capable of producing top allowable (even if restricted because of high gas-oil ratio) commingling will be permitted only if adequate facilities are installed for accurately determining the production from each such pool prior to commingling, except as provided in Section 2-B below.

Such facilities shall be in substantial compliance with one of the installations depicted in Figures 1, 2, 3, and 4.

Production from each zone to be commingled shall be separately measured by means of a meter acceptable to the Commission. Such meter shall be equipped with a non-reset counter. The counter and the meter registering mechanism shall be readily sealable.

Samplers are recommended but are not required when commingling production from two or more commonly-owned pools underlying a single lease, BS&W content being periodically determined by standard centrifugal testing procedures. If a sampler is not utilized, the net zone production shall be determined by applying the known meter factor to the gross meter reading less BS&W content up to two per cent. Credit may not be taken against the

gross meter reading for BS&W content in excess of two per cent unless a sampler is utilized.

If a sampler is utilized, the net zone production shall be determined by applying the known meter factor to the gross meter reading less BS&W content regardless of per cent. If a sampler is installed on any one zone, then samplers shall be installed on all zones making two per cent or more BS&W.

Any type of automatic sampler may be used for determining BS&W content in zone commingling installations provided that the sampler and sampler probe are so installed and maintained as to give a representative sample of the metered stream. The sample container shall be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and the sample container are to be readily sealable.

Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to the determination of net zone production.

If the summation of the net production from all zones does not agree with the net pipeline runs from the commingling installation plus any increase in storage during the month (or less any decrease in storage), the difference between said summation and pipeline runs shall be proportionately distributed to each zone in accordance with the allocation formula in Section I of this manual.

Each meter used in zone production accounting shall be proved for accuracy monthly until adequate history of performance has been established to merit extension of the proving frequency.

Meters may be proven by means of any of the following:

1. Strapped storage tank
2. Top-and-bottom graduated neck prover
3. Master meter
4. Piston Displacement meter
5. Any prover facility that is developed having accuracies comparable to items one through four.

The minimum volume for proving shall be sufficient to read the volume in the prover to a degree of one part in 100. (For example, if a strapped storage tank is used, and the fluid level in the tank cannot be gauged closer than 1/4 inch, then sufficient volume would have to be run during the meter proving test to equal 100 times 1/4, or 25 inches in the tank. If a sight glass is installed on the tank and the level can be read to 1/16 inch and 1/16 inch strapping tables are available, then 100 times 1/16 or 6 1/4 inches of oil would have to be run.)

If the prover device is not automatically temperature compensated, the prover volume shall be corrected for temperature by correcting the initial and final volumes to 60°F.

2-B. Zones with Top Allowable Wells (All zones except one separately metered - Subtraction Method)

If any well in any pool to be commingled on a given lease is physically capable of producing top allowable (even if restricted because of high gas-oil ratio) commingling will be permitted only if adequate facilities are installed for accurately determining the production from each such pool prior to commingling in accordance with Section 2-A above or in accordance with the subtraction method described below. Administrative approval of installations utilizing the subtraction method will be granted only if all zones to be so commingled produce hydrocarbons having a gravity of 45° API or less.

Subtraction method commingling facilities shall be in substantial compliance with one of the installations depicted in Figures 5 and 6.

Production from all except one of the zones to be commingled shall be separately measured by means of meters acceptable to the Commission. Normally the unmetered zone should be the one producing the highest API gravity oil. All meters shall be equipped with non-reset counters. The counters and the meter registering mechanisms shall be readily sealable.

Samplers are required on all metered zones which are metered prior to treatment for BS&W, in which case the net zone production for the metered zones shall be determined by applying the known meter factor to the gross meter reading less BS&W content.

Samplers may be installed but are not required on all metered zones which have individual treating systems upstream from the meter. If samplers are installed, the net zone production for the metered zones shall be determined by applying the known meter factor to the gross meter reading less BS&W content. If samplers are not installed, the net zone production shall be the gross meter reading corrected for the known meter factor with no credit allowance for BS&W.

The net zone production for the unmetered zone shall be the difference between the net pipeline runs with beginning and ending stock adjustments, and the sum of the net zone production of all metered zones as determined above.

Each meter used in zone production accounting shall be proved for accuracy monthly into a proving tank which simulates actual run conditions. The minimum volume for proving shall be sufficient to read the volume in the prover to a degree of one part in 100. Prior to reading the final volume, the oil in the prover tank shall be permitted to weather as long as the oil is normally retained in storage on the lease, provided however, that it is not required to weather any such oil in excess of 24 hours.

Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60°F.

III COMMINGLING BETWEEN LEASES

1. Common Ownership

Where ownership of one or more leases is identical throughout, including working interest ownership, royalty ownership, and overriding royalty ownership, the commingling of production from said leases in a common tank battery will be permitted without separately measuring the production from each lease provided an exception to Rule 309-A has been obtained and provided further that adequate facilities shall be installed to permit determining the producing capacity of each well on each lease at least once each month. Provided however, that the rules governing commingling between pools shall also apply if more than one zone or pool is involved.

2. Diversified Ownership

Where there is a diversity of ownership (whether in working interest, royalty interest, or overriding royalty interest) between two or more leases or where there is any such diversity of ownership between the various zones, strata, or pools underlying a lease, the same shall be considered as separate leases and the commingling of production therefrom shall be permitted only as an exception to Rule 309-A and shall be in accordance with the requirements hereinafter set forth governing the installation and operation of commingling facilities between leases. Provided however, that the rules governing commingling between pools shall also apply if more than one zone or pool is involved.

Measuring facilities for the transfer of liquid hydrocarbons from individual leases to a central marketing facility (tank battery or LACT unit) shall provide adequate means for net volume determination and fail-safe operation. The overall accuracy of the system must equal or surpass the present hand-gauging methods used in oil custody transfer.

Production from each lease to be commingled shall be separately measured by means of a meter which has previously been authorized for use in an automatic custody transfer system, or otherwise approved by the New Mexico Oil Conservation Commission. Such meter shall be equipped with a non-reset counter registering in barrels. The counter and the meter registering system shall be readily sealable. All measured volumes shall be corrected to a base temperature of $60^{\circ}F$. If automatically temperature compensated meters are used, compensation shall conform to ASME-API Code 1101. If non-temperature compensated meters or other non-temperature compensated measuring devices are used, the measurement of temperature for correction of volumes to $60^{\circ}F$ shall be in accordance with API Standard 2500, Part IV, "Automatic Temperature Devices."

All diversified ownership lease commingling facilities shall be in substantial compliance with one of the installations depicted in Figures 1, 2, 3, and 4. In addition, such installations shall conform to certain other minimum requirements. These include:

Strainer - A strainer shall be installed to remove entrained particles from the liquid which could cause premature wear of or stop the metering mechanism. However, where the liquid is clean, or where the type of meter installed does not require such protection, the Commission may approve elimination of the strainer.

Air and Gas Eliminator - If the meter used or the production is of such a nature as to render accurate measurement of liquids impossible due to the passage of air and/or gas vapor through the meter, an air and gas eliminator shall be installed. Combination air and gas eliminators and strainers may be used.

Samplers and Sampler Probes - Provision shall be made for the representative sampling of the fluid transferred from the individual lease to the central facility for BS&W content and, in the case where fluids of different gravities from two or more pools underlying separate leases are being commingled, for determination of API gravity. The lease facilities must be such as to remove gas and sufficient water prior to metering and sampling to permit accurate measurement and sampling of the stream prior to commingling. Continuous-type samplers shall be used, and are defined as that type of sampler so designed and operated as to transfer equal increments of liquid from the metered stream to the sample container at a uniform rate.

The sample probe and sample container shall meet the requirements of API Standard 2500, Part V, Paragraphs 1402 through 1403.2. Atmospheric type containers may be used except in the case where API gravity must be determined (above), in which event the sample container must be of the closed type.

Sample containers shall be of sufficient volume to store the sample for one month or such lesser time as the Commission may approve. Both the sampler and the sample container shall be readily sealable.

Proving Connections - Facilities shall be installed for proving meters in accordance with the section entitled, "Meter Provers and Procedures for Calibration."

BS&W Monitor and Automatic Reroute Control Valves - The use of these items is optional.

Flow-Rate Controllers (Positive Displacement Metering Systems Only) - It is essential that the system be so designed as to provide an adequate head of fluid at the meter to produce a sufficiently constant flow through the meter to ensure that the rate of flow is within the accurate range of the meter.

Dump Valve (Outlet Control Valve) - P. D. Metering Systems Only - Meters shall be installed in the stream between the separating vessel and its dump valve to maintain adequate pressure on the liquid while being metered. The dump valve must provide a positive shut-off to prevent drainage of the separator or treating system. Single-seated snap-acting valves shall be used.

Pilot-operated valves are recommended and shall be, of the normally closed type, i.e., closing with pilot supply failure. Combination flow-rate controllers and dump valves may be used.

Positive Volume and Dump Meter Systems - When measuring oil from two or more leases of varying ownership by means of positive volume vessels or dump meters, the internal walls thereof should be as self-cleaning as possible. This shall include plastic-coating of said walls where conditions indicate the deposition of corrosive products, paraffin, and foreign matter which may render accurate measurement of fluids impossible.

Meter Provers and Procedures For Calibration - Each meter used in lease accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

The proving system shall, as nearly as possible, simulate actual operating conditions. When open proving equipment is used, a meter-proving connection shall be installed and suitably valved so that flow may be diverted into the prover and still maintain the normal operating meter pressure and flow rate. Where closed proving equipment is used, a meter-proving connection may be installed upstream or downstream of the liquid outlet control valve; however, means shall be provided to maintain the normal operating meter pressure and flow rate. Any of the following types of provers can be used for calibrating lease meters.

Positive Displacement Master Meter - Refer to API Standard 1101, Section III, Paragraphs 3036 and 3037. The master meter shall be proved at least every six months. The minimum time for proving a lease meter with a master meter is the time required to produce at least 30 barrels or a duration of 24 hours.

Calibrated Storage Tank - A suitable portion of the tank equipped with sight glasses, graduated scales, and thermometers, and calibrated by the water displacement method or by precise strapping methods outlined in applicable API Standard may be used as a prover tank. The minimum capacity of the calibrated section of such prover should be ten times the maximum volume delivered per minute by the largest meter to be proved. The distance between the opening and closing levels and the provision for determining the opening and closing reading should be sufficient to detect variations of 0.05%

Any proving device described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met.

If the prover device is not automatically temperature compensated, the prover volume shall be corrected to 60°F.

Lease Production Allocation - Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to determination of net lease production.

Net lease production shall be determined by correcting the gross meter reading for known meter factor and BS&W content as determined from a standard centrifugal test of a representative sample from the sample container. If the measuring device is non-temperature compensating, correction of measured volume to $60^{\circ}F$ shall also be made to determine net lease production.

If the summation of the net production from all zones does not agree with the net pipeline runs from the commingling installation plus any increase in storage during the month (or less any decrease in storage), the difference between said summation and pipeline runs shall be proportionately distributed to each zone in accordance with the allocation formula in Section I of this manual.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 1850
Order No. R-1597

APPLICATION OF THE OIL CONSERVATION COMMISSION ON ITS OWN MOTION TO CONSIDER REVISING RULE 303 OF THE COMMISSION RULES AND REGULATIONS TO ESTABLISH A PROCEDURE WHEREBY AUTHORITY TO COMMINGLE PRODUCTION FROM TWO OR MORE SEPARATE COMMON SOURCES OF SUPPLY MAY BE APPROVED WITHOUT NOTICE AND HEARING

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on January 13, 1960, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 8th day of February, 1960, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That in the interest of administrative convenience, Rule 303 of the Commission Rules and Regulations should be revised to establish a procedure whereby the authority to commingle the production from two or more separate common sources of supply may be approved without notice and hearing, provided that the production from each common source of supply will be accurately measured and determined prior to such commingling.

IT IS THEREFORE ORDERED:

That Rule 303 of the Commission Rules and Regulations be and the same is hereby revised to read in its entirety as follows:

RULE 303. SEGREGATION OF PRODUCTION FROM POOLS

(a) Each pool shall be produced as a single common source of supply and the wells therein shall be completed, cased, maintained, and operated so as to prevent communication, within the well bore, with any other specific pool or horizon, and the production therefrom shall at all times be actually segregated, and the commingling or confusion of such production, before marketing, with the production from any other pool or pools is strictly prohibited.

(b) The Secretary-Director of the Commission shall have the authority to grant an exception to Rule 303(a) to permit the commingling in common facilities of the commonly owned production from two or more common sources of supply, without notice and hearing, provided that the liquid hydrocarbon production from each common source of supply is to be accurately measured and determined prior to such commingling.

Applications for administrative approval to commingle the production from two or more common sources of supply shall be filed in triplicate with the Santa Fe office of the Commission. The application must contain detailed data as to the gravities of the liquid hydrocarbons, the values thereof, and the volumes of the liquid hydrocarbons from each pool, as well as the expected gravity and value of the commingled liquid hydrocarbon production; a schematic diagram of the proposed installation; a plat showing the location of all wells on the applicant's lease and the pool from which each well is producing. The application shall also state specifically whether the actual commercial value of such commingled production will be less than the sum of the values of the production from each common source of supply and, if so, how much less.

Applicant shall furnish evidence that all persons owning any interest of record in the subject acreage, which interest appears in the applicant's files, have been sent a copy of the application by registered mail.

The Secretary-Director may approve the commingling, if after a period of twenty (20) days following receipt of the application, no person owning any interest in the subject acreage has objected.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOHN BURROUGHS, Chairman

MURRAY E. MORGAN, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

vem/

WRITTEN STATEMENT

To: Oil Conservation Commission
Santa Fe, New Mexico

By: Skelly Oil Company

Subject: Case No. 2356
Proposed Changes in Rules 303 and 309-B, and Adoption of a "Manual for the Installation and Operation of Commingling Facilities".

Skelly Oil Company favors the proposed changes in Rules 303 and 309-B. We feel that providing for administrative approval of commingling applications according to established minimum standards will aid both the Commission and the operators.

We have examined the report by the Industry Study Committee setting forth minimum standards for commingling crude oil. The Committee is to be commended for its excellent report which entailed many hours of meetings, thought and effort. We do feel, however, that especially in the case of zone commingling on the same lease with common ownership and interests, the drawings set out in the Appendix are too restrictive.

We are attaching a schematic diagram of the commingling facilities actually installed on one of our leases. The diagram is self-explanatory, but briefly, it provides for separate heater treater or separator facilities for each zone with facilities downstream of the meter, but before commingling, for diverting a zone's production into a stock tank separate from the other zones. This allows not only testing of each individual zone, but also at the same time, allows us to check the meter reading against stock tank gauges.

We feel that this system, as outlined, is as accurate and foolproof as any outlined in the Committee's report. A separator on the gas line provides a fail safe feature on the system in that it prevents oil being lost to the gas pipeline by a malfunction of the dump meters. Although this will allow unmetered oil to be produced into the tank battery, it would prevent unmetered oil from going down the gas pipeline.

We believe a system of this type to be of good design, and earnestly urge consideration of it.

Skelly Oil Company

By Ronald G. Jacobs

METER TEST REPORT

~~MASTER METER PROVING DATA REPORT FOR A SYSTEM~~

(This form filed in Duplicate and to be used for no more than one system.)

COMPANY	POOL	TEST NUMBER	METER FACTOR USED LAST PERIOD	GRAVITY (60°) LAST PERIOD
MASTER TEST METER MAKE OR STOCK TANK NO.	SIZE	MODEL	SERIAL NO.	DATE LAST CALIBRATION / FACTOR
LEASE METER MAKE	SIZE	MODEL	SERIAL NO.	

(1) Lease Name Well No. - Unit Letter	(2) S.T.R.	(3) Date Tested	Date Meter (4) Installed or Repaired	TESTED LEASE METER Final (5) Reading	Initial (6) Reading	Bbls (7) 60°F	TESTING DEVICE Final (8) Reading	Initial (9) Reading	Bbls (10) 60°F	7-10 (11) Ratio Error	(12) Gr. 60°F	Lease meter (13) factor for next period	(14) Remarks

REMARKS: _____

I hereby certify that the information is true and complete to the best of my knowledge.
Are all meters on this system included? Yes____ No____

Tested by_____ Position_____ Company_____

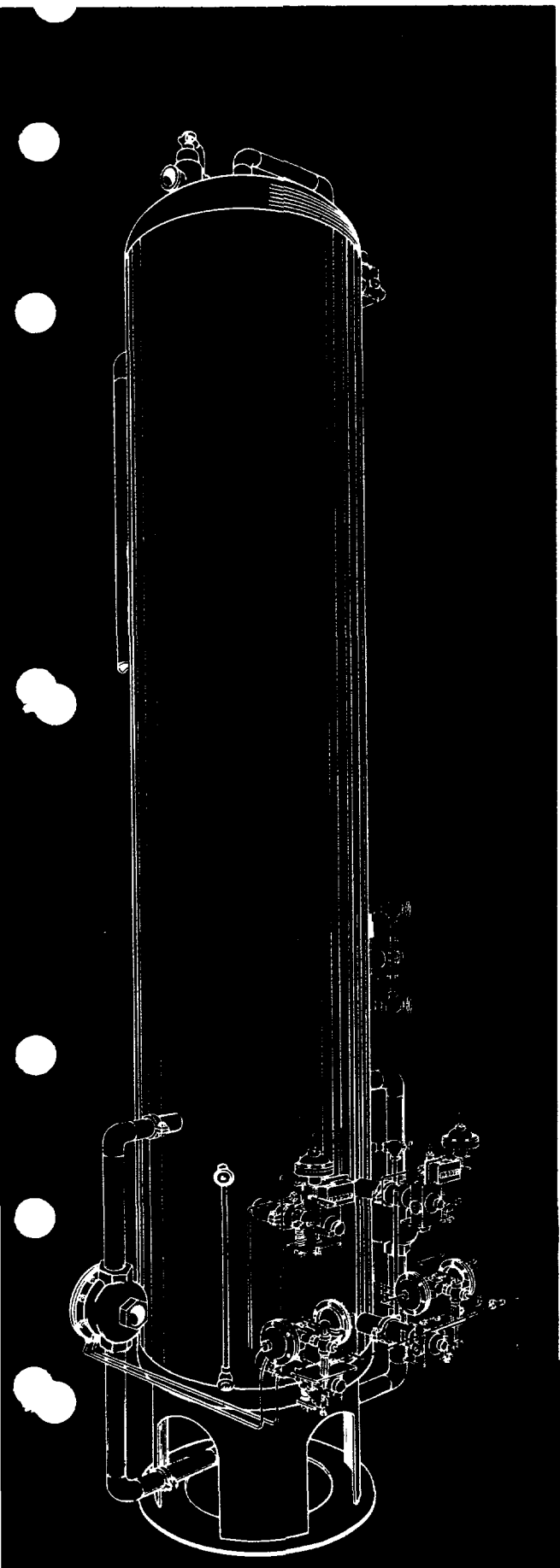
Witnessed by_____ Position_____ Company_____

Signed_____
Title_____
Address_____
Company_____

Submit to the appropriate District Office of the Oil Conservation Commission.

vertical metering

FREE WATER KNOCK-OUT



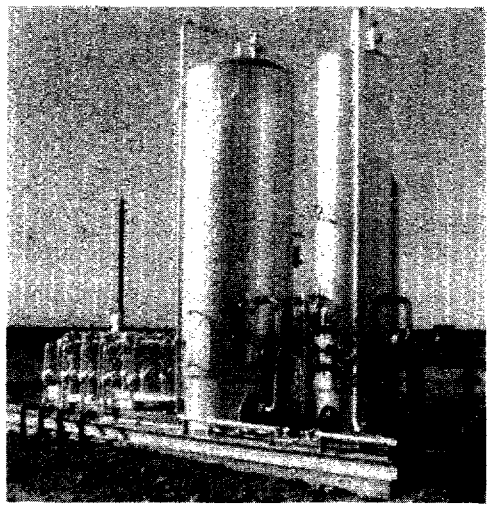
WHEN reliability and accuracy are of vital importance to you in measuring liquids and gas produced from your wells and —

WHEN increased profits and lower maintenance costs are a definite must.

THEN . . . You should investigate

ODEX ENGINEERING CO'S

vertical metering FREE WATER KNOCK-OUT



Skid mounted well test unit incorporating the 48"x10'-0" knock-out, 30"x10'-0" separator and an eight well test header as was exhibited during the 1958 Permian Basin Oil Show in Odessa, Texas

These units can operate independently on a single lease or can be integrated into a complete, remote controlled field automation system.

ODEX

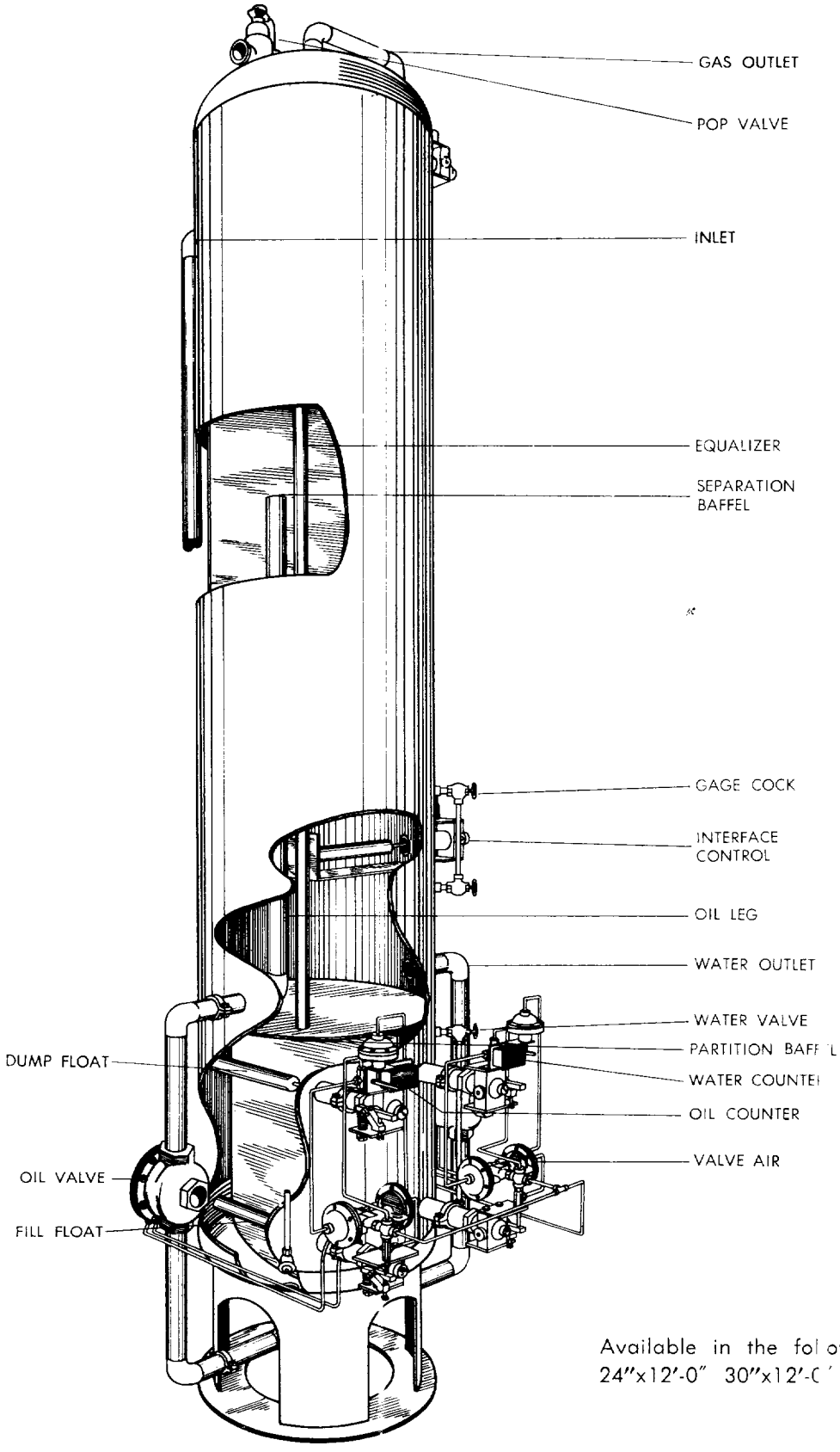
ENGINEERING COMPANY

NOMENCLATURE AND SPECIFICATIONS

All the components shown here have been time tested and proved to be of the highest quality and without a doubt the most accurate and dependable.

Victualic connections make these units simple and inexpensive to install and definitely less time consuming when repairs should become necessary.

The three way two position oil valve and the three way three position throttling water valve combine in oil and water metering to make this unit the best and most accurate of its type in the oil field today.



Available in the following sizes:
24"x12'-0" 30"x12'-0" 48"x10'-0"

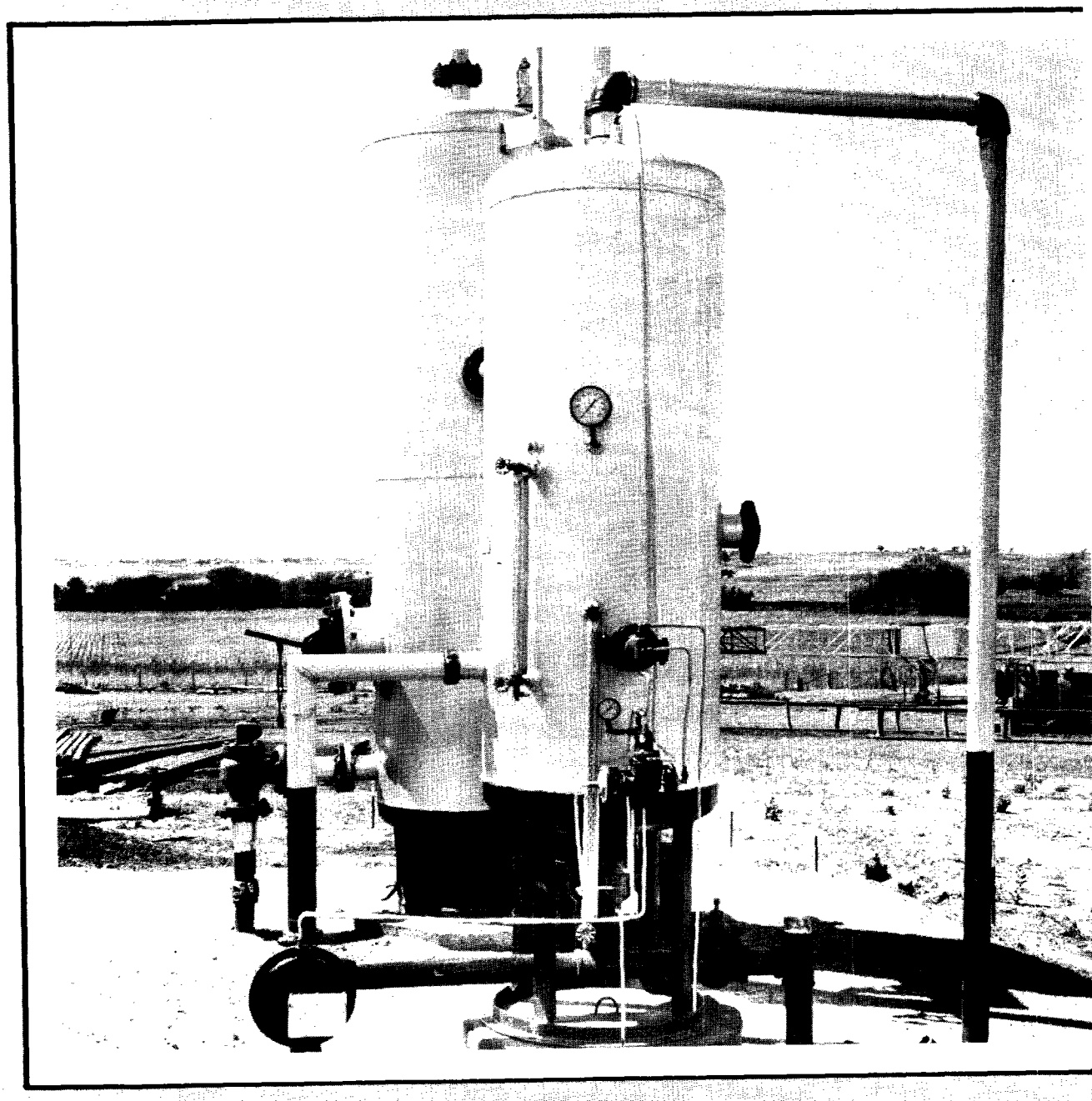
ODEX

ODEX ENGINEERING COMPANY

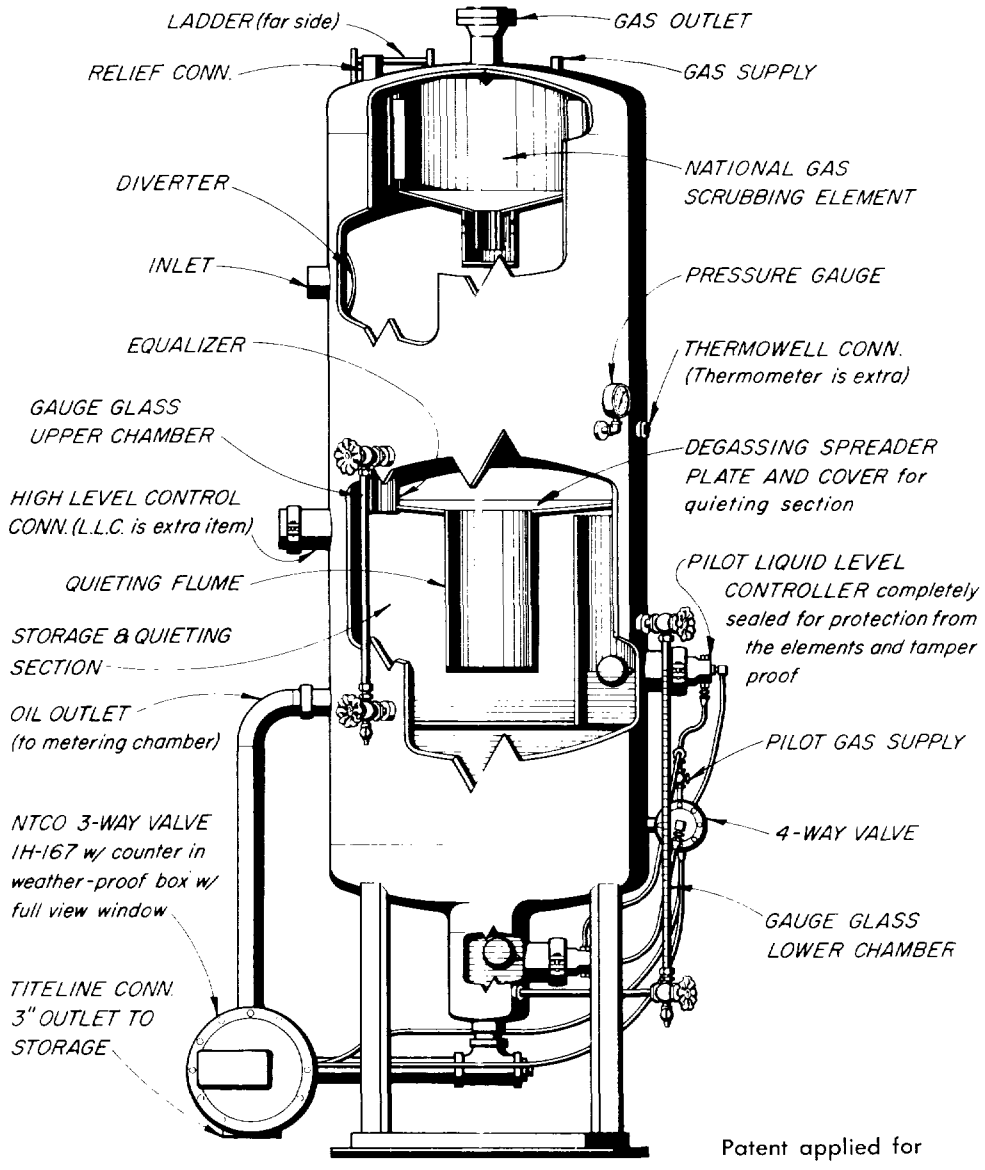
STORES IN: ODESSA, TEXAS, HOBBS, N. M.

Representatives in: Wichita Falls, Texas, Harvey Louisiana Oklahoma City, Okla., Houston, Texas, Berkley, Califc nia.

METERING SEPARATORS



NATIONAL COMBINATION SEPARATOR AND METER



Patent applied for

FEATURES

(Separator Section)

1. The long proven National Standard Gas Scrubbing Element guarantees liquid free gas.
2. A spreader plate to insure degassing of the oil and provide the quieting section essential for efficient separation.

(Meter Section)

3. Reduced liquid surface area at both high and low level assures minimum metering error.
4. Two weatherproof, tamper-proof sensitive level controls operating in conjunction with a power booster and custom designed three-way valve guarantee the ultimate in accuracy obtainable for a meter in this class.
5. Prefabricated piping furnished for ease and speed of installation.

METERING SEPARATORS

SERAPHIN NECK TYPE CHAMBER

* * * * *

DELIVERED PRICES BY TRADE AREAS (Except as noted)

TRADE AREAS by GROUPS

ALL SIZES 125 PSI EXTRA for Code Stamp $34.00 Catalog Number	SIZE	Oklahoma E. Kansas C. Kansas Hugoton N. Texas Permian Basin S. Texas Houston S. Louisiana Ark-La-Tex Ark. Valley Reg.	Alabama Mississippi	Montana Tri-State Julesburg N. Dakota Big Horn Four Corners	California Michigan Craig
1MS-124-6	24" x 6'	$ 880.00	$ 877.00	$ 903.00	$ 946.00
1MS-124-10	24" x 10'	$ 895.00	$ 913.00	$ 940.00	$ 985.00
1MS-130-6	30" x 6'	$1020.00	$1040.00	$1071.00	$1128.00
1MS-130-10	30" x 10'	$1060.00	$1081.00	$1113.00	$1166.00
1MS-136-6	36" x 6'	$1446.00	$1475.00	$1518.00	$1590.00
1MS-136-10	36" x 10'	$1496.00	$1526.00	$1571.00	$1646.00
1MS-148-13	48" x 12½'	$1871.00	$1908.00	$1965.00	$2058.00

Standard Accessories are Listed on Following Page.

USE DISCOUNT PAGE G-100 TO DETERMINE NET PRICES

COMBINATION SEPARATOR AND SERAPHIN NECK TYPE METERING CHAMBER

SPECIFICATIONS and SIZES

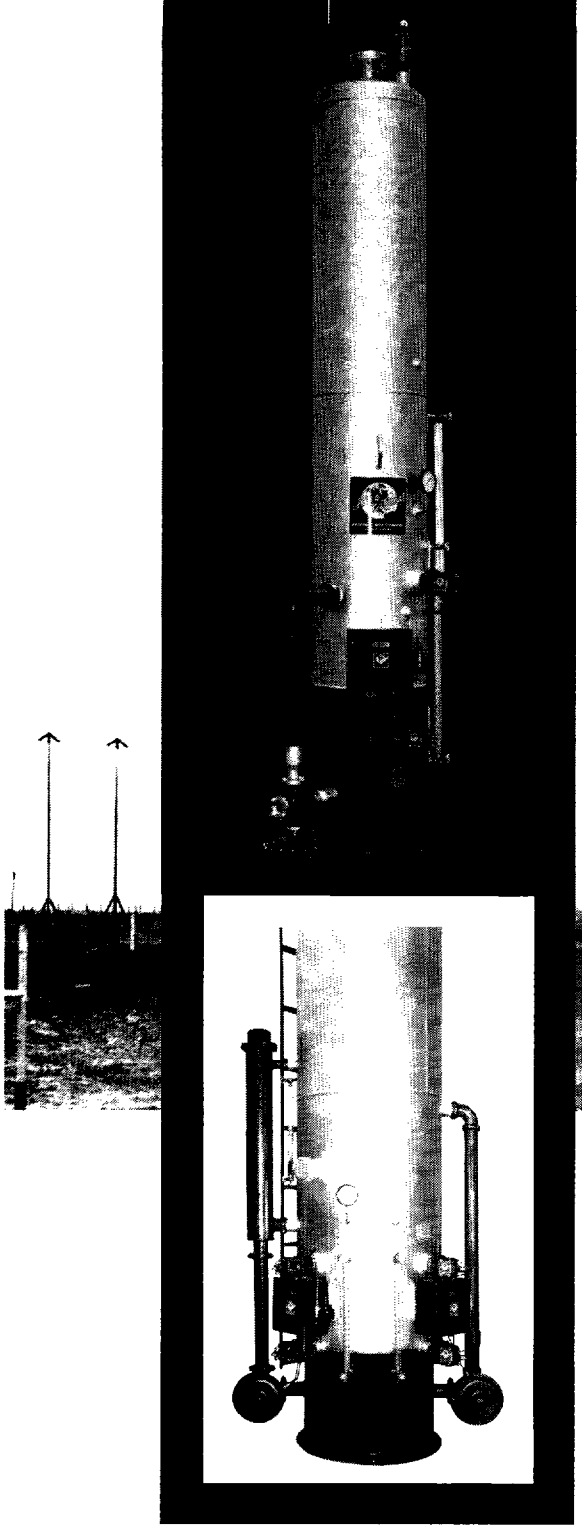
Catalog No.	Dia. x Shell Length	Nominal W.P.	METERING SECTION DUMP CAPACITY	Size Inlet	Flanged Gas Outlet
1MS-124-6	24" x 6'	125	½ Bbl.	3" Scrd.	3"
1MS-124-10	24" x 10'	125	1 Bbl.	3" Scrd.	3"
1MS-130-6	30" x 6'	125	1 Bbl.	3" Scrd.	3"
1MS-130-10	30" x 10'	125	1 Bbl.	3" Scrd.	3"
1MS-136-6	36" x 6'	125	2 Bbl.	3" Scrd.	3"
1MS-136-10	36" x 10'	125	2 Bbl.	3" Scrd.	3"
1MS-148-13	48" x 12½'	125	5 Bbl.	4" Flgd.	4"

STANDARD ACCESSORIES:

2 - Liquid Level Controls
1 - 3-Way Liquid Valve sized for maximum flow at minimum differential
1 - 2" ASME Safety Relief Valve
2 - Sets Gauge Cocks with Glasses
1 - Pressure Gauge
1 - Set Oil Line Piping Separator section to metering section
1 - Outside Ladder
1 - Set Miscellaneous small fittings (Gas Valve is EXTRA)
1 - Panel Assembly containing 4-Way Switching valve, Rust proof Reset counter and Pilot gas Reduction Station

National® METERING SEPARATORS

Patents Pending



National Two-Phase Metering Separator separates and measures production from individual wells for commingling.

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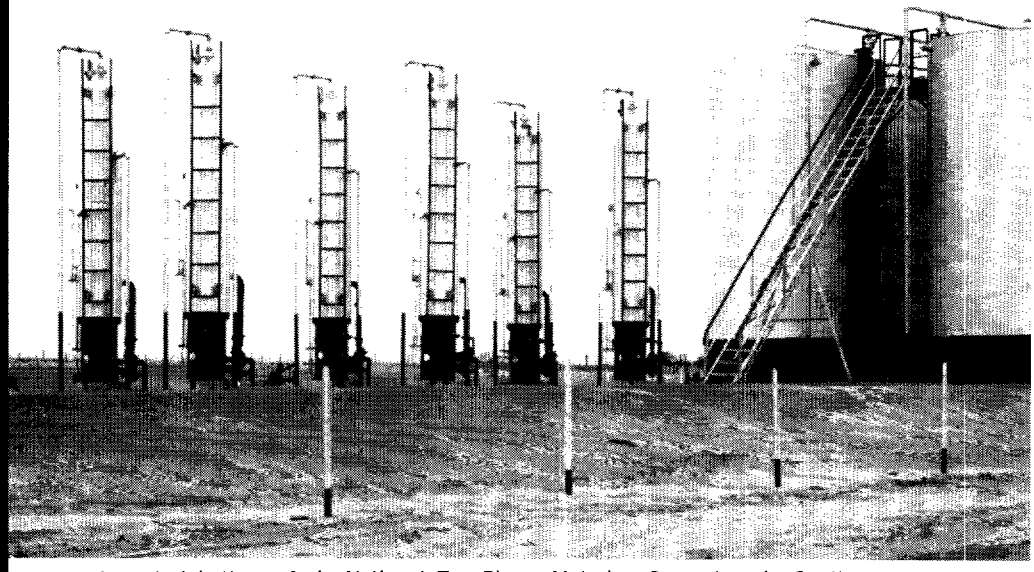
National Three-Phase Metering Separator for separating and measuring oil and water for individual well testing.



A central battery of six National Two-Phase Metering Separators in Southern Oklahoma, producing three wells, two zones each, commingling, into one tank battery. (Shown top.)

In The Separator Section

1. The long proven National Standard Gas Scrubbing Element assures liquid free gas.
2. A spreader plate insures degassing of the oil and provides the quieting section essential for efficient separation.
3. Ample storage of oil in a turbulent-free section provides stabilization and prevents carry-over during meter discharge period.

In The Liquid Metering Section
FEATURING NATIONAL'S NEW 3-WAY VALVE

1. Surface area at both high and low level assures minimum metering error.
2. Two weather-proof, sensitive level controls operating in conjunction with a power booster and custom designed three-way valve guarantee the ultimate in accuracy obtainable for a meter which isolates a volume between level control points.
3. Prefabricated piping furnished for ease and speed of installation.
4. Counter records individual dumps of meter and is readily convertible to barrels run during the test.

A PLUS Value with all National Products . . . Engineers and field crews available from over 50 service and warehouse stocking points for complete units or spare parts to size, install and service National Metering Separators.

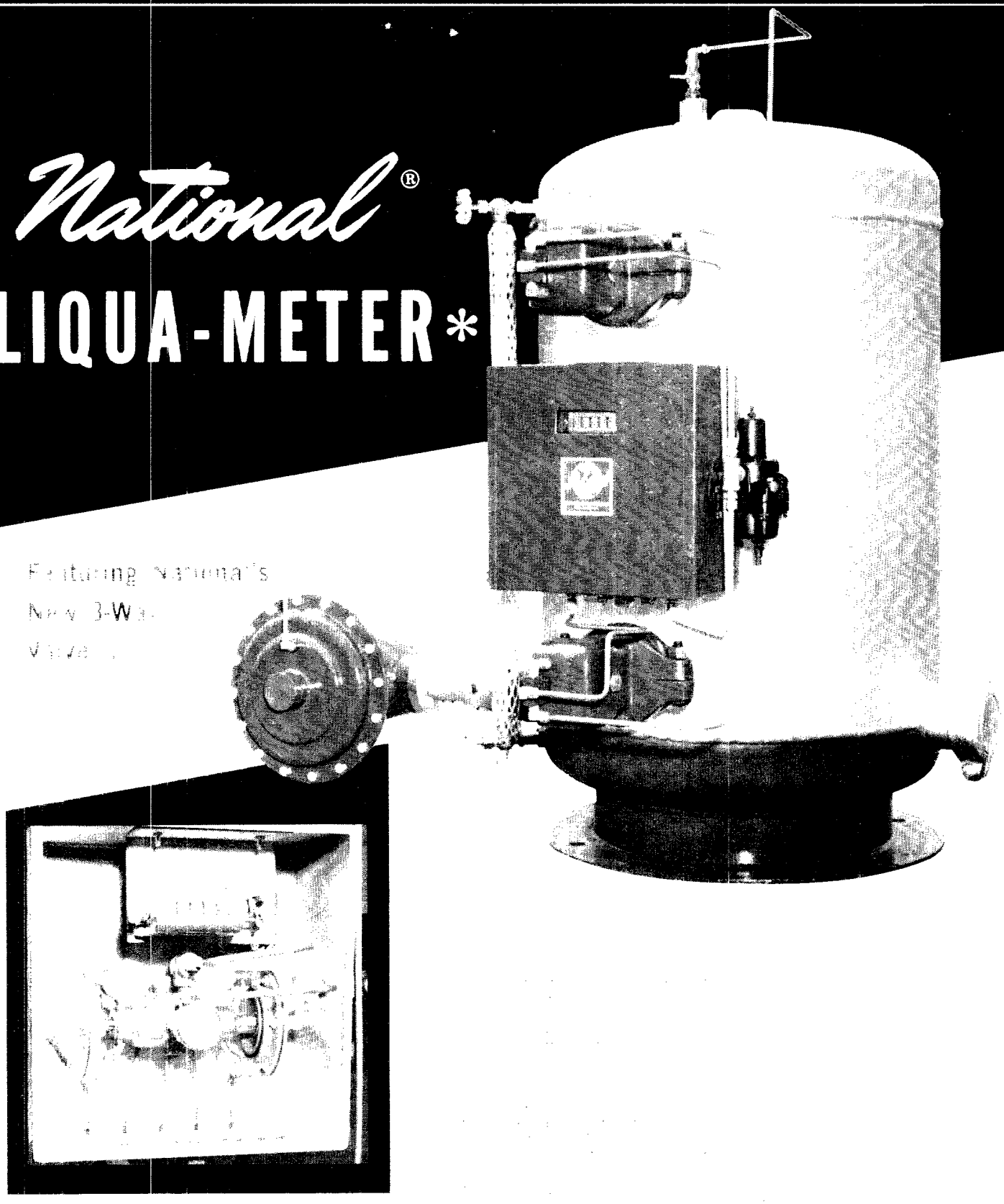
NATIONAL TANK COMPANY
DRAWER 1710
TULSA, OKLAHOMA

PRINTED IN U.S.A.

National®

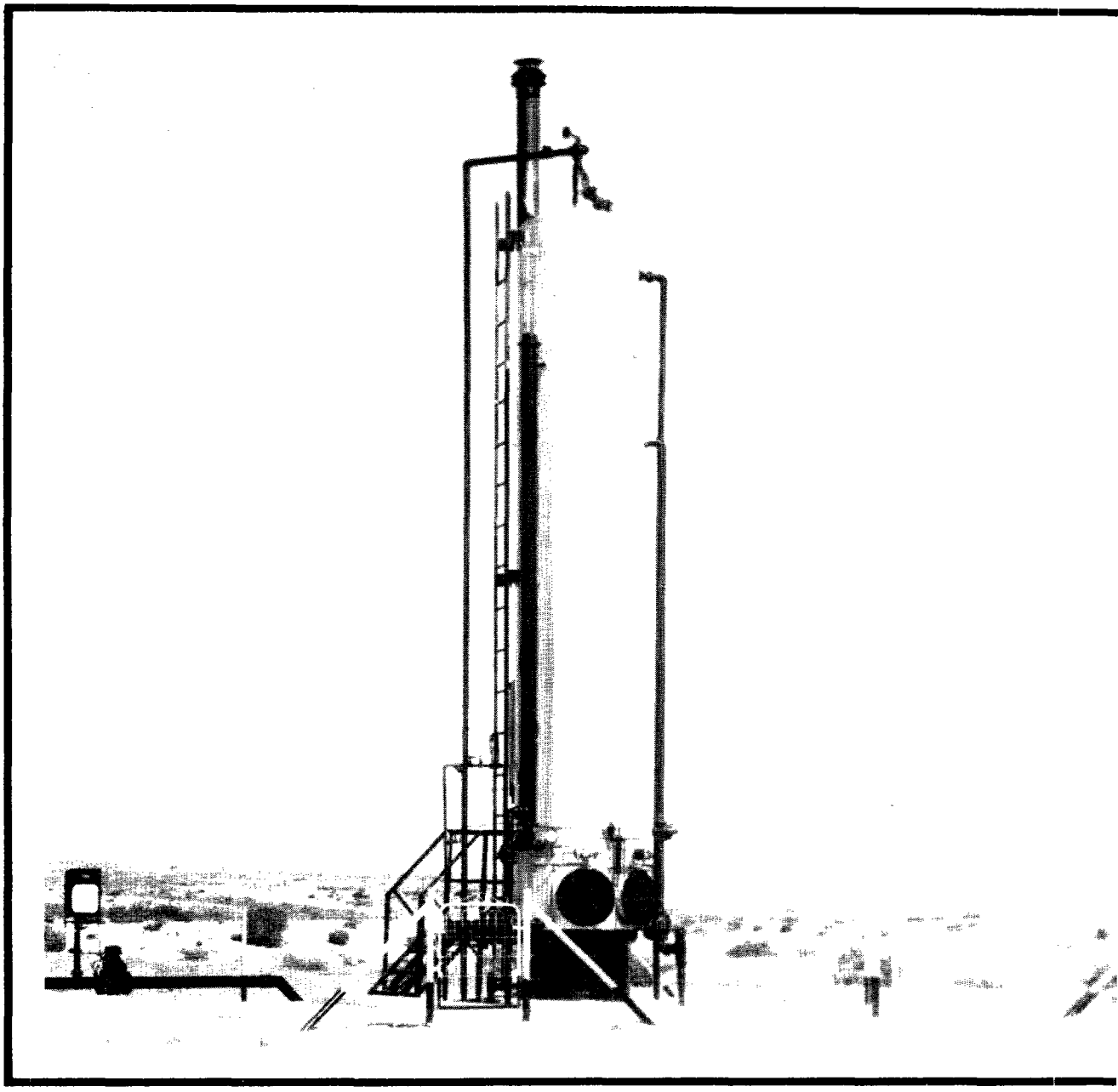
LIQUA-METER*

Featuring National's
New 3-Way
Valve

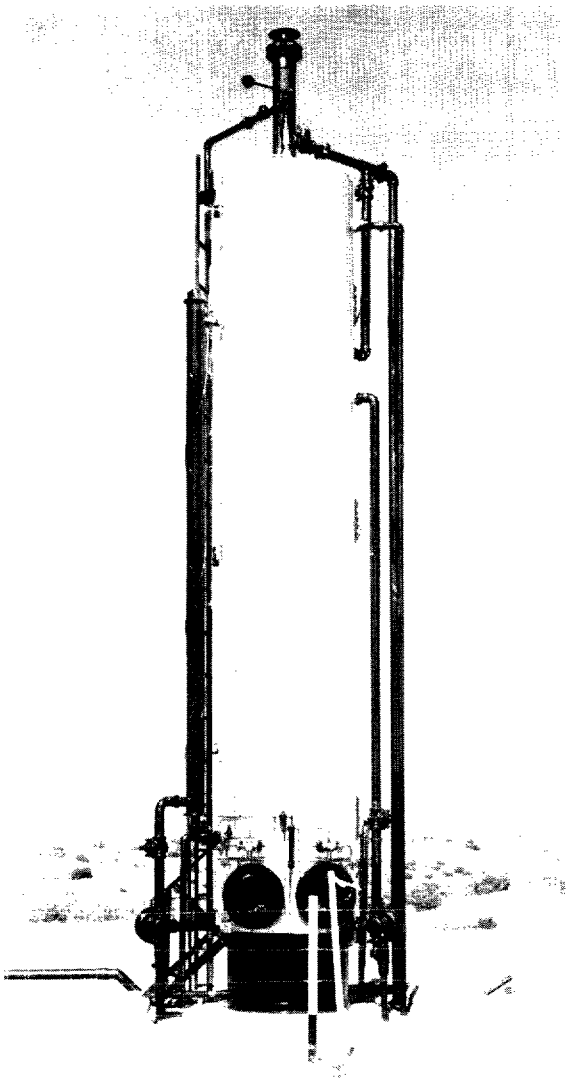


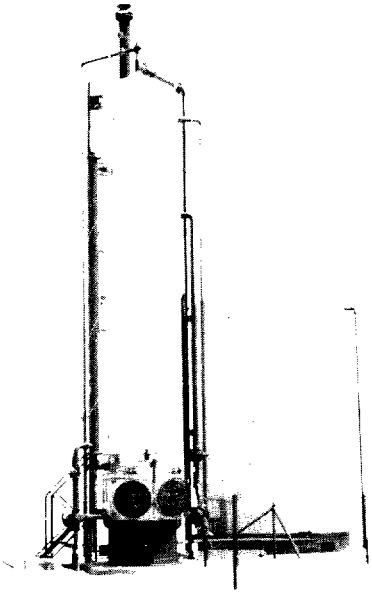
NATIONAL TANK COMPANY

METERING TREATERS



NATIONAL'S® *metering treater*



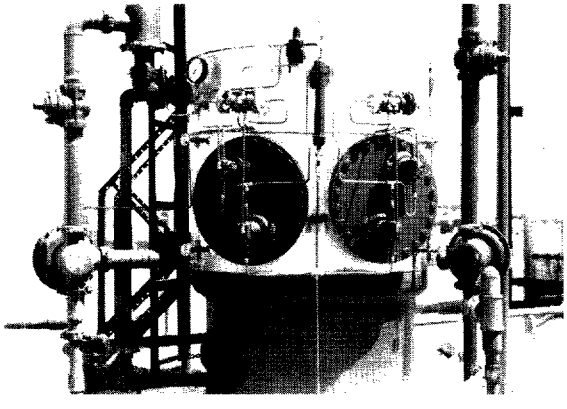


COMBINES EFFICIENT EMULSION TREATING WITH AUTOMATIC METERING AND RECORDING

Now . . . the incomparable National emulsion treater is equipped with metering compartments to automatically meter and record the volume of water and oil being produced. Combining the metering vessels for both oil and water in a lower compartment of a National treater offers distinct advantages over adding metering vessels to the lease equipment at some other time.

NATIONAL'S METERING TREATER —

- Provides more uniform temperature of metered liquid during periods of wide variation in ambient temperature.
- Lessens paraffin deposition on wall of metering chamber by virtue of higher average temperature of oil.
- Provides measurement of clean oil and oil-free water
- Reduces amount of solution gas in oil and thus reduces shrinkage due to flashing of oil to storage pressure.
- With "Full Area" construction of meter chambers, provides uniform fill and discharge rates over a complete cycle.
- Groups controls and working parts of metering chambers for easy accessibility or housing.
- Reduces installation time and fittings required for connecting components.
- Reduces size of foundation requirements or platform space.
- Reduces maintenance costs over multiple vessel installation.
- Allows accurate testing of wells individually without additional tank capacity.



Patent Applied for

MIC-O-FLOAT PARTS LIST

Ref. No.	Description	No. Req'd	Part No.	Ref. No.	Description	No. Req'd	Part No.
1	Cover Screw	4	II 1-2307	25	Screw BD. HD.	1	II 66-3671
2	Case Cover	1	II 62-2128	26	Upper Mtg. Bracket	1	II 87-3759
3	Retainer Ring	4	II 3-2351	27	Lock Washer	1	II 88-3760
4	Float Ball	1	II 25-1731	28	Screw, BD. HD.	1	II 89-3761
5	Socket Set Screw	1	II 23-1890	29	Magnet	1	II 90-3762
6	Lock Washer	1	II 24-3669	30	Magnet Receiver	1	II 91-3763
7	Float Rod	1	II 22-2029	31	Lock Washer	2	II 92-3764
8	Lock Washer	1	II 21-2075	32	Screw, RD. HD.	2	II 93-3765
9	Float Rod Connector	1	II 20-2018	33	Flex Lox	1	II 4-2230
10	Case	1	II 17-2479	34	Washer	1	II 5-2228
11	"O" Ring	2	II 18-1408	35	Cap Screw	2	II 6-2213
12	Guide Plug	1	II 19-2016	36	Jam Nut	2	II 7-2513
13	Switch Stop	1	II 63-3676	37	Cap Screw	2	II 8-2212
14	Bleeder Filter	1	II 54-2612	38	Actuating Arm	4	II 9-2208
15	Stand Off	4	II 80-3753	39	Pin, Sel-lok	1	II 26-2391
16	Mounting Plate	1	II 81-3754	40	Spacer (Plain)	2	II 10-2227
17	Lock Washer	4	II 82-3755	41	Pinion Gear	2	II 27-2014
18	Screw, BD. HD.	4	II 83-2263	42	Gear	1	II 28-2144
19	Terminal Strip	1	II 70-3679	43	Spacer (Threaded)	2	II 11-2226
20	Lock Washer	8	II 48-3670	44	Gear Retainer	1	II 29-2019
21	Screw BD. HD.	4	II 68-3672	45	Stem	1	II 30-2009
22	Micro Switch	1	II 84-3756	46	"O" Ring	1	II 31-1725
23	Screw BD. HD.	2	II 85-3757	47	Stem Bushing	1	II 32-2020
24	Lower Mtg. Bracket	1	II 86-3758	48	Pin, Sel-lok	1	II 12-2497

INSTRUMENTS, INC.

P. O. BOX 556 TULSA, OKLAHOMA

PRINTED IN U. S. A.

INSTALLATION AND OPERATING INSTRUCTIONS

MIC-O-FLOAT MODEL CMEAQ-401

INSTALLATION

The Model CMEAQ-401 is equipped with a 4" P.V. coupling adapter for mounting to the vessel wall. The 3½" dia. ball float is designed to pass through a 4" tank nozzle. The CMEAQ-401 has a working pressure of 100 PSI.

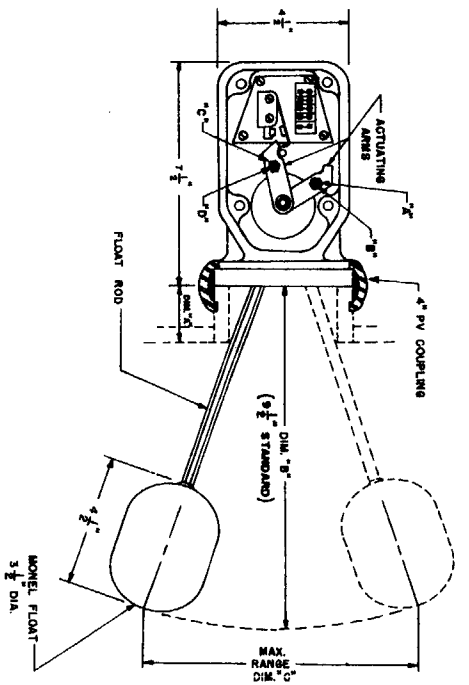


FIGURE 1

WIRING

The CMEAQ-401 is equipped with a S.P.D.T. Micro Switch.

All electrical connections enter thru a ½ inch conduit opening located adjacent to the terminal strip. Each contact is identified on the terminal strip for ease in making connections.

CONTACT RATING

S.P.D.T. 15 Amps. at 125 V. A.C.

LEVEL ADJUSTMENT

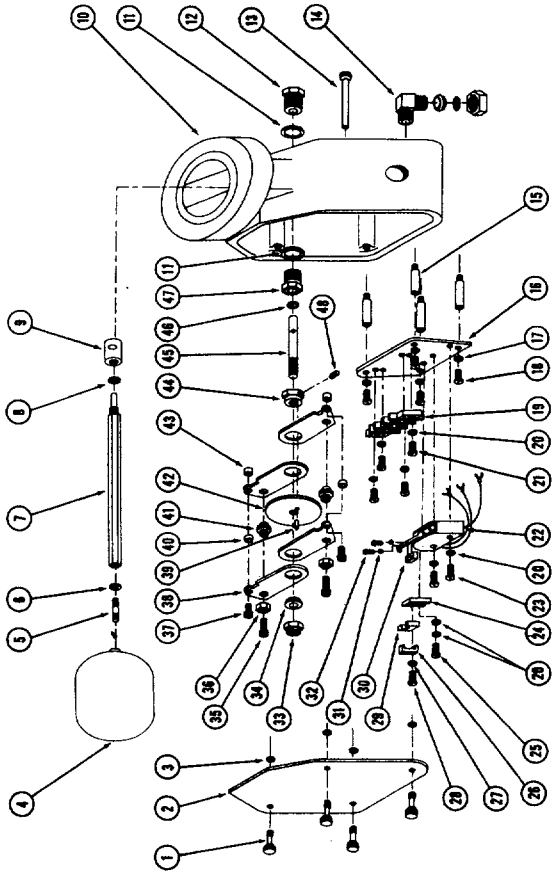
The CMEAQ-401 is provided with two adjustments permitting the setting of both the high and low level set points. To change this span the following procedure should be used, reference figure 1.

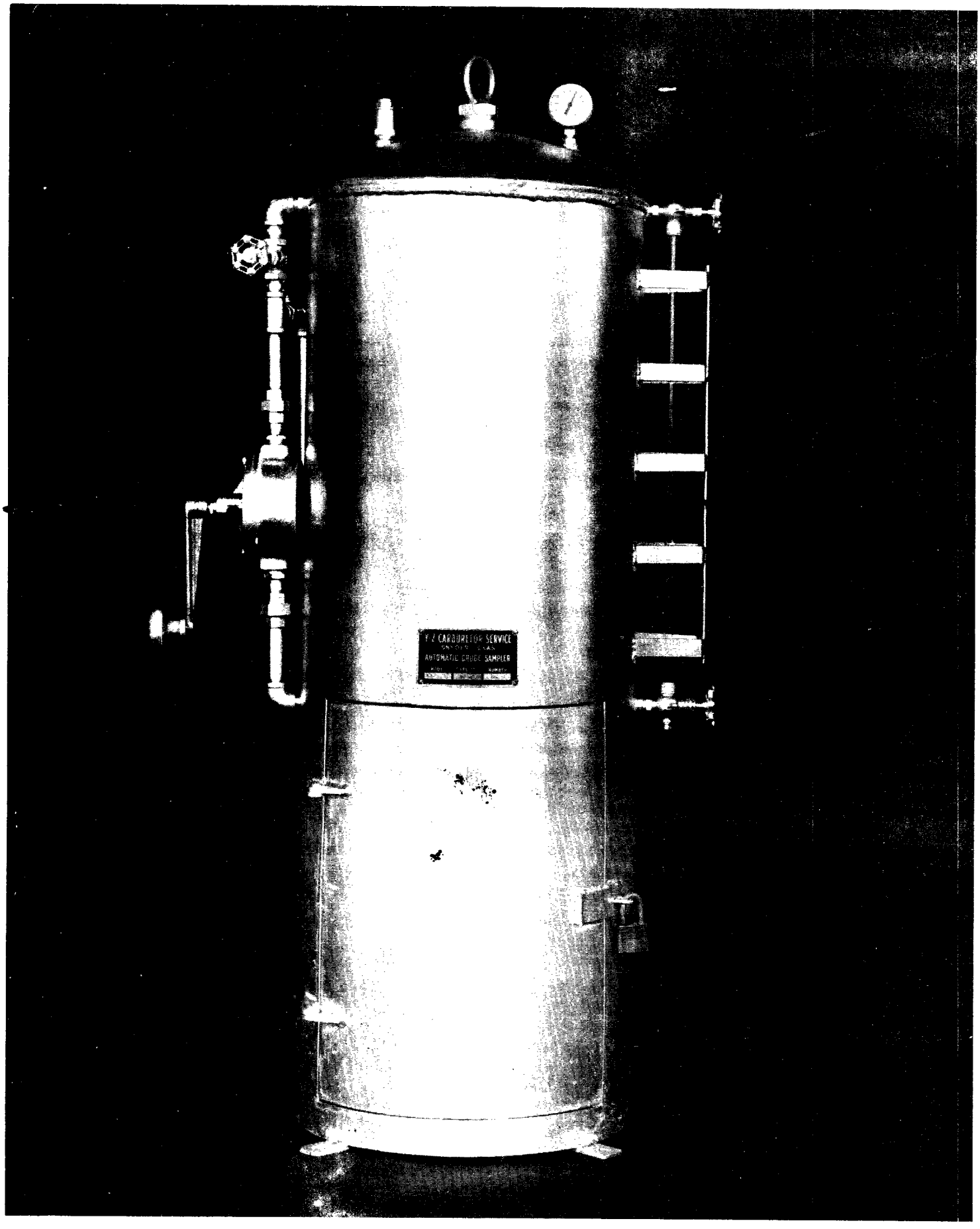
To Change Low Level Set Point

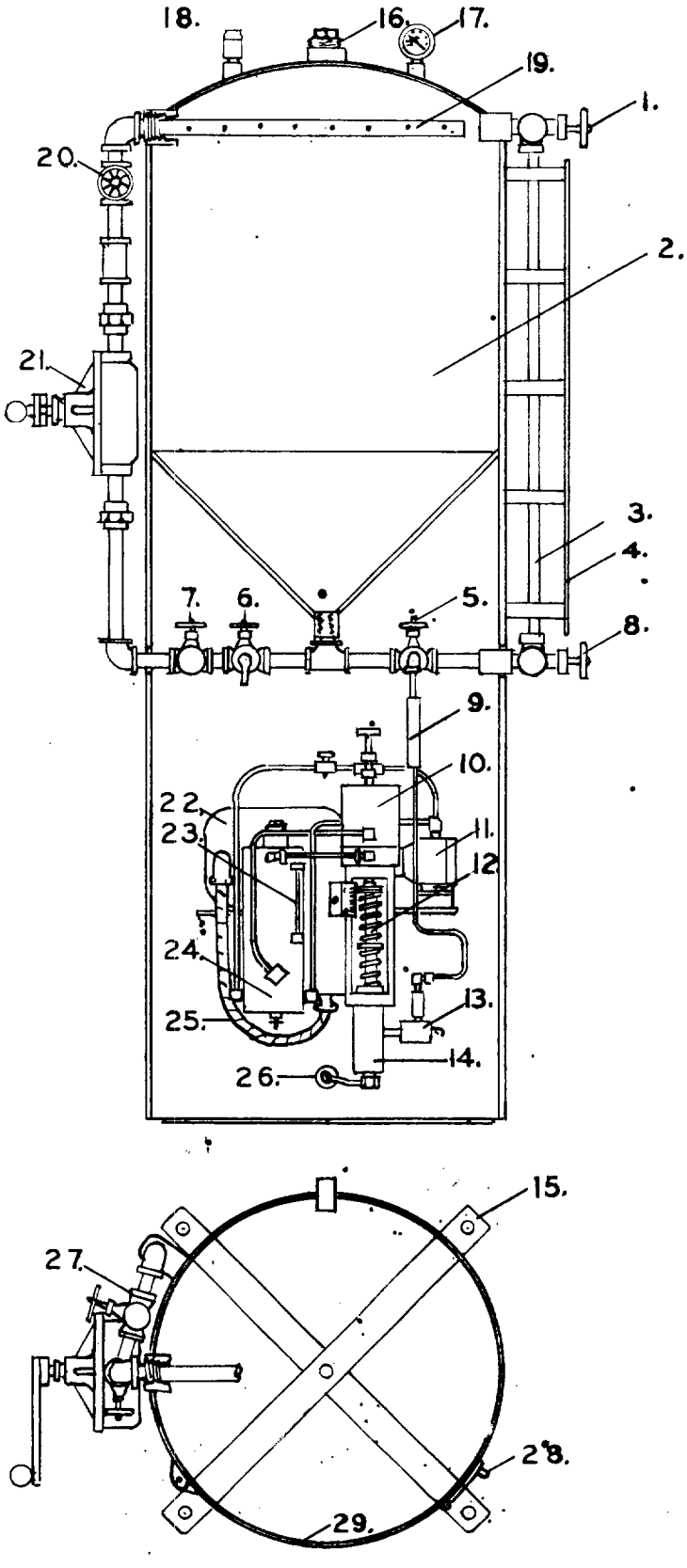
1. Loosen lock nut "C"
2. Turn adjust screw "D" until the Switch operates at the desired position.
3. Tighten lock nut "C" Holding adjust screw "D" in position.

To Change High Level Set Point

1. Loosen lock nut "A"
2. Turn adjust screw "B" until the Switch operates at the desired position.
3. Tighten lock nut "A" Holding adjust screw "B" in position.




F / CARBURETOR SERVICE
AUTOMATIC CRUDE SAMPLER



MODEL RI-E

Model RI-E Automatic crude sampler is an electrically operated, directly proportional sample machine capable of taking a sample from a pipe line with pipe line pressures ranging from 250 psi to a few points negative pressure. The rate of sample is controlled by a meter operated switch and the size of the sample taken may be varied in the field to obtain up to 20 gallons of sample depending upon the rate of oil flowing in the pipe line.

Also Model RI-E is provided with a hand operated pump to agitate the accumulated sample to give an accurate average sample for testing. The hand pump also serves to put the unused sample back into the pipeline.

Y. & Z. CARBURETOR SERVICE
Dial 3-6632 — P. O. Box 176
SNYDER, TEXAS

I. V. (Jack) ZECK

TED E. ZECK

Y. & Z. CARBURETOR SERVICE

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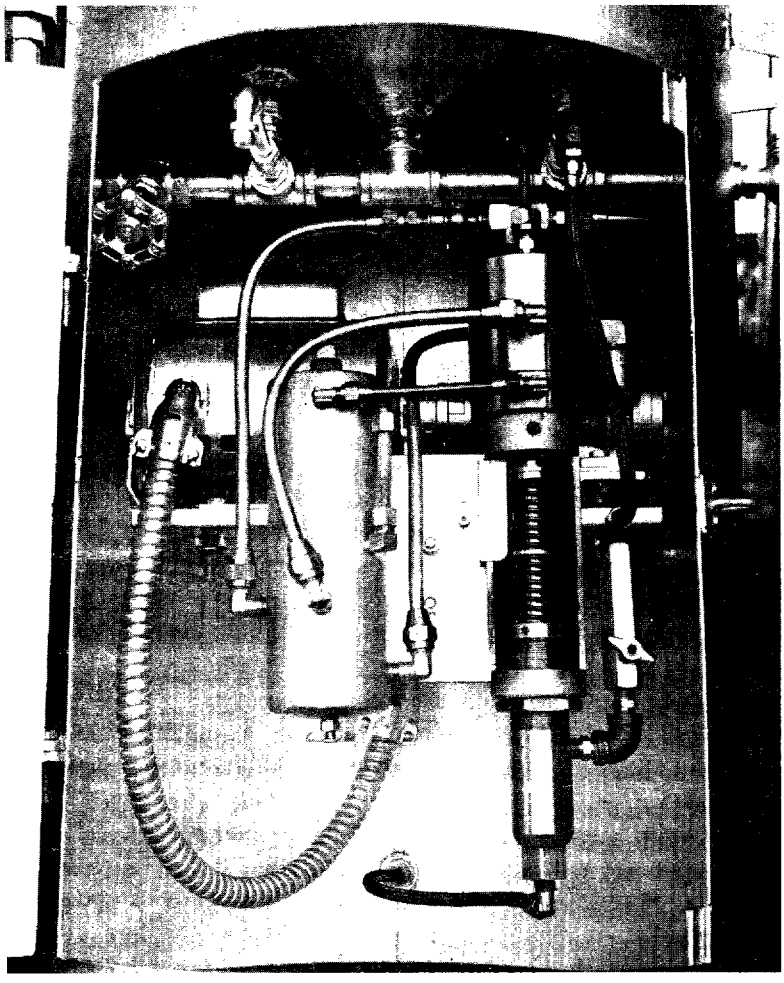
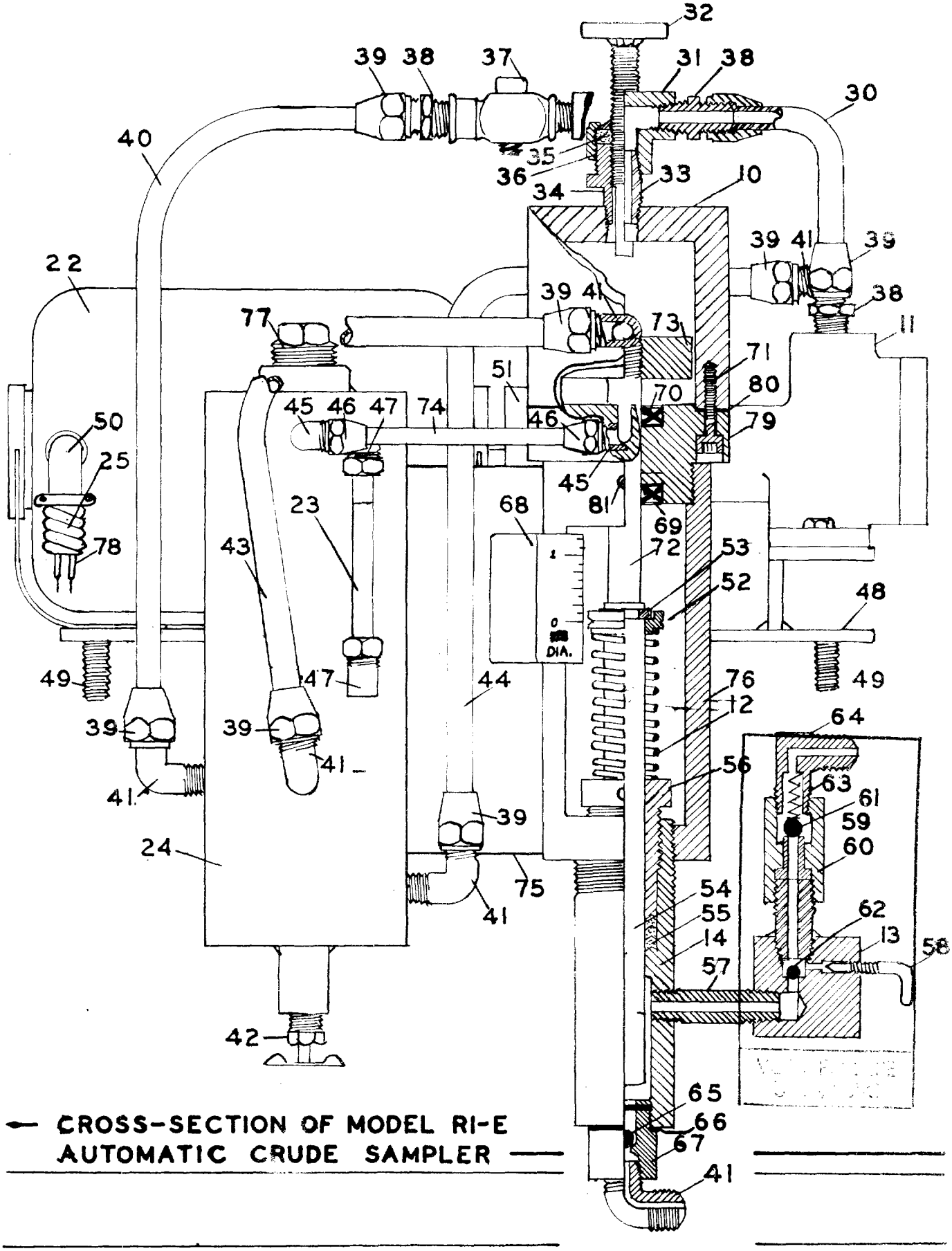
SNYDER, TEXAS



MODEL RI-E



CROSS-SECTION OF MODEL RI-E AUTOMATIC CRUDE SAMPLER

OPERATING INSTRUCTIONS
MODEL R1-E AUTOMATIC CRUDE SAMPLER

When installing the machine; the sample from the pipeline probe is plumbed into the machine via connector #26 which is ½" pipe thread. The method of wiring is left to the operator to work, but the machine is provided with two #12 600V. insulated wire extending out from a fitting which will accommodate ½" conduit thin wall or explosion proof fittings. When ordered explosion proof, the machine is wired explosion proof to this point. The signal from the transmitter in the meter must be taken to a relay capable of starting the ¼ HP, single phase 115 V. Cap. start motor. Also this signal must be time controlled to remain on at least 3 seconds and not over 5-7 seconds. This may be accomplished as per the attached recommended wiring diagram.

This signal from the transmitter in meter starts the motor #22 as described above, and activates the gear pump noted in the drawing as rotor pump #11, which takes oil from the reservoir #24 and pumps it into the actuator cylinder #10 thereby forcing piston #73 and rod #72 downward until it passes and opens a port in the side of the cylinder. The piston remains in this position with the oil by-passing back into the reservoir until the motor is cut off by the time controlled relay. As the capacity of the rotor pump is in excess of the need of the actuator; a portion of its output is by-passed to the reservoir by means of valve #37. This valve will have been adjusted at the factory and should not need to be adjusted. The adjustment of valve #37 also controls the rate the spring #12 returns the piston assembly. The length of the stroke of the piston #73 and thereby the length of stroke of the pump plunger is controlled by the positioning of adjusting screw #32. The adjusting screw #32 is packed by means of packing #35 and nut #36 which should be checked and tightened if needed.

The oil used in the hydraulic system is recommended to be any brand of good quality motor oil of the 10W-30 type. The level of the oil in the reservoir should be kept in the range of the sight gauge #23. The reservoir should be checked periodically for condensation of water by means of drain cock #42.

The sample pump is a positive displacement pump with a plunger #54, chevron packing #55 and gland nut #56. The gland nut should be no tighter than necessary to keep it from leaking. The standard plunger is ½" in diameter and strokes 1" as is read on the scale #68 by means of the Vee shaped groove on the plunger spring cap #52. The diameter of the pump plunger will also be marked on the scale.

As the pump is stroked; a measured amount of sample is taken into the pump, pumped out under pressure to the adjustable check valve and into the sample tank. The adjustment of the spring loaded check must be adjusted to 50 lbs. above the pressure on the pipeline the sample is being taken from. Before operating be sure valve #5 is open. When a desired amount of oil has been metered, sampled, and collected in the tank #2 it can be agitated by opening valves #7 and #20 and operating the hand pump. Two minutes should mix the sample. The desired amount of sample to be tested may then be removed by opening sample removal valve #6. The sample may be pumped back into the pipeline by closing valve #23 and opening valve #27, and operating the hand pump until tank is empty. All valves should be closed except #5 before the machine is put back into operation.

Y-Z CARBURETOR SERVICE

Part No.	NAME	Price
1	Top gauge valve	$ 3.08
2-1	Sample tank Assy	195.00
3	Sight glass (Pyrex)	2.80
4	Sight glass guard (in 2-1 assy.)	— —
5	Sample stop valve	4.02
6	Sample remove valve	2.98
7	Control valve	4.02
8	Lower gauge valve	3.08
9-C	Adjustable check valve assy.	17.76
10-2	Actuator cylinder and piston assy.	72.00
11	Rotary pump	31.40
12	Plunger return spring (2)	1.25
13	Disch. valve block (superseded) (use 9C assy.)	— —
14	Plunger pump body (1/2 & 5/8)	23.47
15	Anchor lugs (in 2-1 assy.)	— —
16	Clean out plug	1.51
17	Pressure gauge (0-100#)	3.25
18	Pop valve 125 psi	2.90
19	Tank wash pipe	2.25
20	Valve, agitation	4.02
21	Pump, hand	22.71
22	Motor 1/4 h.p. cap. 110V.	25.73
22X	Motor 1/4 h.p. cap. 110V. Exp. proof	60.30
23	Sight glass, res. oil level	.25
24-4	Reservoir, hydraulic oil and mtg. bkt.	38.75
25	Flex conduit	.60
26	Sample inlet connector (in 2-1 assy.)	— —
27	Sample pump valve	4.02
28	Hasp, access door (in 2-1 assy.)	— —
29	Door, access (in 2-1 assy.)	— —
30	Tubing, 3/8 copper, rotor pump to actuator cyl.	.35
31	Tee 1/4 brass pipe	1.29
32-3	Screw, plunger stroke adjust assy.	7.43
33	Nipple 1/4 x close, brass	.28
34	Connector, stroke adj. screw (in 32-3 assy.)	— —
35	Packing, screw, #32 (in 32-3 assy.)	— —
36	Packing nut, screw #32 (in 32-3 assy.)	— —
37	Valve, bypass	3.25
38	Connection, 3/8 tube to 1/4 pipe, brass	.47
39	Flare nut, 3/8 tube	.33
40	Tubing, 3/8 copper, actuator to reservoir	.35
41	Connection, 3/8 tube to 1/4 pipe, ell, brass	.59
42	Drain cock, reservoir	.40
43	Tubing, 3/8 copper, res. to bypass port.	.35
44	Tubing, 3/8 copper, res. to rotor pump inlet	.35
45	Connection, 1/4 tube	.40
46	Flare nut 1/4 tube	.17
47	Fitting, 1/4 ferrule to 1/8 pipe ell	.38
48	Pump mounting bracket, main	10.50
49	Pump mounting bracket studs (with #48)	— —
50	Connector, 90 degree flex conduit	.72
51	Coupling, motor to rotor pump	9.00
52	Cap, plunger return spring	.55
53	Keeper, plunger return spring cap	.30
54	Plunger, sample pump (1/2 & [redacted])	7.50
55	Packing, sample pump plunger	3.85
56	Gland nut, plunger pump packing	7.50
57	Nipple, 1/4 x 2 HD brass	.50
58	Screw, air bleed (use 9-C assy.)	— —
59	Discharge valve seat (use 9-C assy.)	— —
60	Cage nut, discharge valve ball (use 9-C assy.)	— —
61	Ball, Discharge 5/16 (use 9-C assy.)	— —
62	Ball, check 3/16, stainless steel (use 9-C assy.)	— —
63	Spring, discharge ball, plated (use 9-C assy.)	— —
64	Connection 1/4 x 1/8	.17
65	Ball, inlet, stainless steel	.30
66	Gasket, inlet check body assy. to pump body	.40
67	Inlet check body	4.25
68	Gauge, plunger stroke length	3.00
69	Seal, piston rod dirt wiper (in 10-2 assy.)	.78
70	Seal, piston rod oil (in 10-2 assy.)	.78
71	Screw, cylinder head (in 10-2 assy.) (6)	.10
72	Piston rod (in 10-2 assy.)	— —
73	Piston, actuator in 10-2 assy.)	— —
74	Tubing, reservoir to piston leak by port 1/4"	.25
75	Bracket, reservoir to pump assy. (in 24-4 assy.)	— —
76	Mount, plunger pump and actuator (in 24-4 assy.)	— —
77	Plug, reservoir vent	.15
78	Wires, motor #12-600V. insulated, ft.	.06
79	Head, actuator cylinder (in 10-2 assy.)	— —
80	Gasket, actuator cylinder head (in 10-2 assy.)	— —
81	Screw, actuator anchor	.16

Factory Service:

Factory repair and or exchange for the pump head complete (includes motor, pump, and all parts of the pumping unit)

R1E (drip proof unit) $75.00

R1EX (explosion proof unit) 87.50

Y-Z Carburetor Service also offers complete skid mounted units complete with motor driven pump to agitate and remove sample, circulate sample by the machine. These units can be made complete with all switches, timers, control box, etc. They can be built to your specifications or designed and engineered at the factory for your approval. Call or write for quotation.

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SPECIFICATIONS
MODEL R1-E AUTOMATIC CRUDE SAMPLER

Sample storage	20 U. S. gallons
Sample storage tank test	100 psi
Sample agitation	Hand operated pump
Sample removal	Gravity and/or vapor pressure in tank
Sample disposal	Hand pumped out of tank into pipeline or disposal pit
Seals	Valves may be sealed with pipeline seals, mechanism is inside machine with door provided with safety hasp Standard machine is drip-proof
Hazards	Explosion proof standards on explosion proof models. (R1-EX)
Motor voltage requirements	115 V.A.C. 6-8 amp.
Adjustments	All adjustments can be made in the field. No special tools required.
Repair parts	Order by Model, Serial Number and part number
Factory repair	Factory repair and/or exchange available, freight one way
Weight	Approx. 200#
Height	53" overall
Diameter of Tank	18"
Freight	F.O.B. Snyder, Texas, plus crating charge
Special order	All machines are standard as per drawings. Explosion proof, special plunger sizes, tank sizes, etc., are considered Special Order
Prices	As per quotation or attached price sheet. Prices subject to change prior to quotation.
Sample per stroke	.1964 cu. inch per 1 inch stroke with 1/2-inch plunger, adjustable to 0 stroke ~~.3066 cu. inch per 1 inch stroke with 5/8-inch plunger, adjustable to 0 stroke~~

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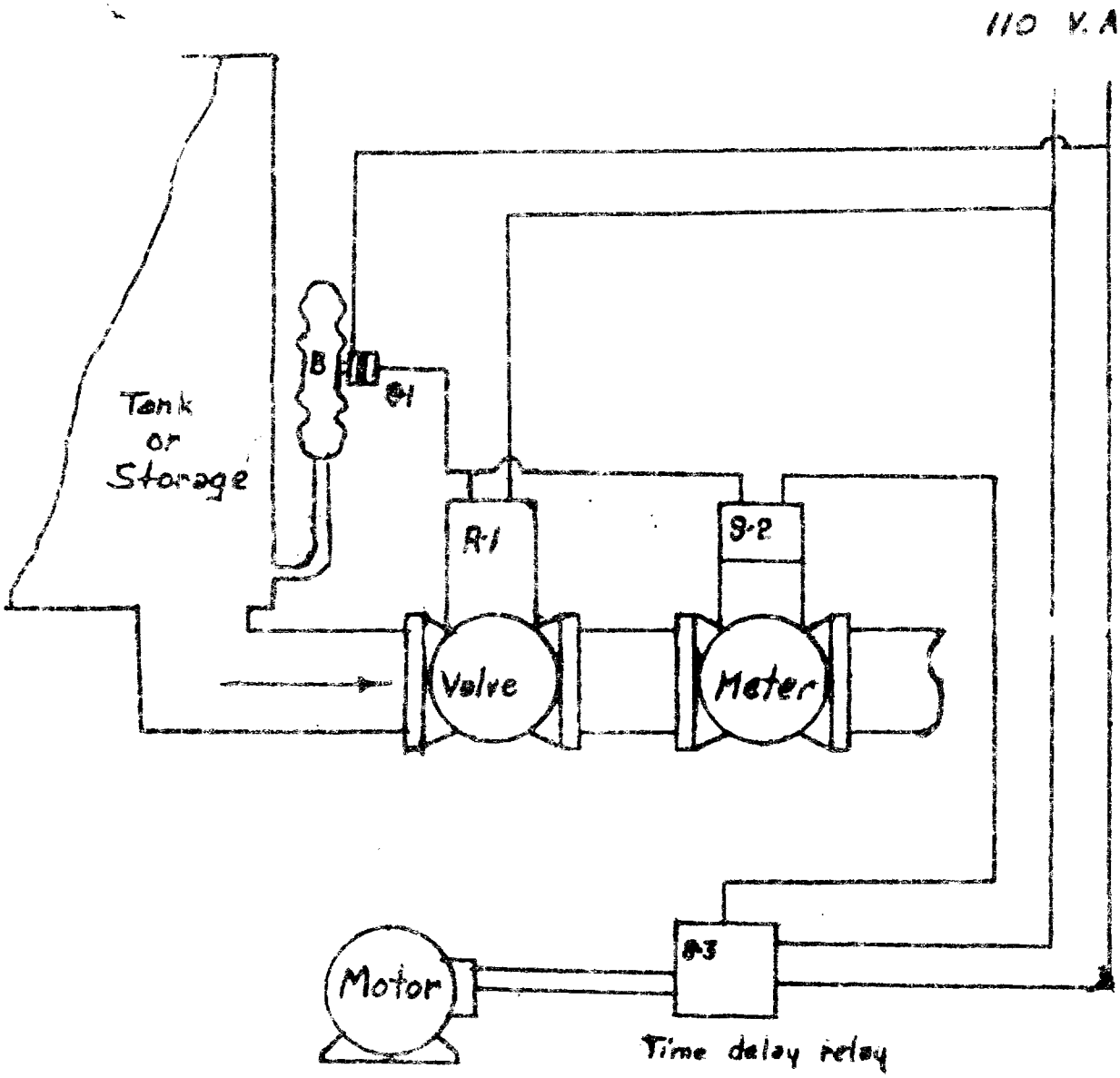


SUGGESTED WIRING DIAGRAM
FOR
MODEL [illegible]E
AUTOMATIC [illegible] SAMPLER

SPECIAL INSTRUCTIONS

MODEL R1-E

AUTOMATIC CRUDE SAMPLER

When installing the machine, care must be taken to have the time delay relay switch adjusted so that the motor in the Sample Machine can run only long enough to pump the plunger pump completely down. If no time delay is used the contacts in the meter must be timed to control running time of the motor.

The oil level in the reservoir must be maintained within the limits of the level gauge. Any good brand of motor oil of the 10W-30 type may be used. In the operation the by pass which controls the speed of the pump cycle has been adjusted at the factory and should not need any further adjustment. The "T" shaped handle on the top of the pump body controls the length of the pump stroke which can be read on the attached scale.

Y. & Z. CARBURETOR SERVICE

Snyder, Texas

MODEL R-1 AUTOMATIC CRUDE SAMPLER

The Model R-1 is identical to the electrically operated Model R-1E except for the machine used to pump the sample into the sample tank or container. In the Model R-1 the electrically operated pump is replaced with the pneumatic pump head made by the Western Machine Co. This pump head fits on the same mounts and uses the same fittings on the tank except that the electrical conduit fitting becomes the inlet for the gas or air supply.

The sampling rate is controlled by adjusting the bleed screw #D26 as per the attached cross section of the Model DF-48 pump head. The sampling rate is on a brass plate attached to the inside of the door. The rate of sample and therefore the amount of sample collected may be adjusted to collect from 1 pint to 6 gal. per each 24 hours of operation.

The pump head will have been modified to operate and give a continuous sample with as low as 2.5 psi supply pressure. A scrubber or filter should be provided for unclean gas or air supply.

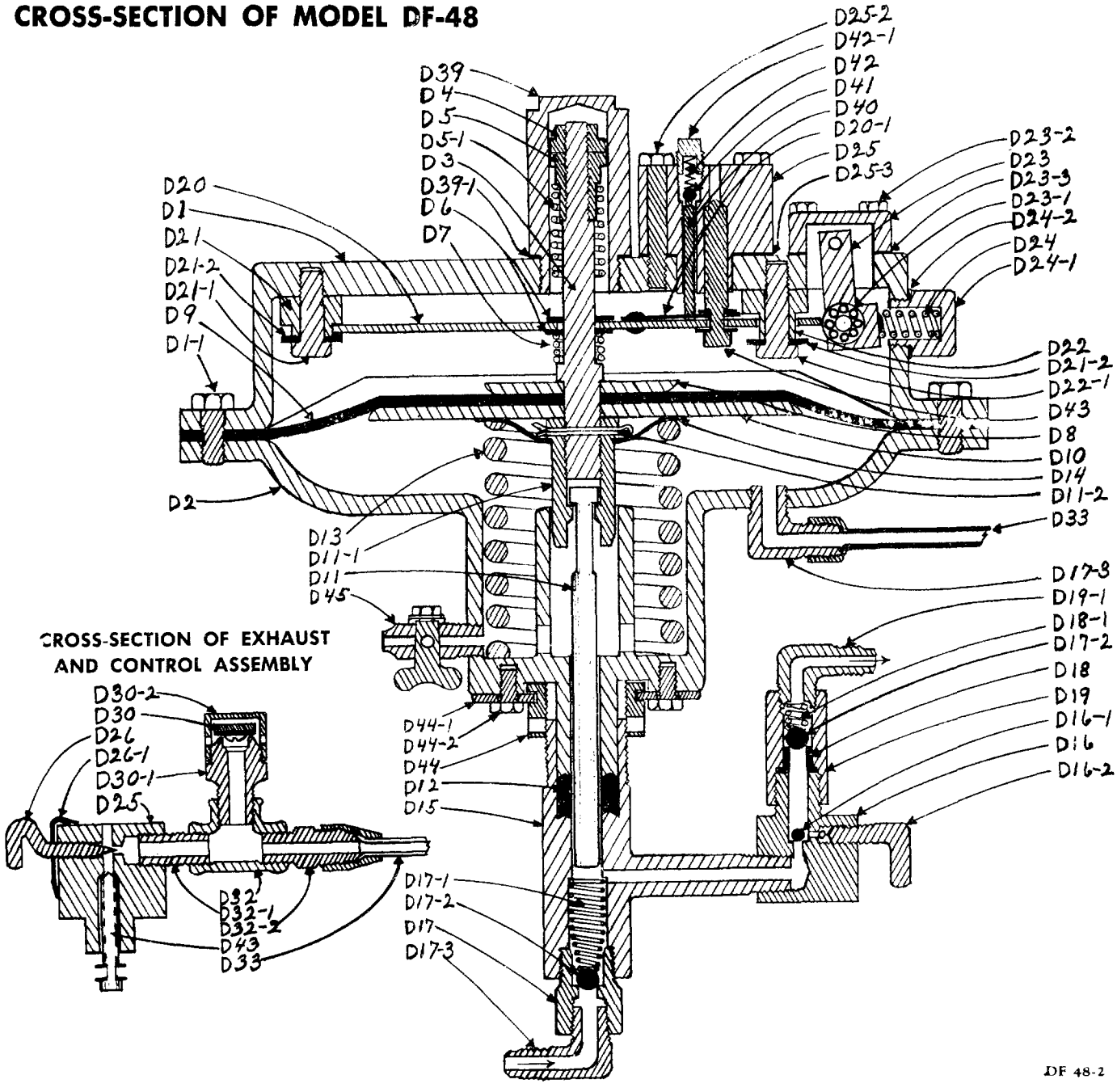
Y. & Z. CARBURETOR SERVICE

Snyder, Texas

All moving parts are entirely enclosed with no exposed stuffing boxes thereby preventing air, dust or foreign material from causing undue wear or corrosion. NO LUBRICATION REQUIRED — ACCURATE SPEED with varying inlet pressures — accurate chemical delivery as low as one pint per day — operates on gas pressures as low as 5 lbs. psi and up to 5000 psi injection pressure.

Available in two models — No. DF-48 for all outside installations and No. DF-48S for inside installations.

CROSS-SECTION OF MODEL DF-48



DF 48-2

Part No.	Part Name	Price
D1	Top casting	$20.24
D1-1	Cap screw 3/8x7/8	.10
D1-2	Cap screw 3/8x2 1/2	.20
D2	Bottom casting	18.15
D3	Dia. shaft	7.04
D4	Lock nut	1.65
D5	Spring nut	2.42
D5-1	Spring	.51
D6	Washers	.18
D7	Spring	.33
D8	Top dia. plate	1.54
D9	Diaphragm	4.07
D10	Bottom dia. plate	2.42
D11	Piston	4.49
D11-1	Nut	5.50
D11-2	Cotter	.22
D12	"V" Packing rings	
	50 or less (ea.)	.62
	Over 50 (ea.)	.51
D13	Spring	2.64
D14	Saddle washer	.66
D15	Pump body	12.08
D16	Disc. block	7.26
D16-1	Ball 3/16	.33
D16-2	Prime valv	.99
D17	Suction check	4.49
D17-1	Spring	.33
D17-2	Ball 5/16	.33
D17-3	Ell 3/8x1/4	.62
D18	Disc. seat	.95
D18-1	Spring	.51
D19	Cage	6.38
D19-1	Ell (special)	1.07
D20	Trip bar	8.05
D20-1	Spring and rivet	.68
D21	Pivot block	.99
D21-1	Bolt 3/8x1	.16
D21-2	Washer	.10
D22	Bumper block	1.17
D22-1	Bolt 3/8x1 1/8	.16
D23	Snap assem.	14.38
D23-1	Bearing and pin	3.69
D23-2	Bolts 5/16x1	.10
D23-3	Gasket	.33
D24	Spring	.51
D24-1	Plug	$1.58
D24-2	Gasket	.33
D25	Std. valv block	14.38
D25-1	R.M. spec. block	17.19
D25-2	Bolts 1/4x1 3/4	.12
D25-3	Gasket	.33
D26	Control needle	3.34
D26-1	Hold spring	.44
D27	Drip pot	4.95
D27-1	Cap	7.15
D27-2	Bolts 5/16x3/4	.10
D27-3	Strainer	.41
D28	Tank valv	9.74
D28-1	Body	4.86
D28-2	Stem	1.62
D28-3	Strainer	1.50
D28-4	Strainer nut	1.98
D28-5	Wing nut	.85
D28-6	Cap nut	.42
D28-7	Gasket	.40
D28-8	Gasket	.40
D30	Check plug	.74
D30-1	Body	2.64
D30-2	Cap	1.83
D31	Split tube check	2.04
D31-1	Retainer ring	.45
D31-2	Body	3.14
D31-3	Cap	2.04
D32	Tee	.94
D32-1	Nipple 1/4x1	.44
D32-2	Adapter 3/8x1/4	.57
D33	Vac. tube std.	1.43
D34	Vac. tube R.M.S.	1.34
D35	Chemical tube	1.43
D36	Gas inlet tube	.96
D37	Chemical line	2.09
D38	Gas line	2.09
D38-1	Adapter 1/4x1/4	.40
D39	Cap	7.15
D39-1	Gasket	.40
D40	Push rod	3.80
D41	Check ball 1/4'	.33
D42	Spring	.33
D42-1	Plug	.66
D43	Valv	$5.52
D44	Packing nut	4.95
D44-1	Split ring	3.85
D44-2	Bolts 1/4x3/8	.10
D44-3	Key	.72
D45	Drain cock	1.87
D46	Line check	8.47
D46-1	Body	3.71
D46-2	Cage	1.95
D46-3	Plug	1.99
D46-4	Spring	.51
D46-5	"O" Ring	.48
D47	Stand	12.76
D48	Tank	9.53
D48-1	Lid	4.51
D48-2	Band	1.61
D48-3	Bolts 1/4x1/4	.15
D49	Gauge stick	1.06
D50	R.M. control tube	2.45
D51	Bracket	.44
D52	Pressure gauge	2.42
D53	Ell 1/4x1/4	.62
D54	Nipple 1/4x1 3/4	.69
R55	Regulator	15.40
R1	Body	4.62
R2	Cap	3.19
R3	Housing	4.07
R4	Spring	.62
R5	Guide screw	.95
R6	Yoke	2.02
R7	Plug nut	.95
R8	Seat	1.30
R9	Bolts 1/4x1 1/2	.10
R10	Gasket	.37
R11	Strainer	.13
R12	Diaphragm	.68
R13	Nuts	.07
R14	Dia. washer	.92
R15	Washer	.09
R16	Nut	.18
R17	Spring	.79
R18	Saddle	.42
R19	Control screw	1.06

Y-Z AUTOMATIC CRUDE SAMPLERS

PRICES

MODEL	TYPE	PRICE (fob Snyder)
R-1	Pneumatic (gas or air)	$ 516.00
R-1E	Electric (meter impulse)	495.00
R-1EX	Electric Explosion proof	553.00

Y-Z PIPE LINE PROBES

SP-1	Removable pitot tube	$ 12.50
SP-2	Removable V" slot tube	12.50
**	** Special probes built to your spec. Labor and material	

GENERAL INFORMATION

All machines shipped will be crated to assure intact delivery and a crating charge of $8.70 will be made for each machine. Gross weight crated is approximately 200#. All models listed above are with 20 gal. sample storage tanks, special size tanks upon request. Tank sizes 20 gal. and less will not change price of basic machine.

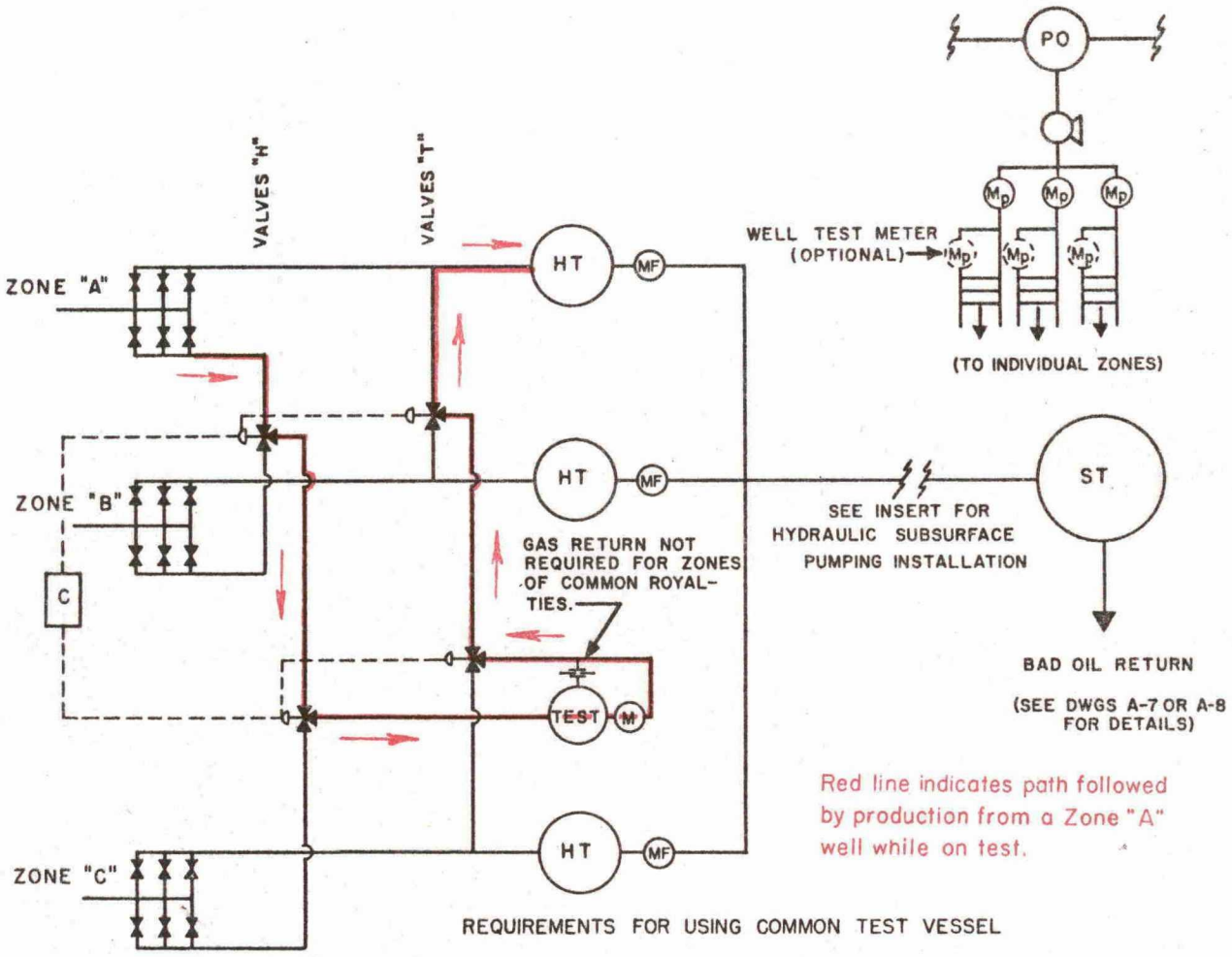
All switches, relays and wiring will be furnished by party making installation.

November 1st, 1959

Y. & Z. CARBURETOR SERVICE

Snyder, Texas

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

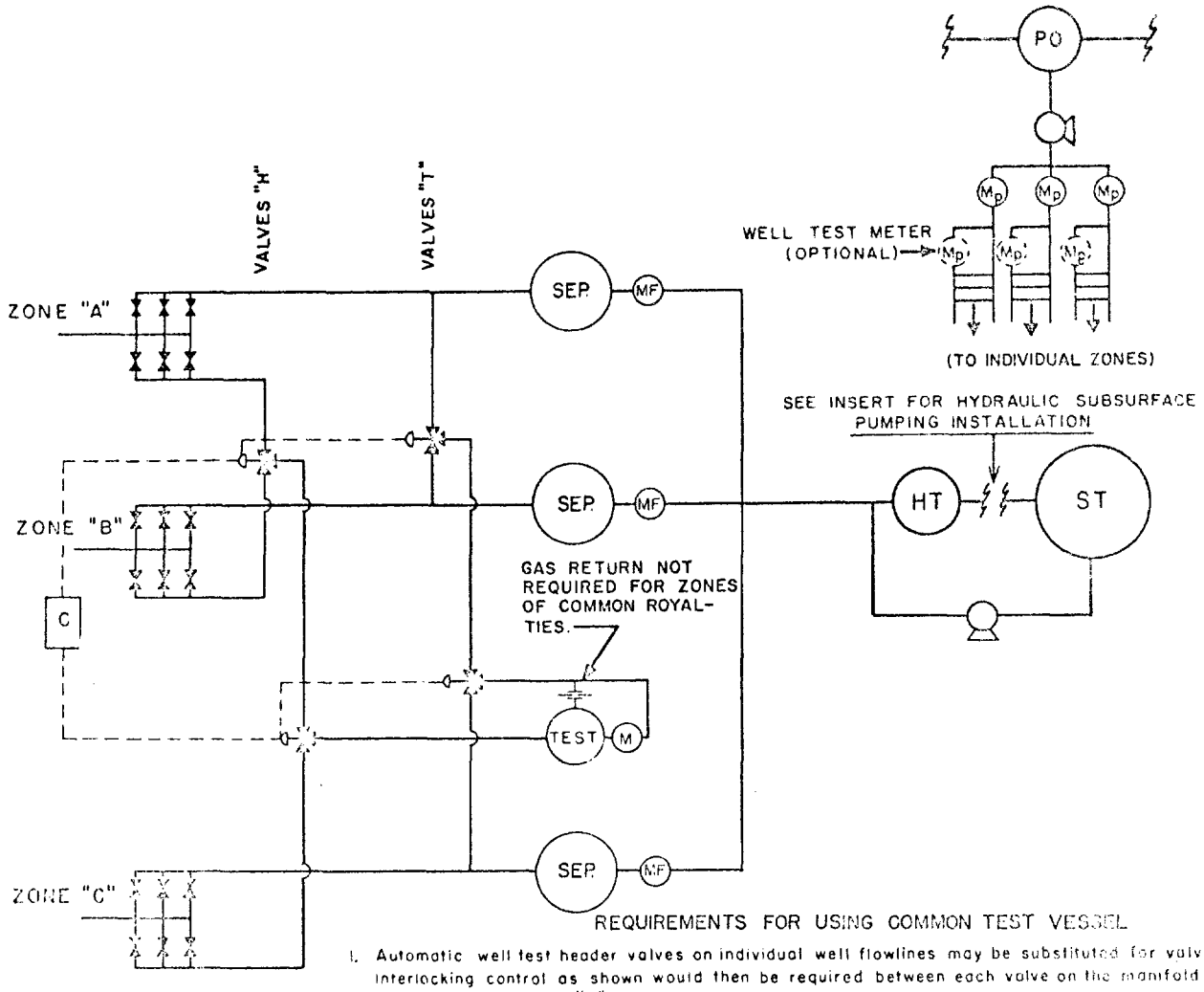
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — TEST METER
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR
- (MF) — METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-1

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T"

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

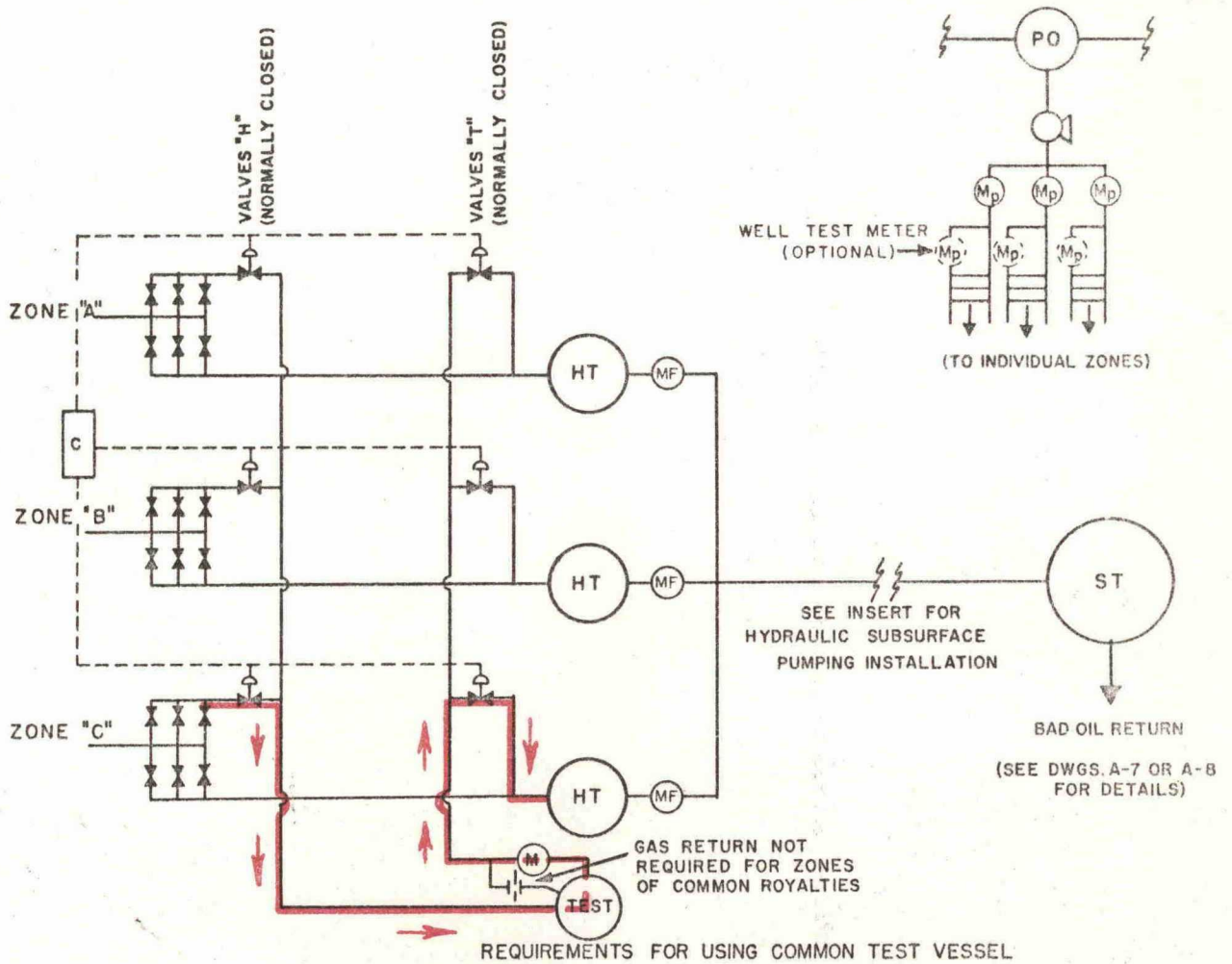
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (M) METER FOR POWER OIL
- (SEP.) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP.) SEPARATOR
- (MF) METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

COMMON TREATER USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-2

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

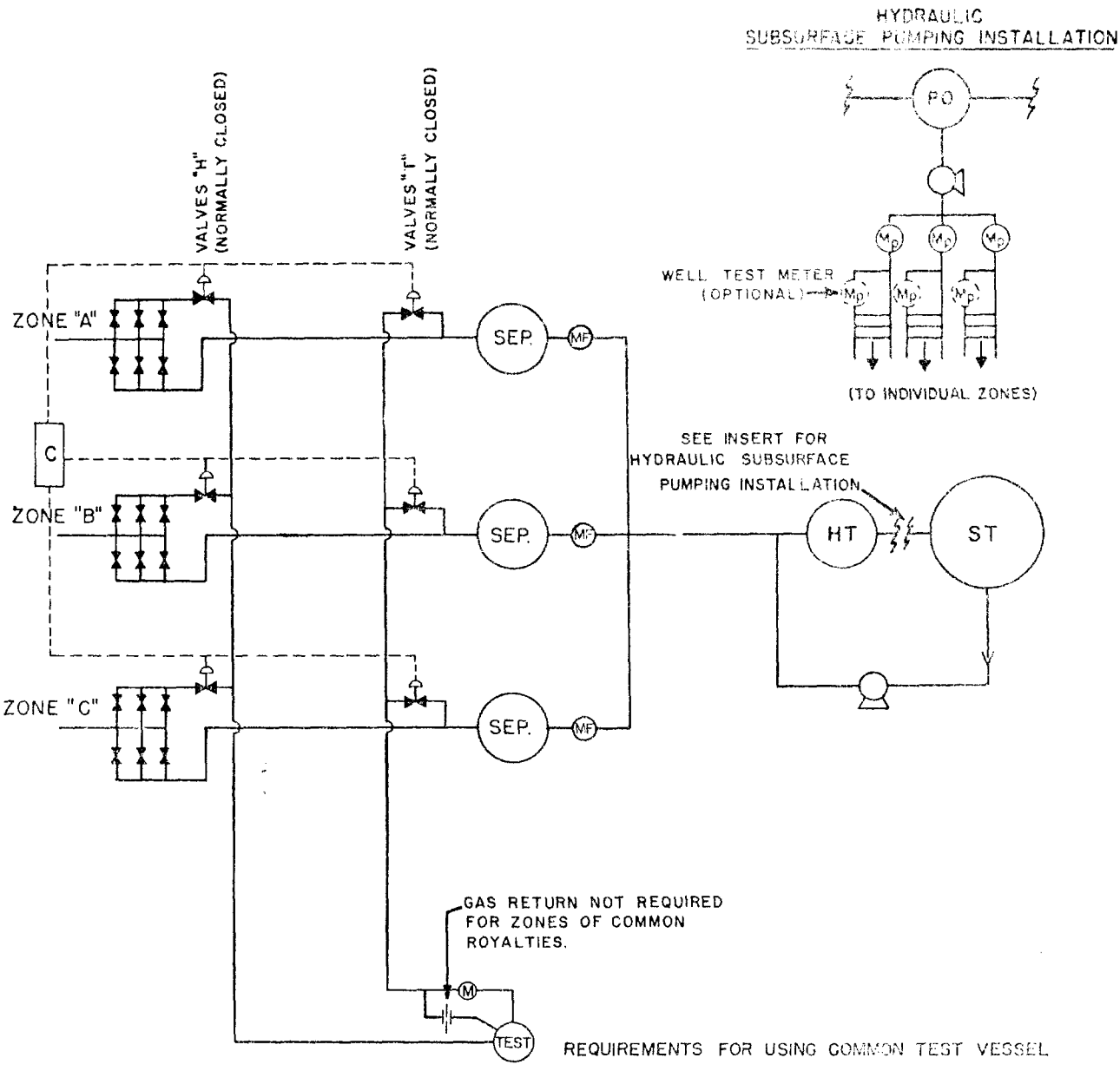
Red line indicates path followed by production from a Zone "C" well while on test.

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — TEST METER
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR
- MF — METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-3



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

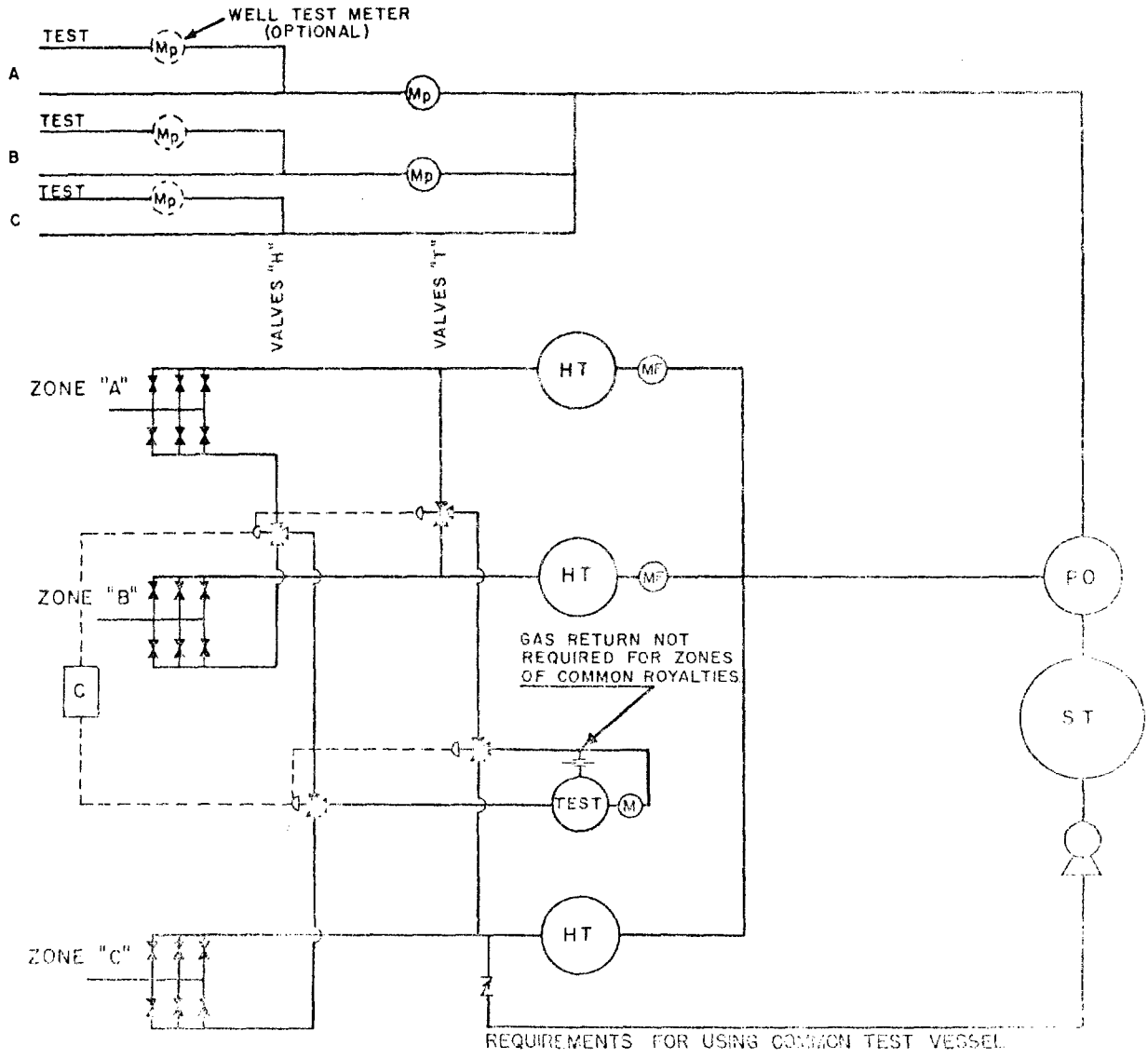
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — TEST METER
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR
- (MF) — METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

COMMON TREATER USED IN COMMINGLING
COMMON OR SEPARATE ROYALTIES
WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-4



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

3. Manual overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

4. If normally closed, two-way valves are to be installed, refer to drawing A-3.

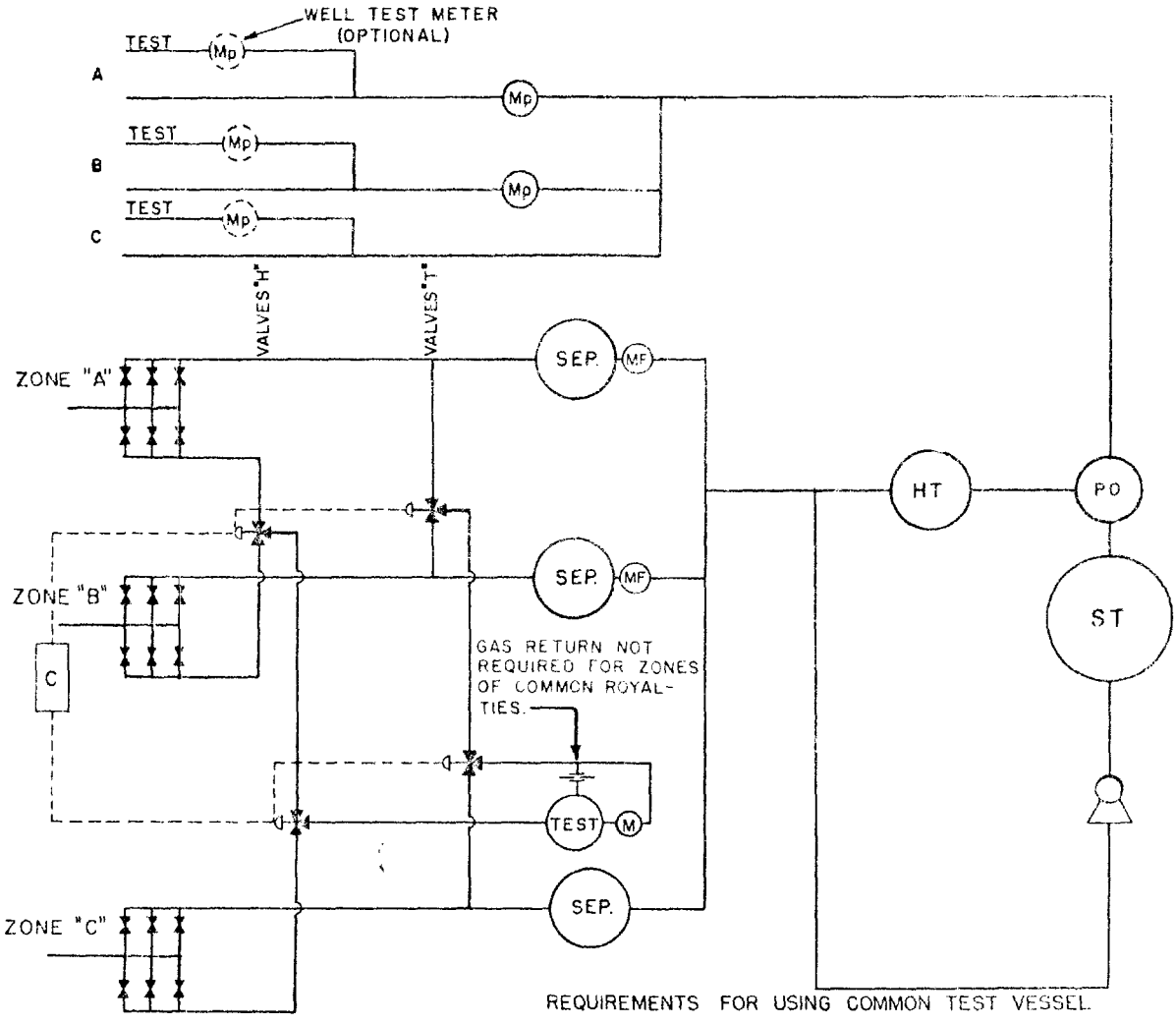
SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (MF) METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-5



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.
4. If normally closed, two-way valves are to be used, refer to drawing A-4

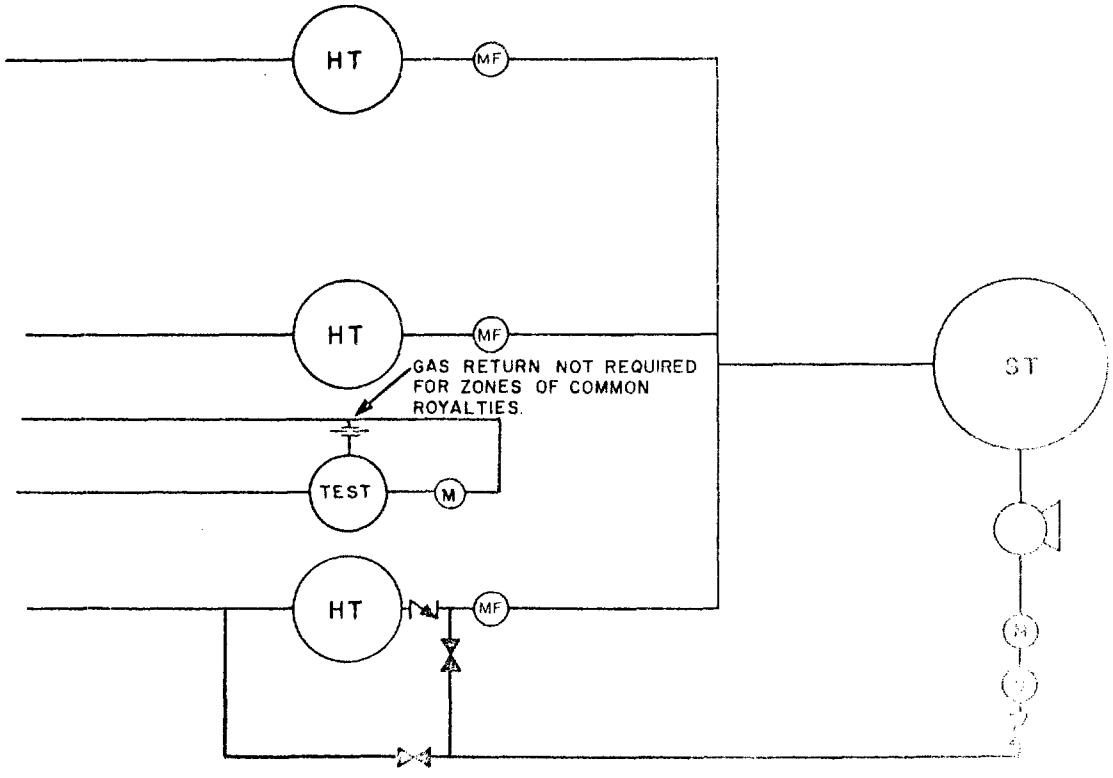
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (MF) METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)
- (SEP) SEPARATOR

COMMON TREATER USED IN COMMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-6



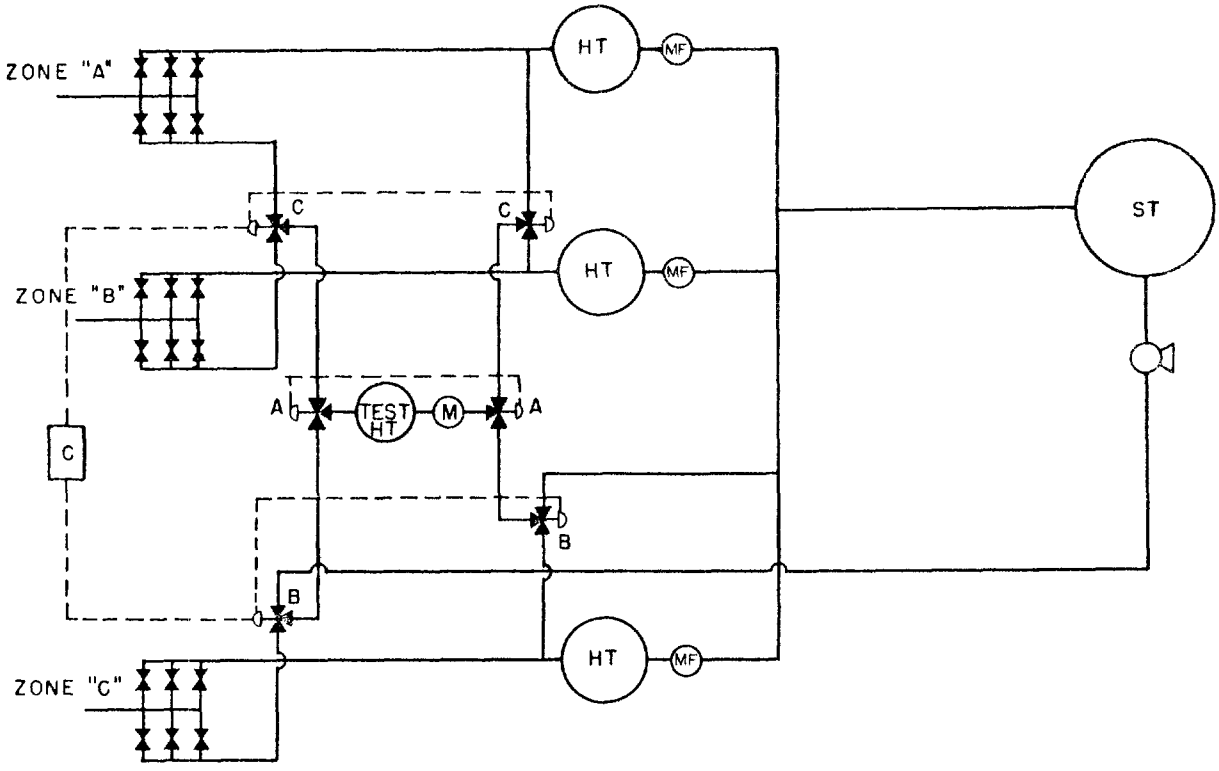
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — TEST OR BAD OIL METER
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (S) — SAMPLER
- (SEP) — SEPARATOR
- (MF) — METERING FACILITIES(METER & SAMPLER IF APPLICABLE)

BAD OIL RETURN (ALTERNATE NO. 1)

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-7



SYMBOLS

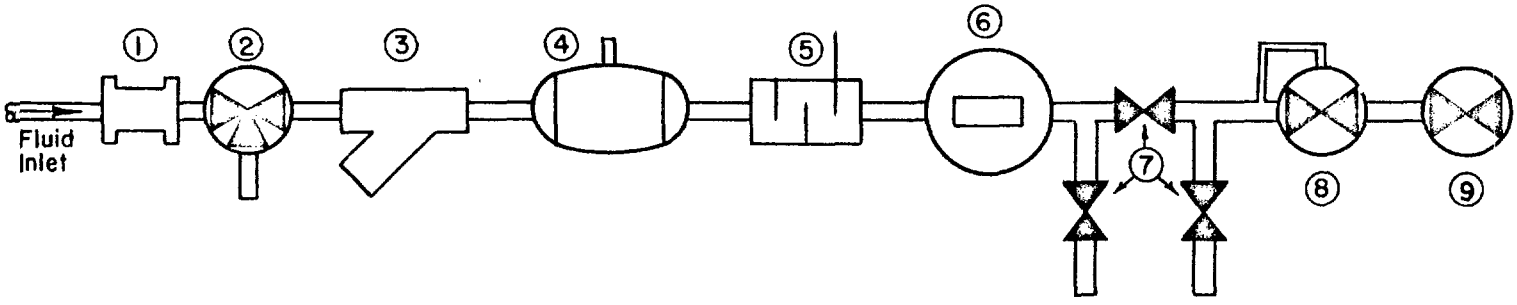
- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (MF) METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

BAD OIL RETURN (ALTERNATE NO. 2)
WHEN TEST TREATER IS INSTALLED

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-8

POSITIVE-DISPLACEMENT METER SYSTEM



LEGEND

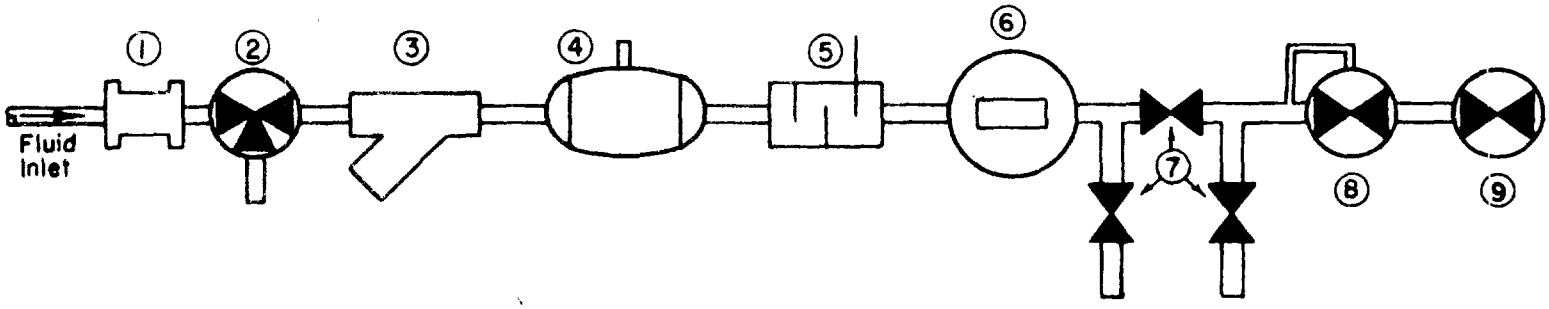
① BS & W Monitor (Optional)
② Reroute Valve (Optional) for rerouting non-merchantable oil
③ Strainer
④ Air & Gas Eliminator (If Needed) with Check in Vent
⑤ Sample Probe
⑥ P. D. Meter with Non-Reset Counter
⑦ Proving Connections
⑧ Flow Rate Controller
⑨ Dump Valve

Note:

No. 3 & 4 can be combined
No. 8 & 9 can be combined

DRAWING A-9

POSITIVE-DISPLACEMENT METER SYSTEM

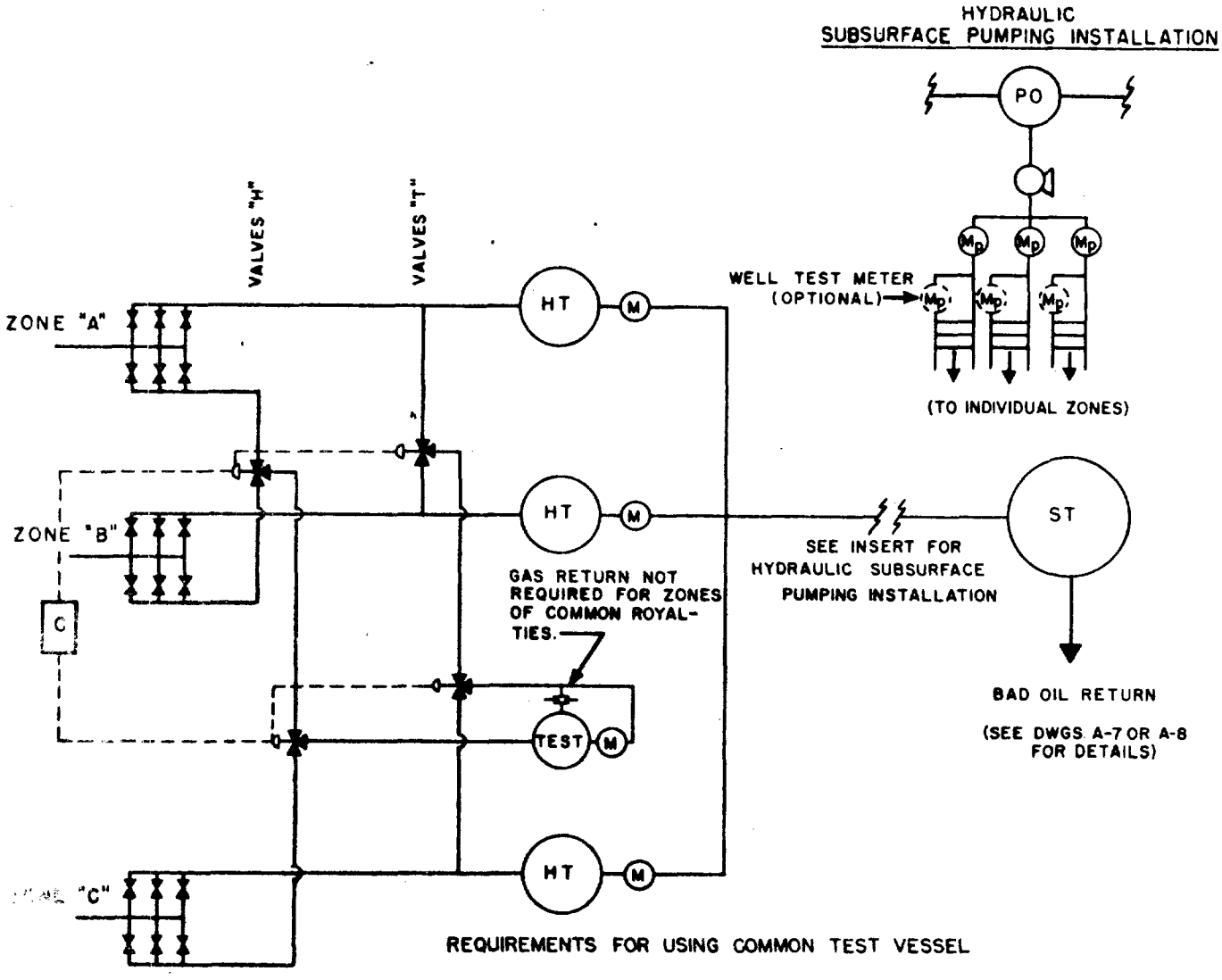


LEGEND

1. BS & W Monitor (Optional)
2. Reroute Valve (Optional) for rerouting non-merchantable oil
3. Strainer
4. Air & Gas Eliminator (If Needed) with Check in Vent
5. Sample Probe
6. P. D. Meter with Non-Reset Counter
7. Proving Connections
8. Flow Rate Controller
9. Dump Valve

Note:

No. 3 & 4 can be combined
No. 8 & 9 can be combined



REQUIREMENTS FOR USING COMMON TEST VESSEL

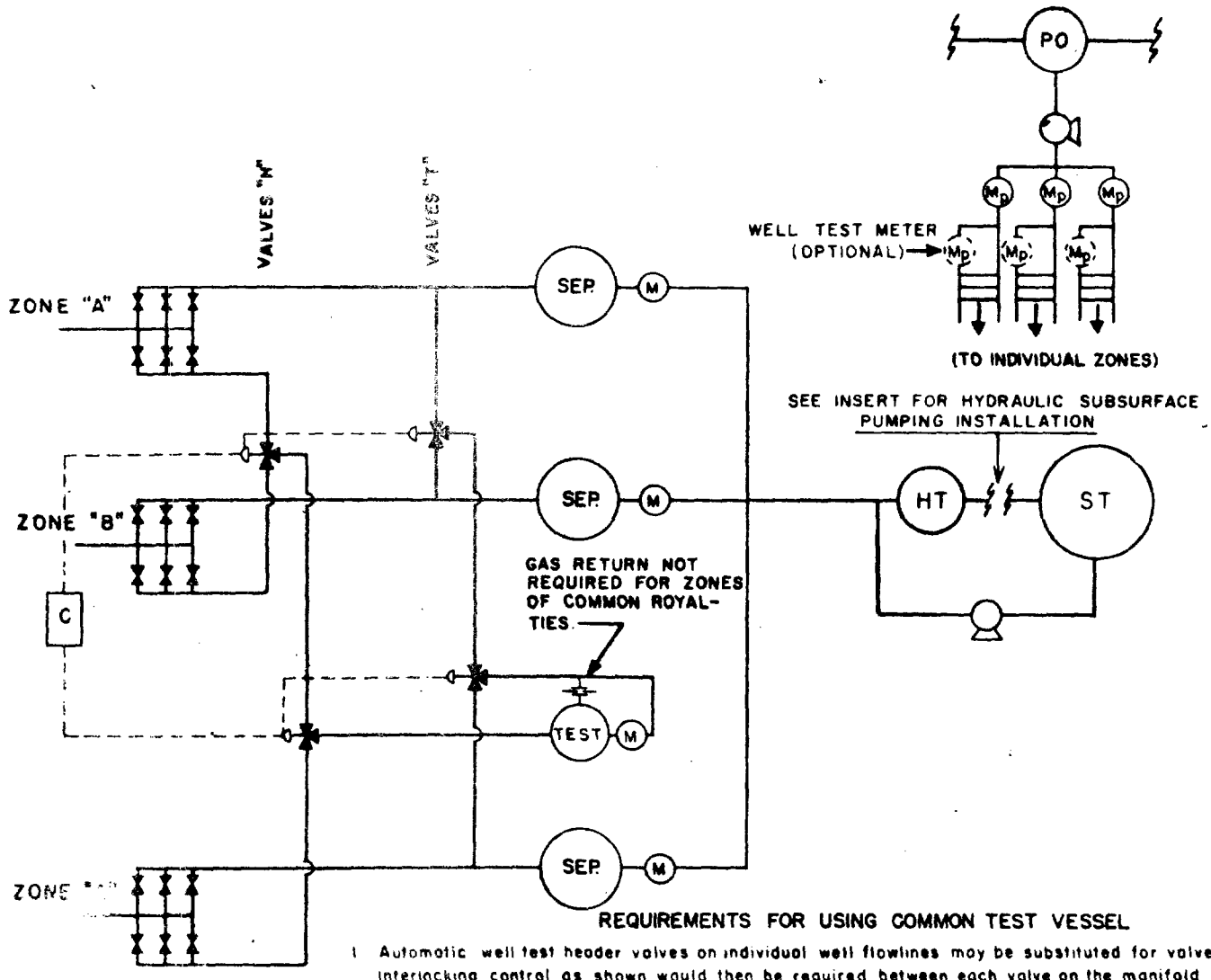
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO. A-1
APPROVED		
REVISED		
APPROVED		

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T"
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

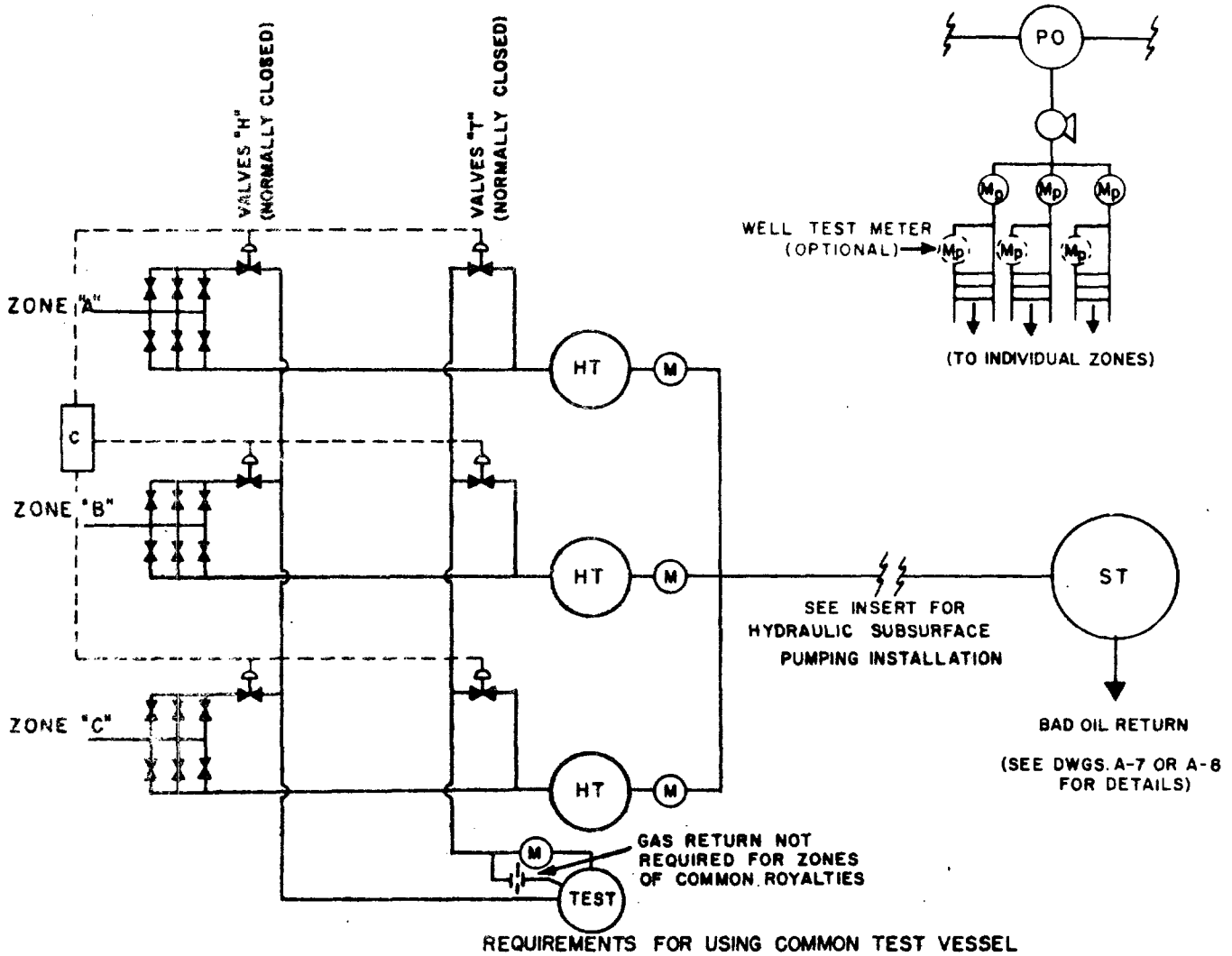
- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

COMMON TREATER USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-2
REVISED		
APPROVED		

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



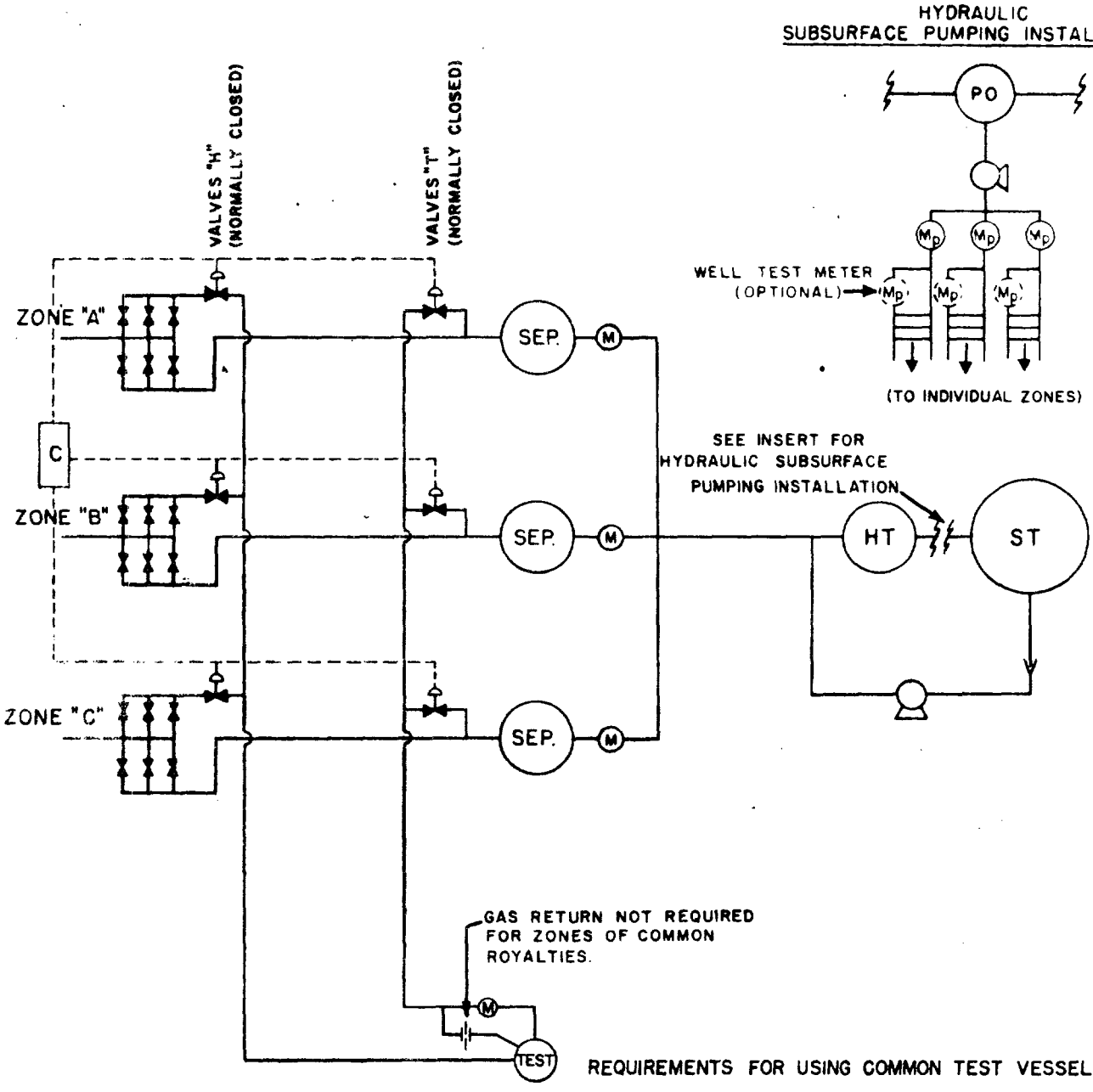
REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES WHEN MANUAL VALVES ARE NOT INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S. APPROVED: REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-3



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

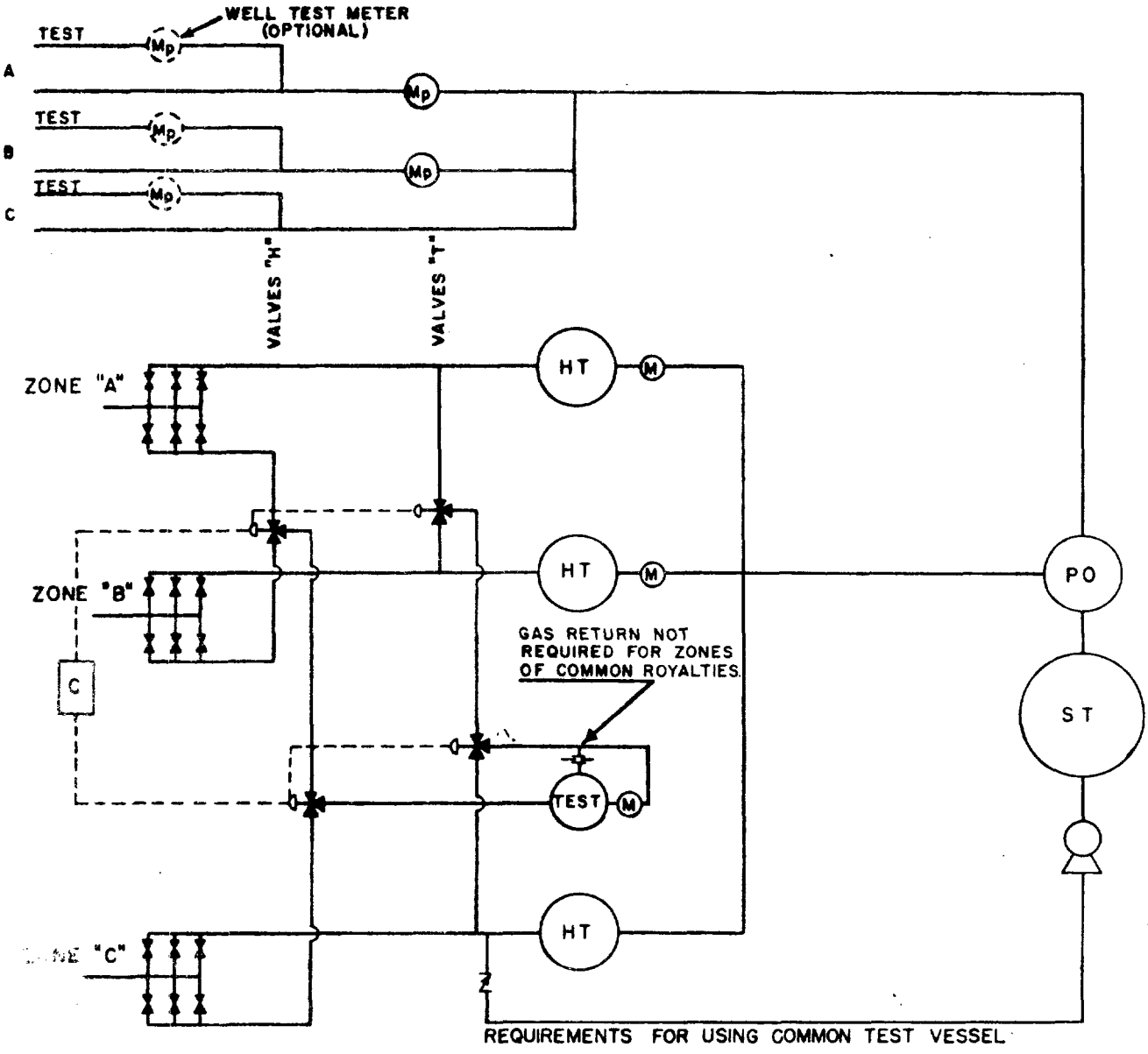
SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — LIQUIDS MEASURING FACILITIES
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR

COMMON TREATER USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES WHEN MANUAL VALVES ARE NOT INSTALLED

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO.
APPROVED:		A-4
REVISED		
APPROVED		



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".

2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [c] and control lines to valves are not required if mechanical interlock is provided for manual operation.

3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

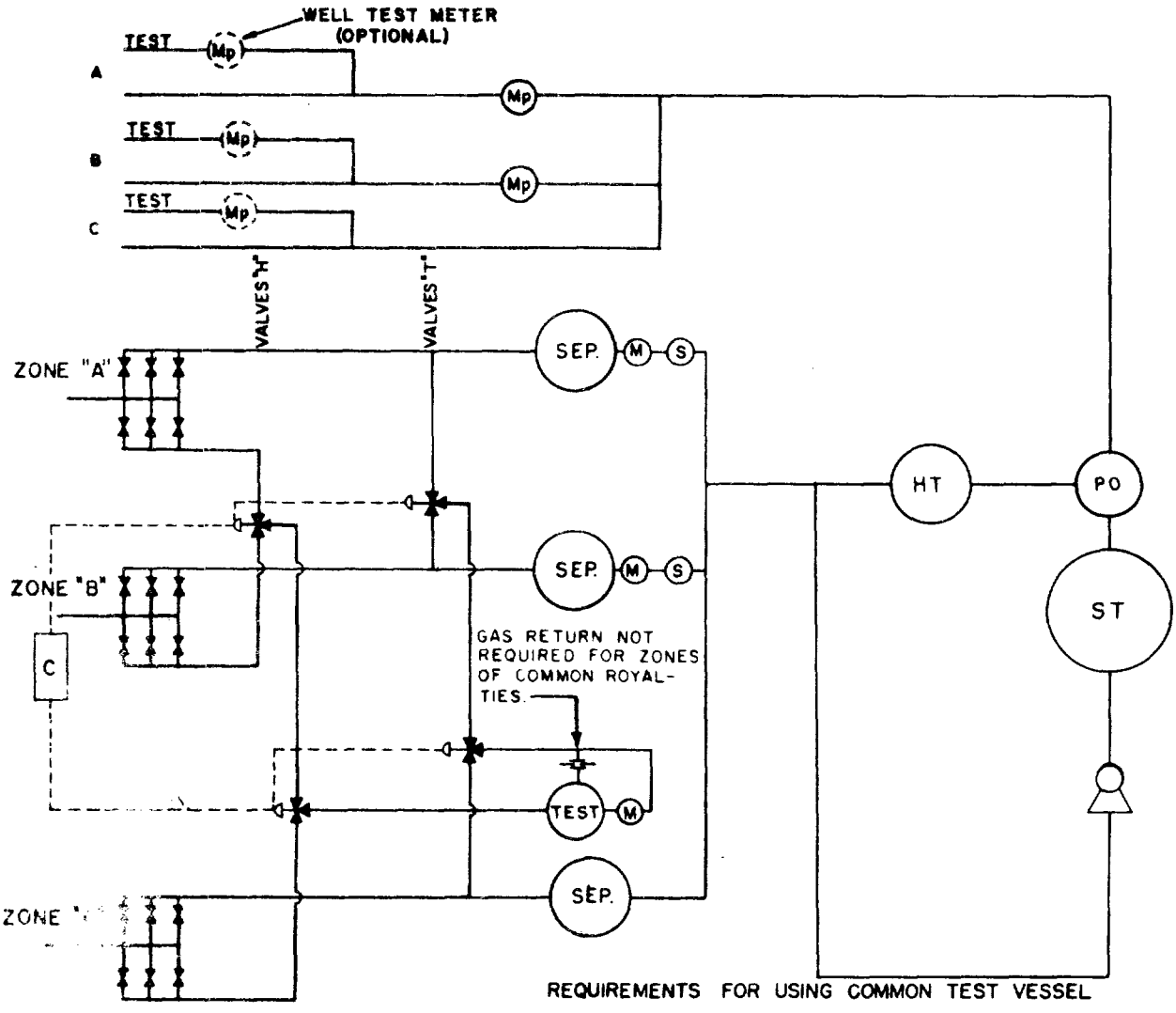
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.	DATE: 5-4-61	DWG.NO.
APPROVED		A-5
REVISED		



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

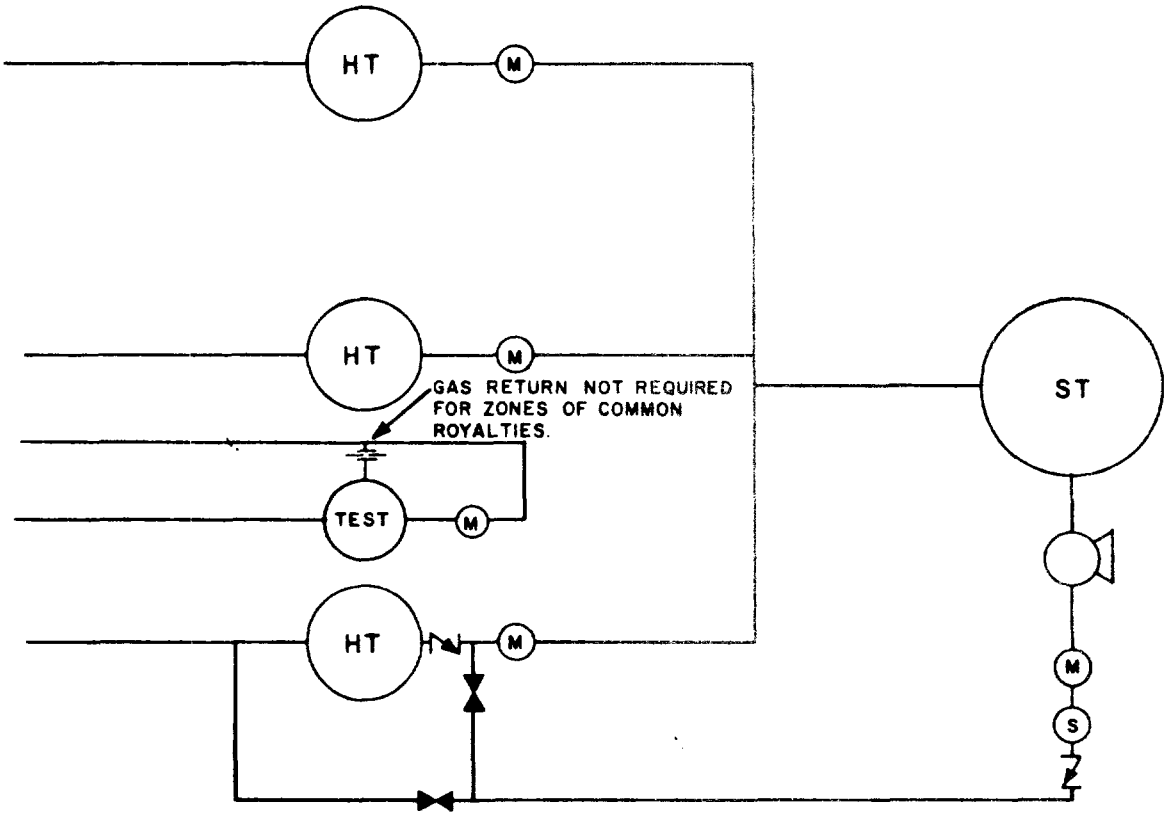
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (S) SAMPLER
- (SEP) SEPARATOR

COMMON TREATER USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVAT'ON COMMISION
COMMITTEE ON COMINGLING

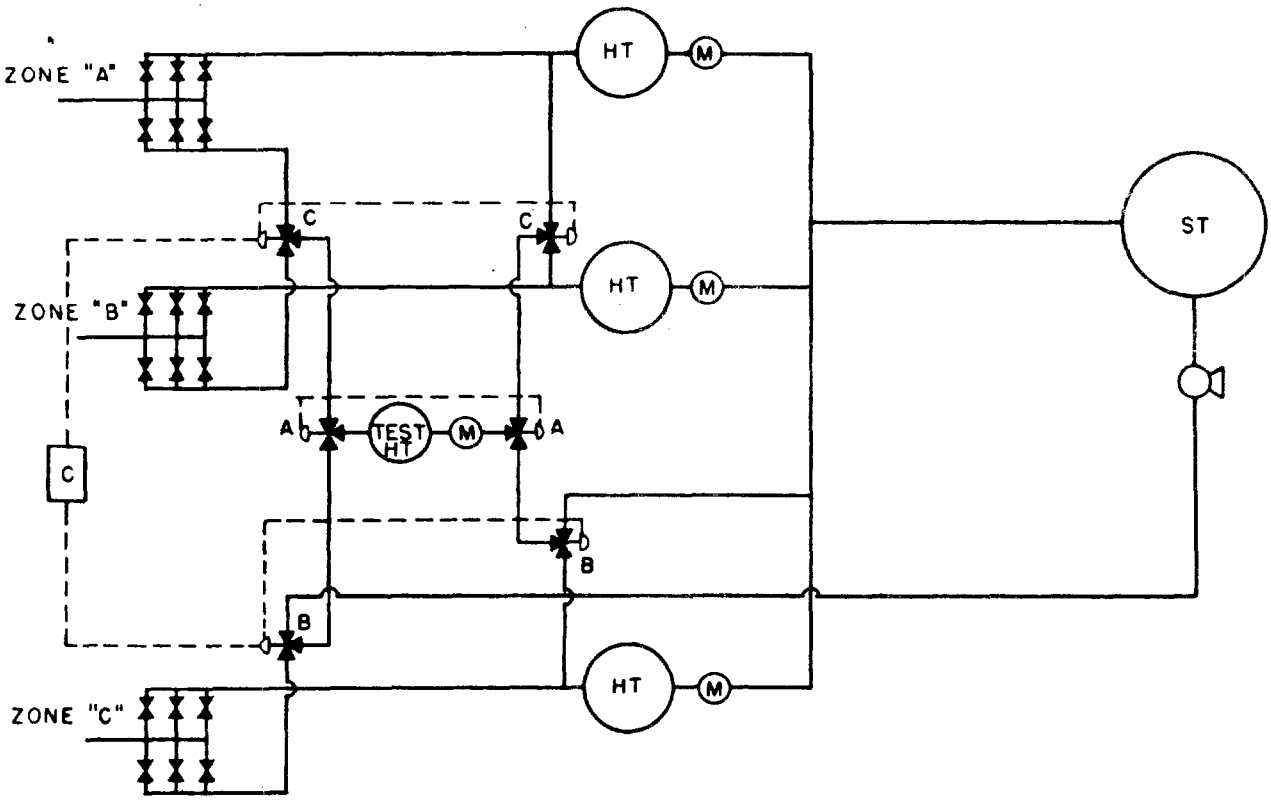
DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-6
REVISED		



SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — LIQUIDS MEASURING FACILITIES
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (S) — SAMPLER
- (SEP) — SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 1)		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN H.M.S. APPROVED REVISED APPROVED	DATE 5-4-61	DWG. NO. A-7



SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 2) WHEN TEST TREATER IS INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S. APPROVED REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-8

PROPOSED A.C.T. SYSTEM, LEA UNIT

LEA COUNTY, NEW MEXICO

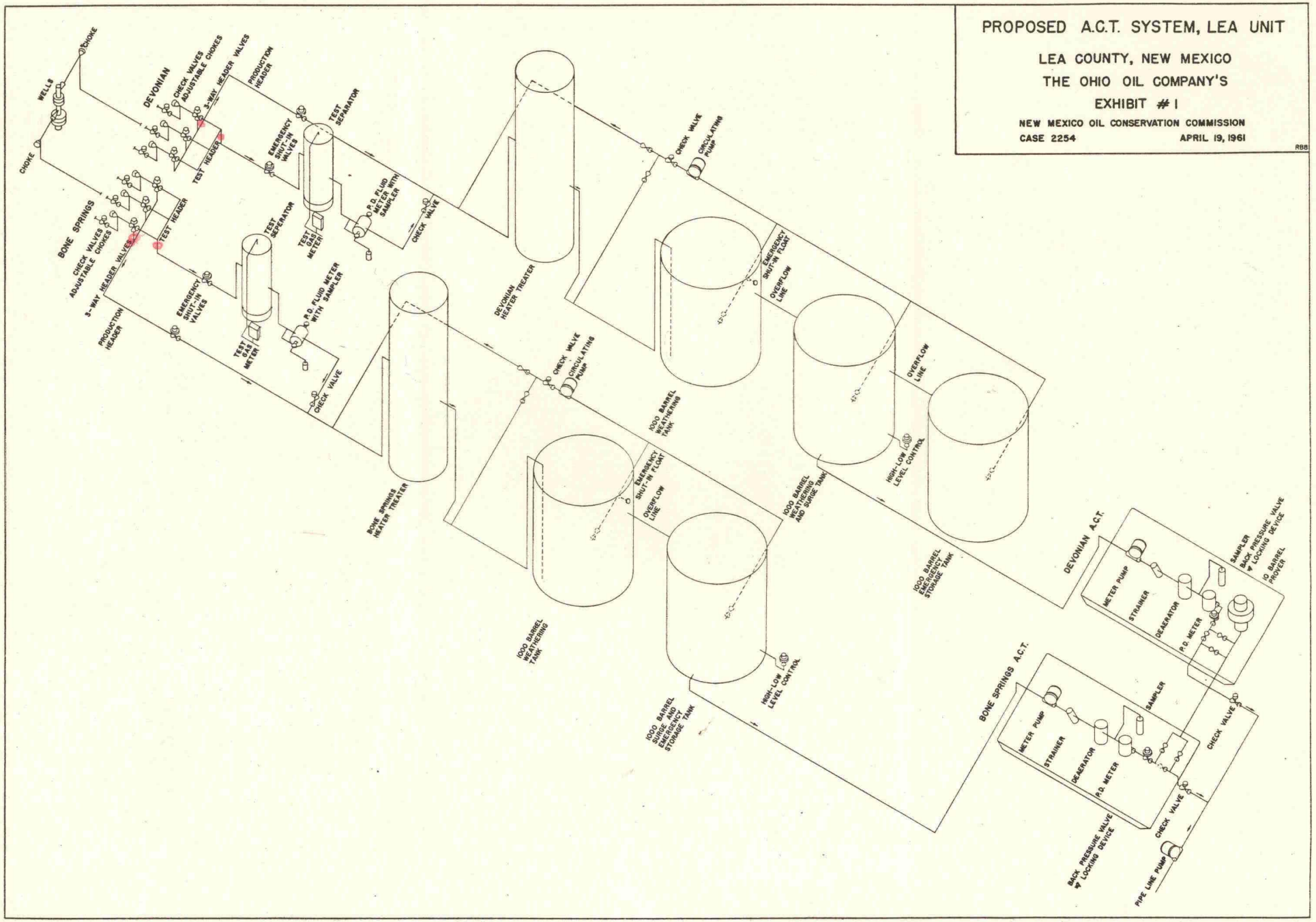
THE OHIO OIL COMPANY'S

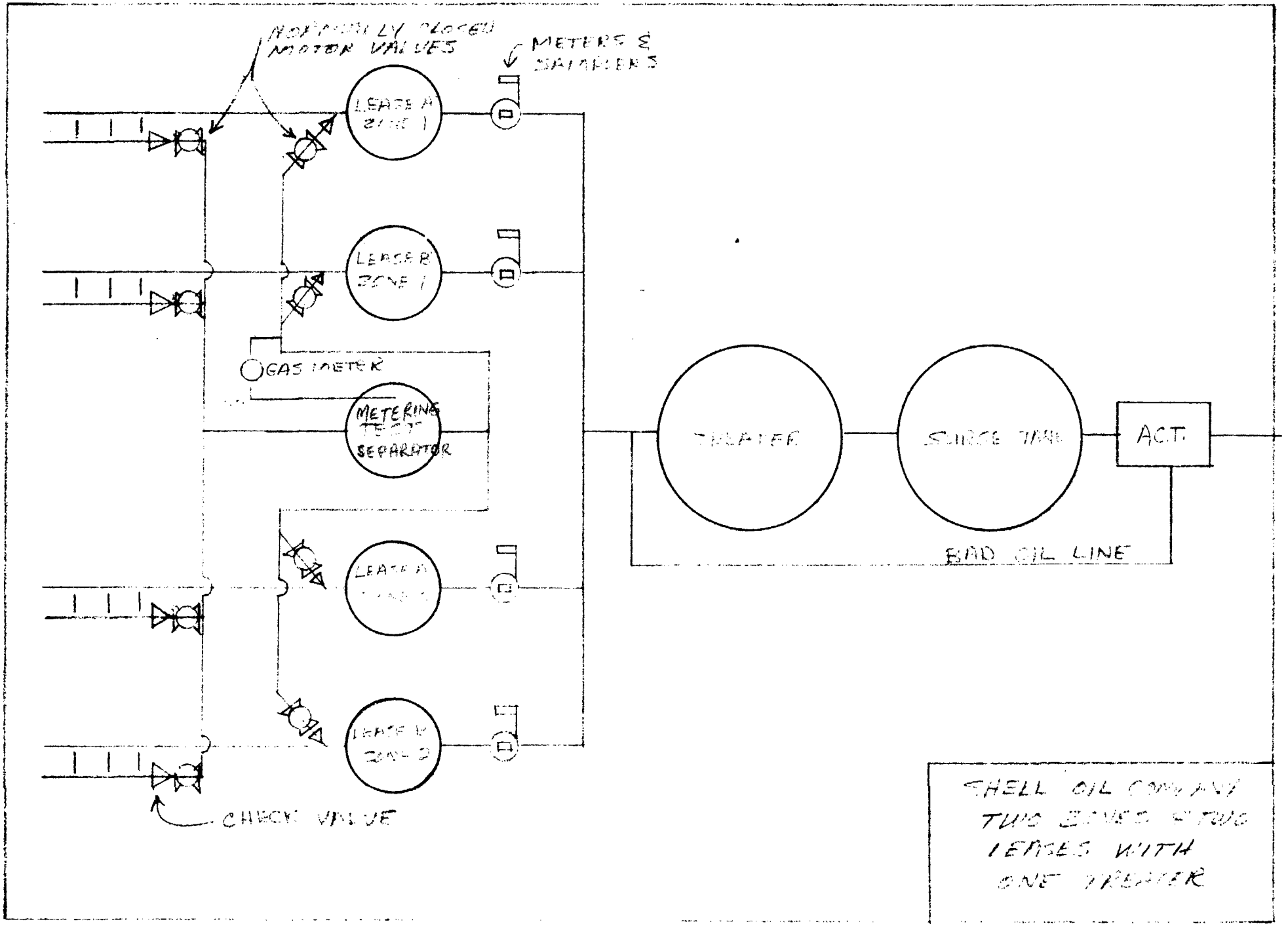
EXHIBIT # 1

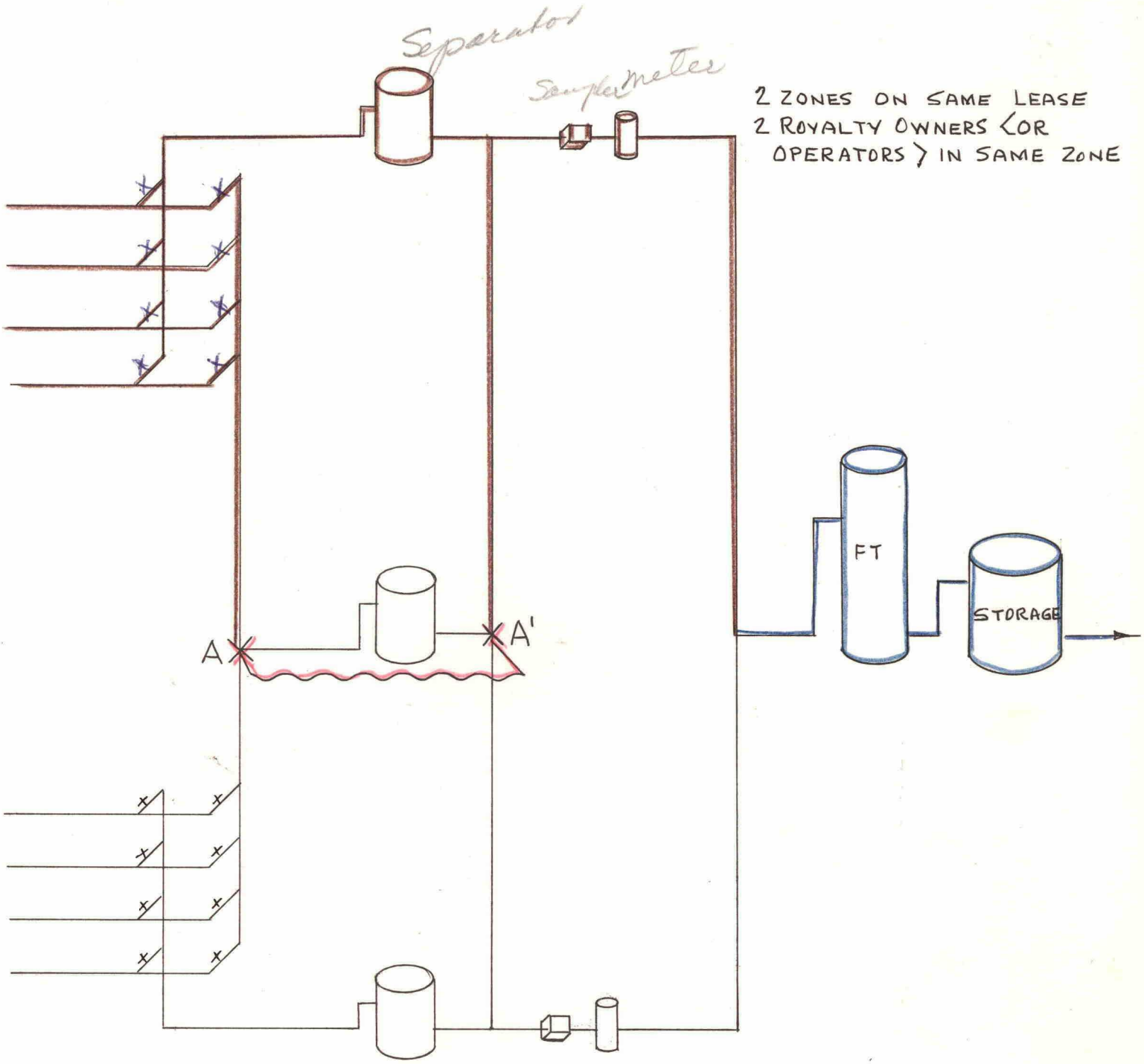
NEW MEXICO OIL CONSERVATION COMMISSION

CASE 2254 APRIL 19, 1961

RBB

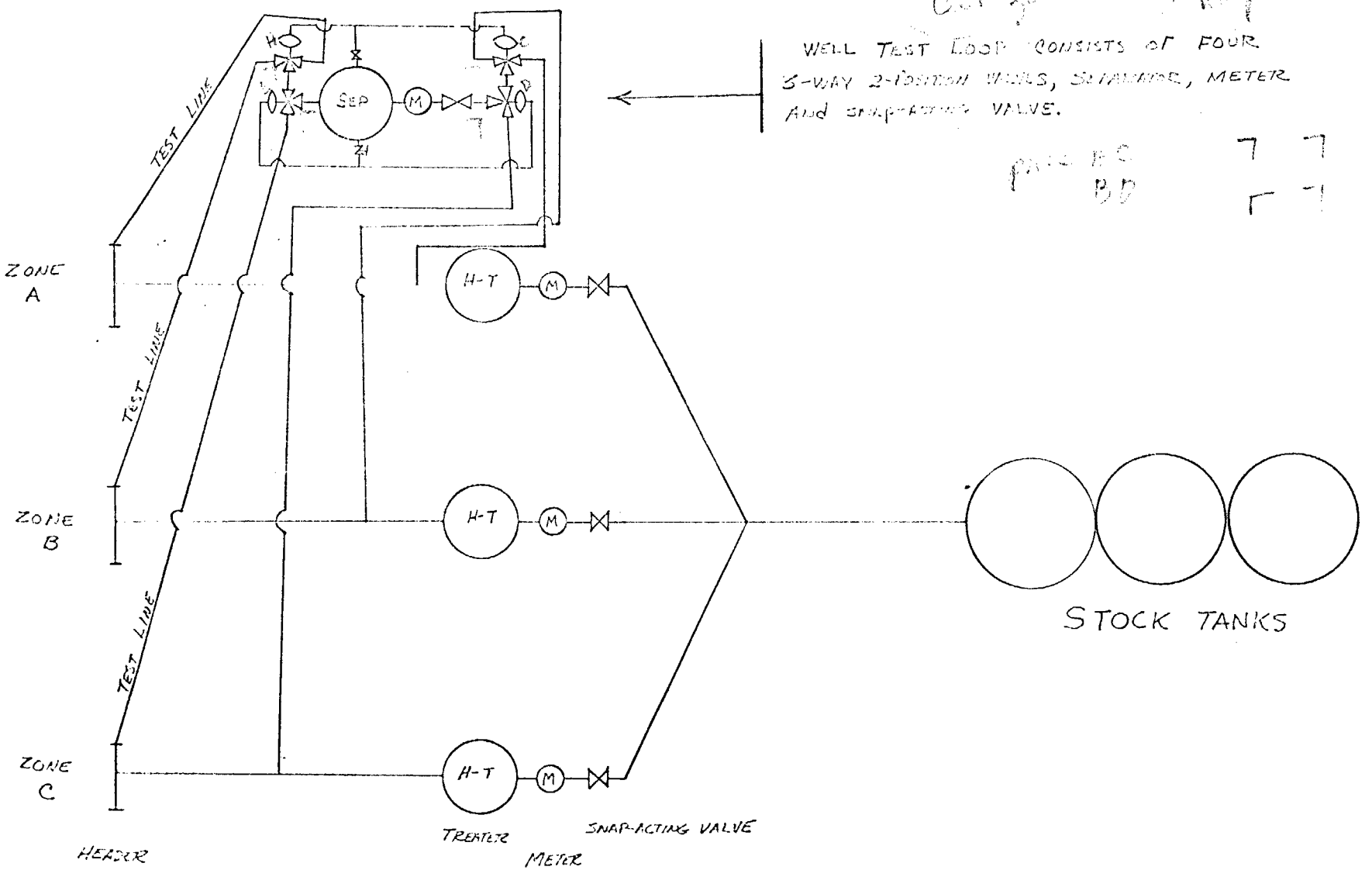



NORMALLY CLOSED MOTOR VALVES
METERS & SAMPLERS
LEASE A ZONE 1
LEASE B ZONE 1
GAS METER
METERING SEPARATOR
LEASE A ZONE 2
LEASE B ZONE 2
CHECK VALVE
TREATER
SURGE TANK
ACT.
BAD OIL LINE
SHELL OIL COMPANY
TWO ZONES WITH TWO LEASES WITH ONE TREATER



VALVES A & A' TO BE 3WAY 3 POSITION VALVES INTERLOCKED (MECHNICALLY OR ELECTRICALLY) TO RELATIVE POSITIONS FOR DIRECTING FLOW.

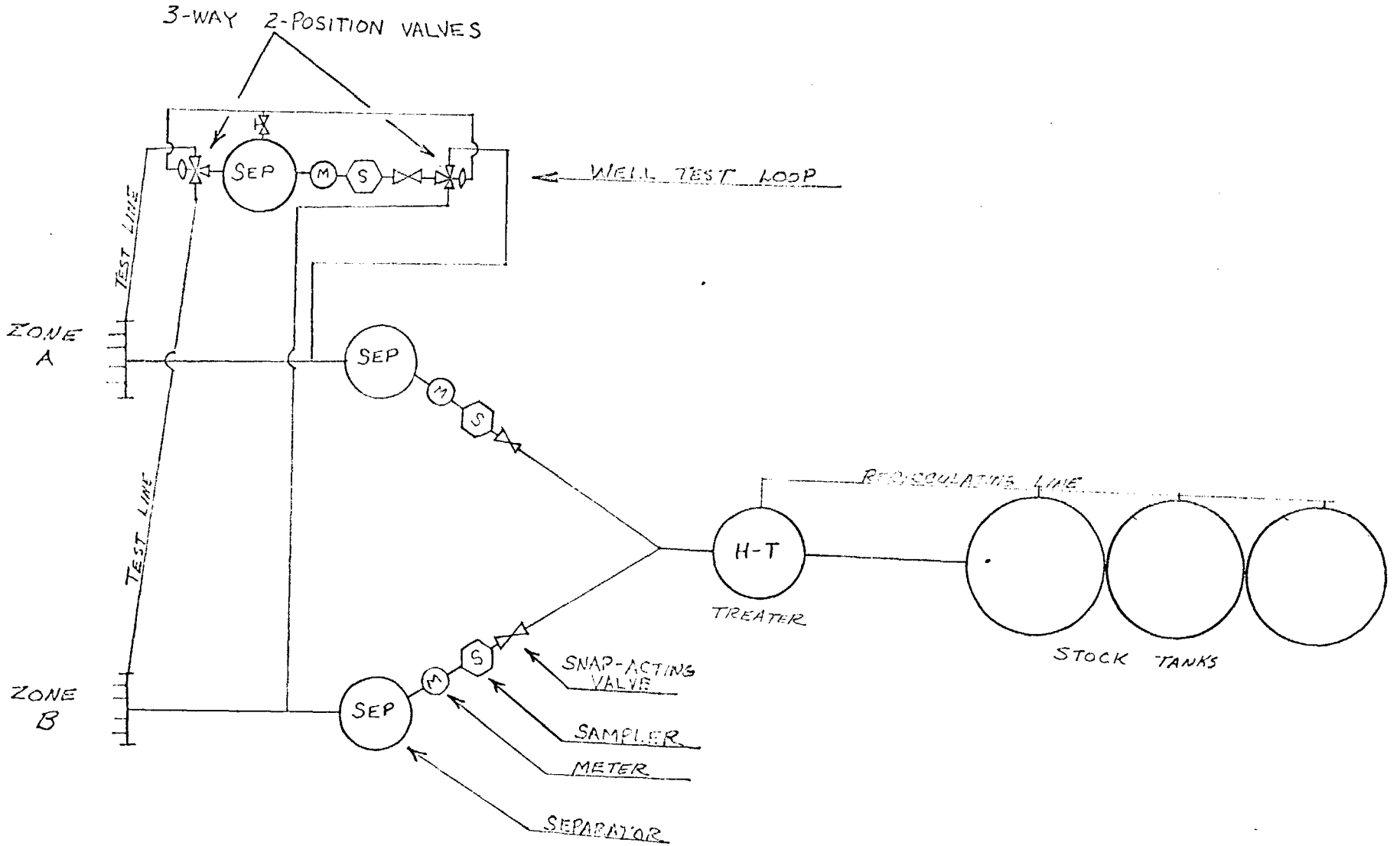
STANDARD HOOK-UP FOR COMMINGLING THREE ZONES



WELL TEST LOOP CONSISTS OF FOUR 3-WAY 2-POSITION VALVES, SEPARATOR, METER AND SNAP-ACTING VALVE.

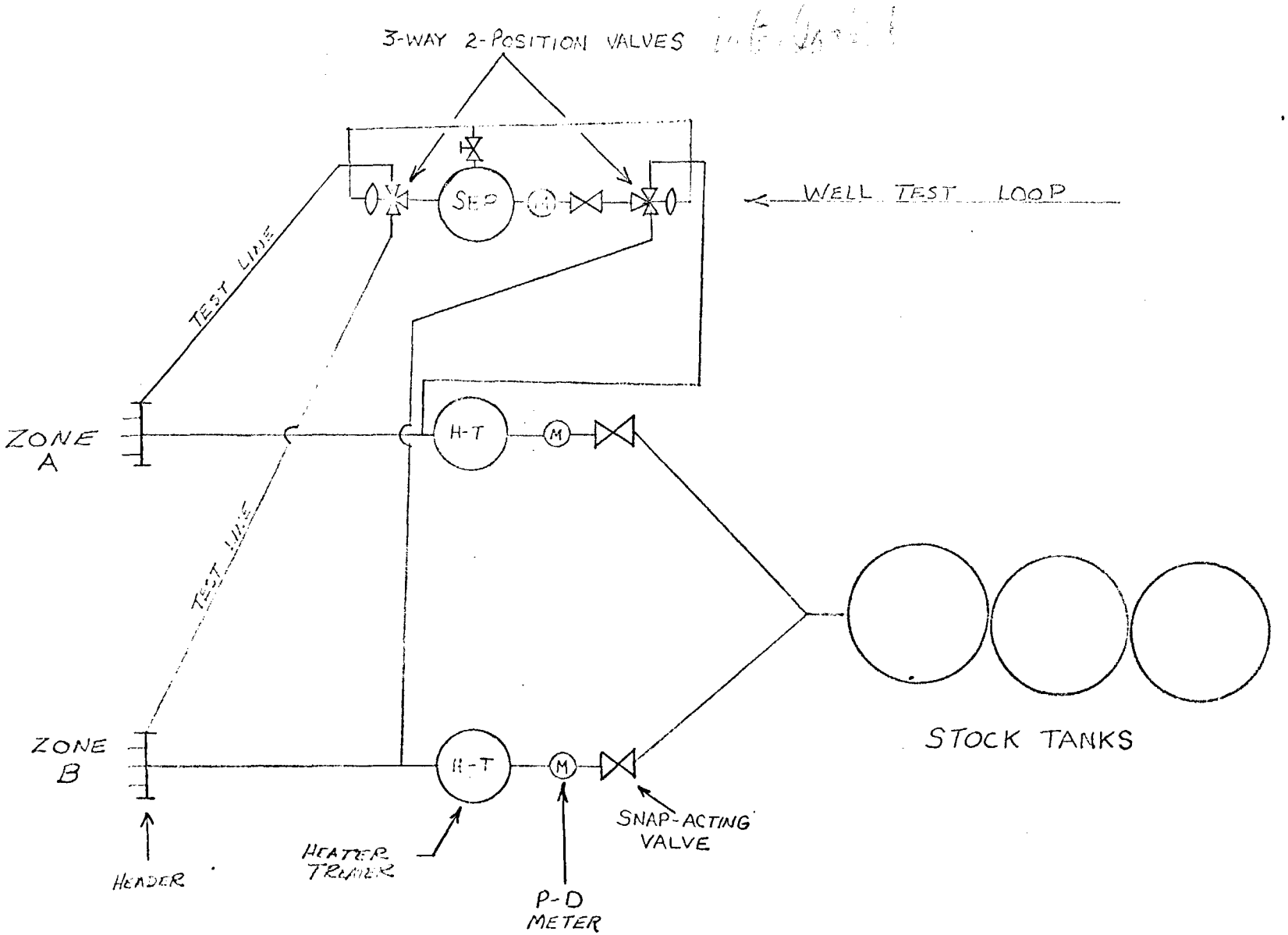
TEXACO Inc.

STANDARD HOOK-UP FOR COMMINGLING TWO ZONES PRIOR TO TREATMENT

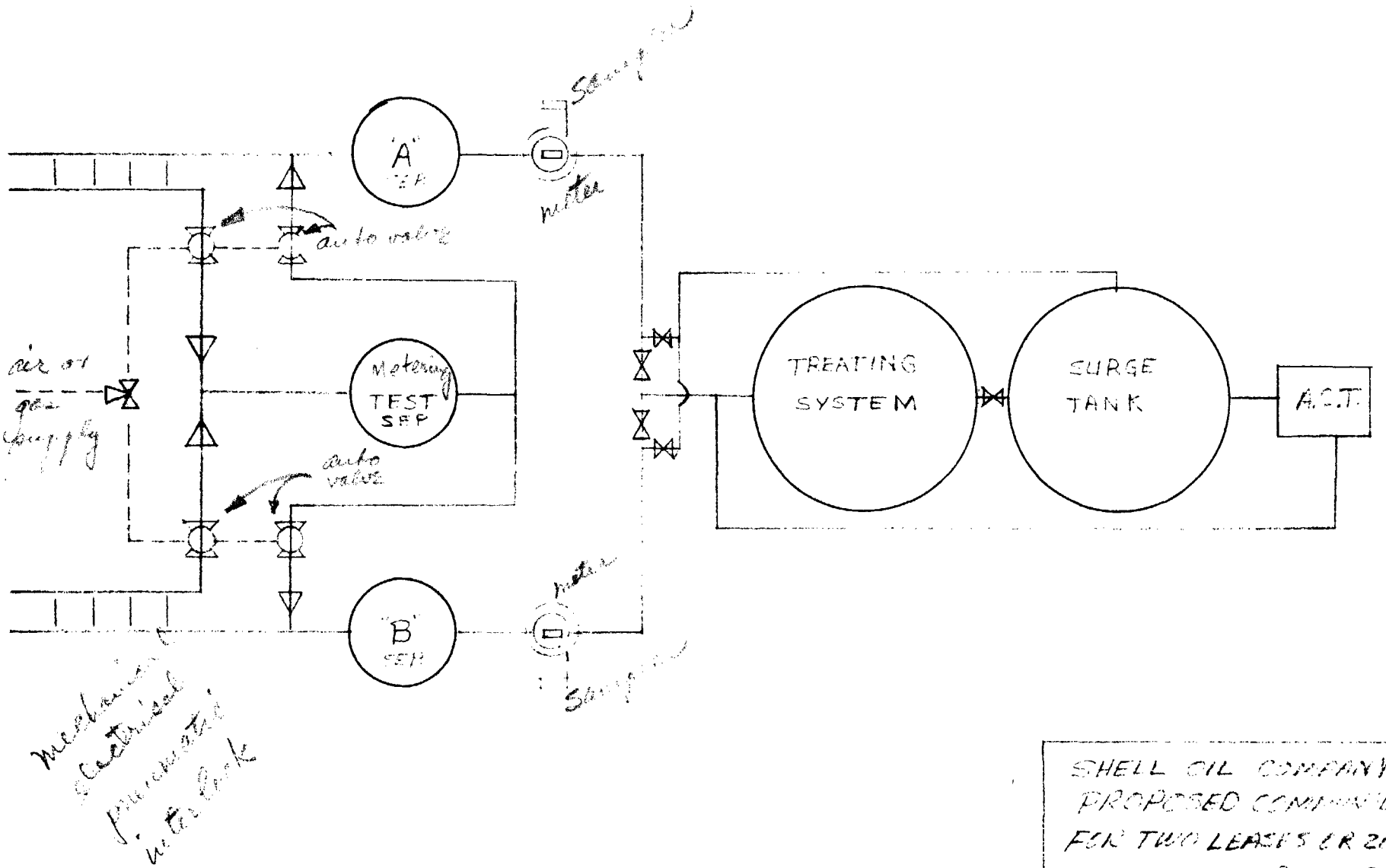


TEXACO Inc

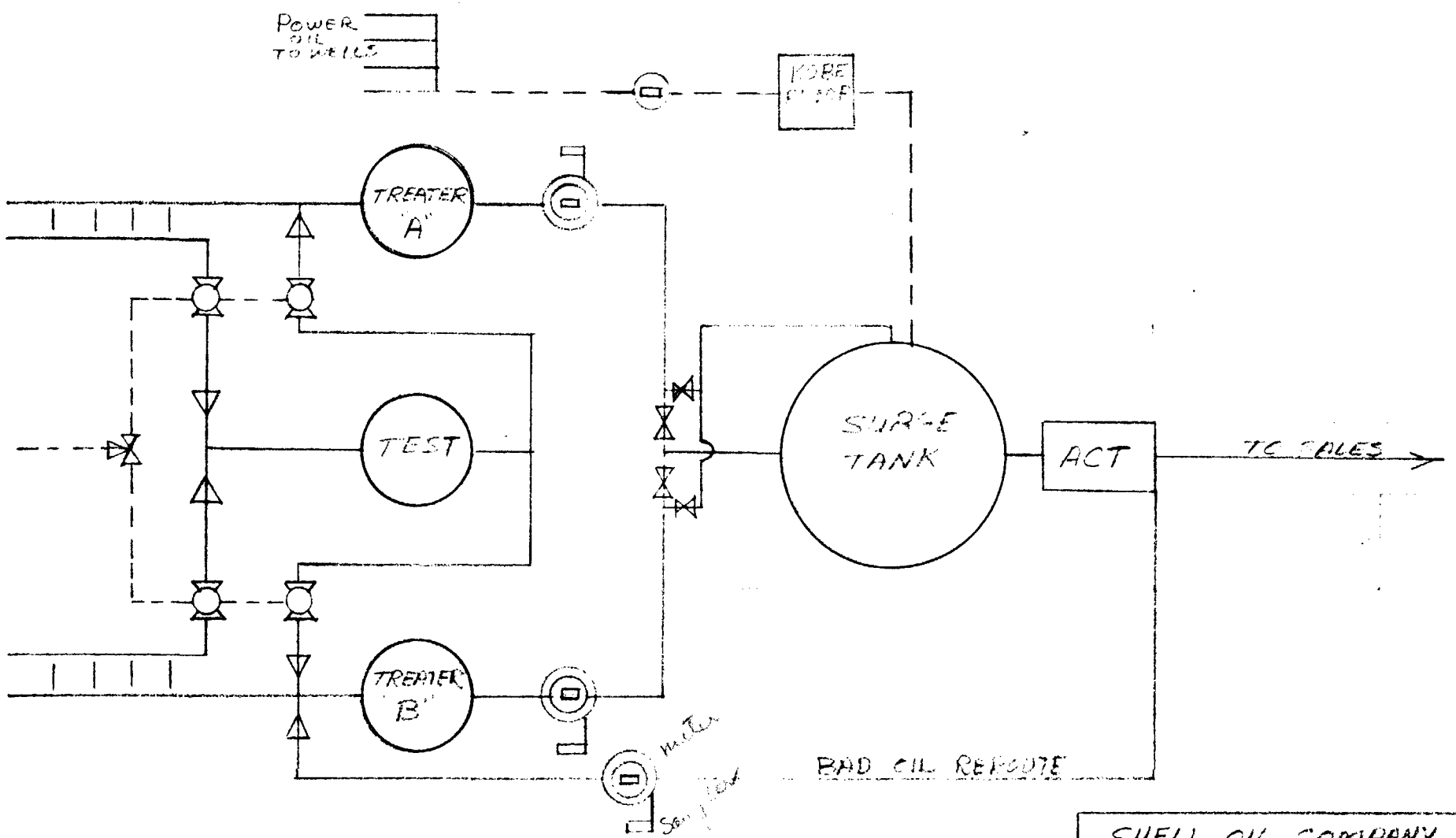
STANDARD HOOK-UP FOR COMMINGLING TWO ZONES



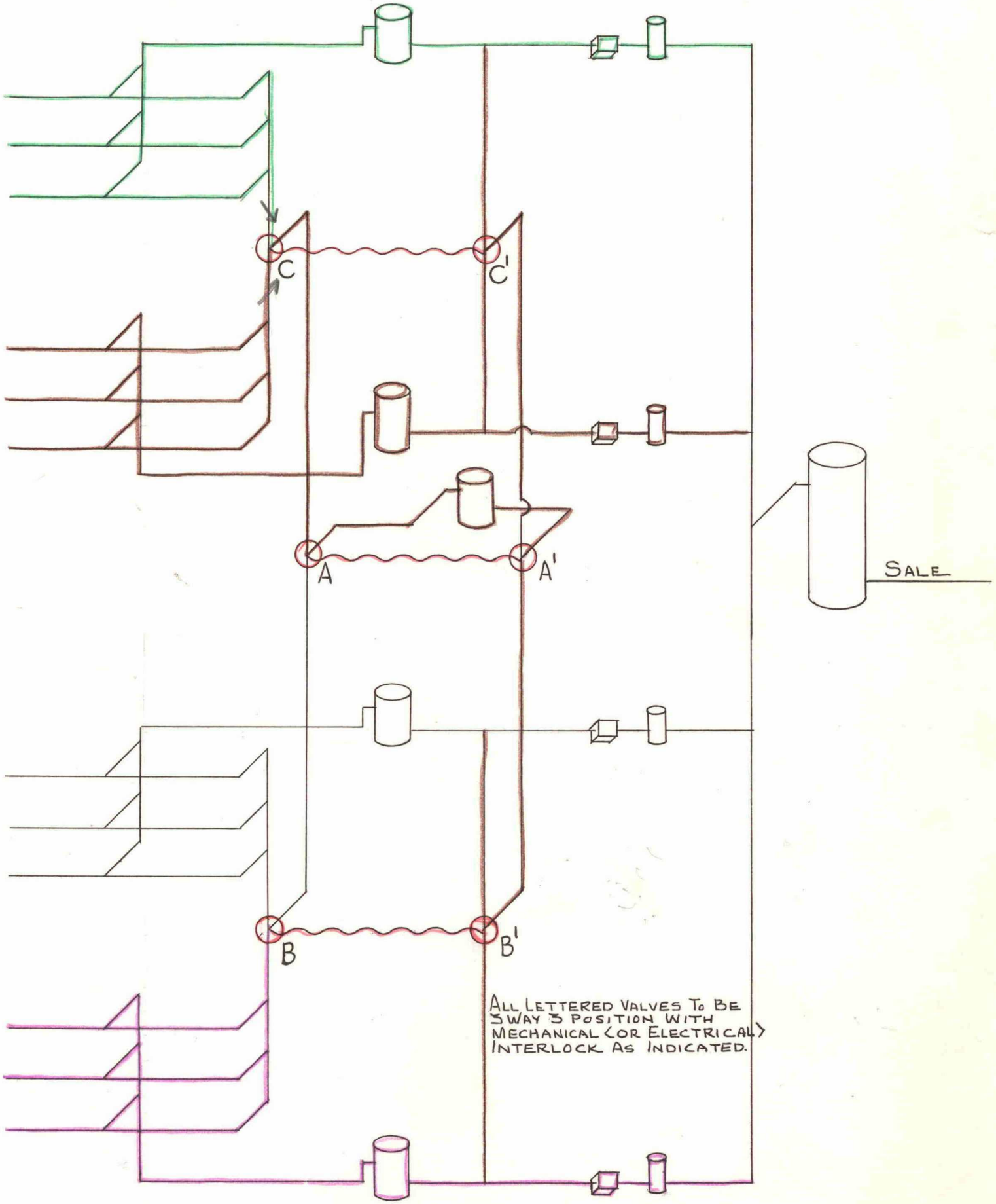
TEXACO Inc.



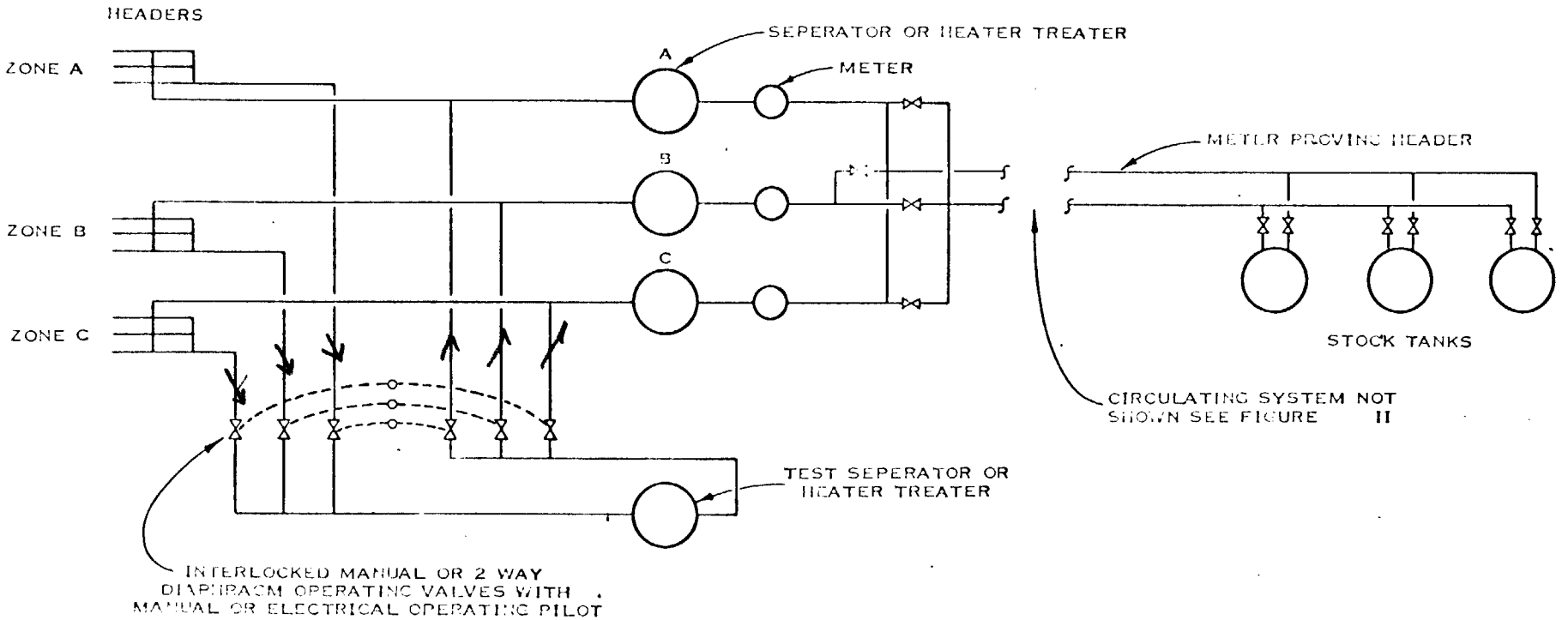
SHELL OIL COMPANY
PROPOSED COMMINGLING
FOR TWO LEASES OR ZONES
WITH ONE TREATER
ALL TOP ALLOWABLE

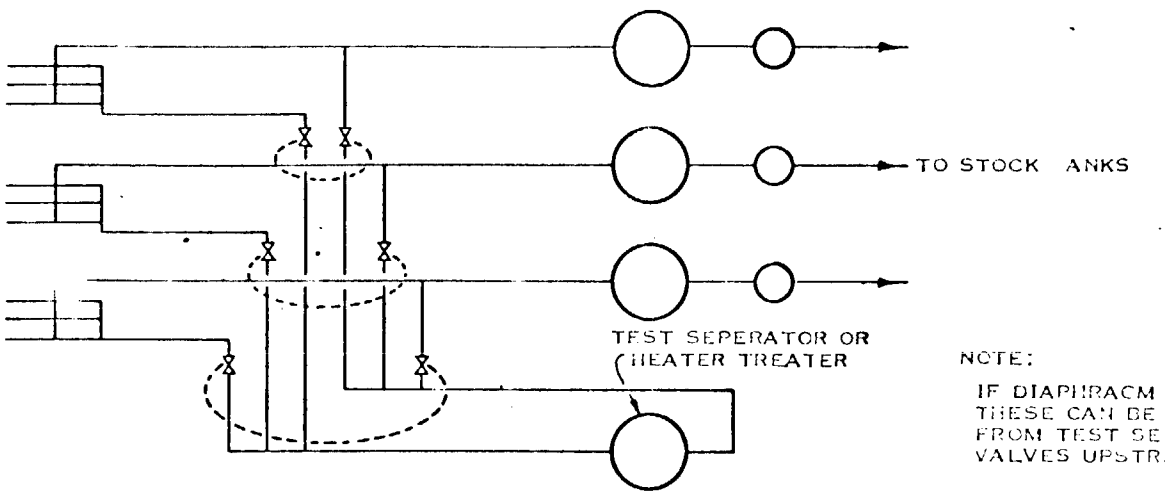


SHELL OIL COMPANY
PROPOSED COMMINGLING
FOR TWO LEASES OR ZONES
WITH TWO TREATERS


C
C'
A
A'
B
B'
SALE
ALL LETTERED VALVES TO BE 3 WAY 3 POSITION WITH MECHANICAL (OR ELECTRICAL) INTERLOCK AS INDICATED.

WELL TEST INSTALLATION FOR COMMINGLING MULTIPLE ZONE LEASES
(COMMON ROYALTY)



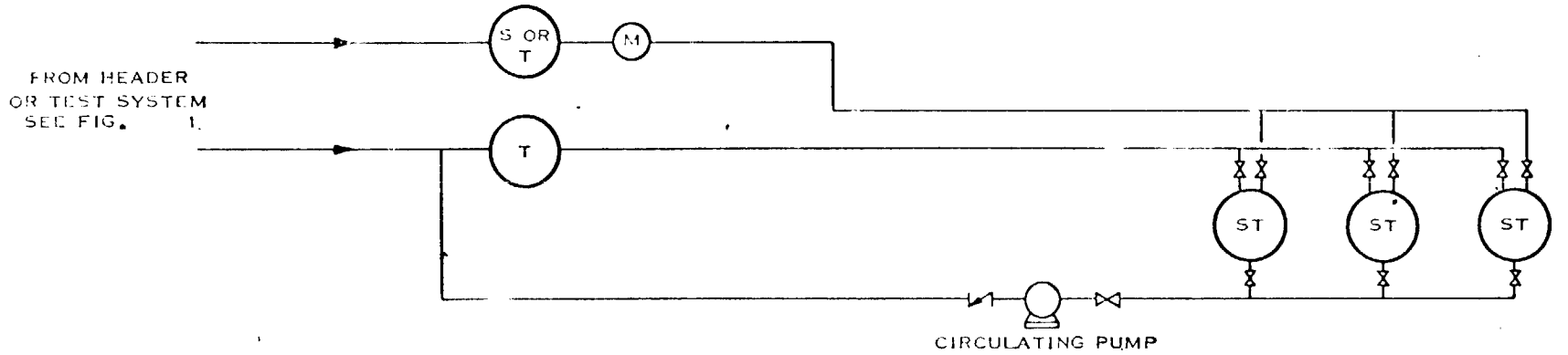


ALTERNATE POSITION OF VALVES
MANUAL OR DIAPHRAGM OPERATED
INTERLOCKED VALVES

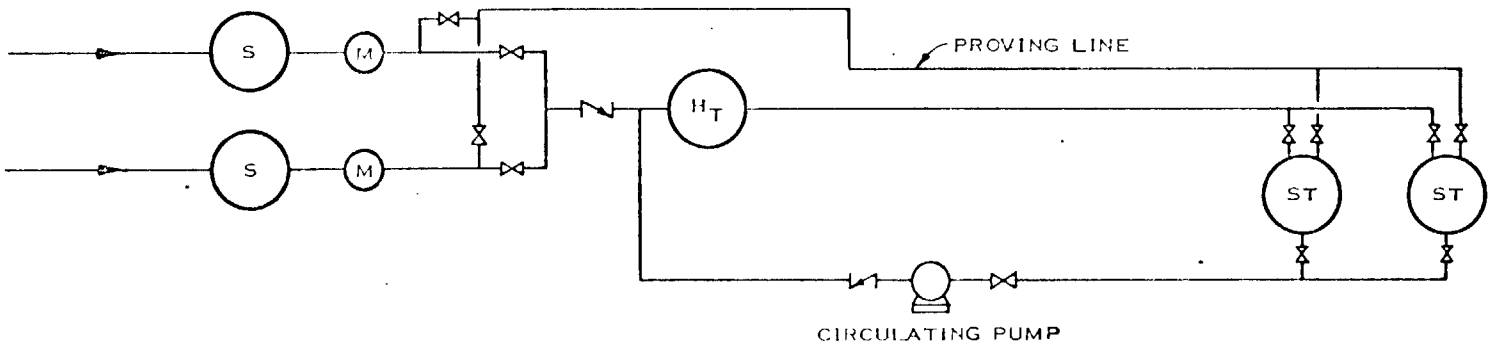
NOTE:
IF DIAPHRAGM THREE WAY VALVES ARE USED IN HEADER, THESE CAN BE INTERLOCKED WITH VALVES DOWNSTREAM FROM TEST SEPERATOR AND ELIMINATE USE OF EXTRA VALVES UPSTREAM OF TEST SEPERATOR.

FIGURE I

CIRCULATING BOTTOMS OR BAD OIL IF ONLY ONE METER USED
(COMMON ROYALTY)



CIRCULATING BOTTOMS OR BAD OIL IF METERING FROM SEPERATOR
(COMMON ROYALTY)



CIRCULATING BOTTOMS OR BAD OIL IF METERING FROM TREATER
(COMMON ROYALTY)

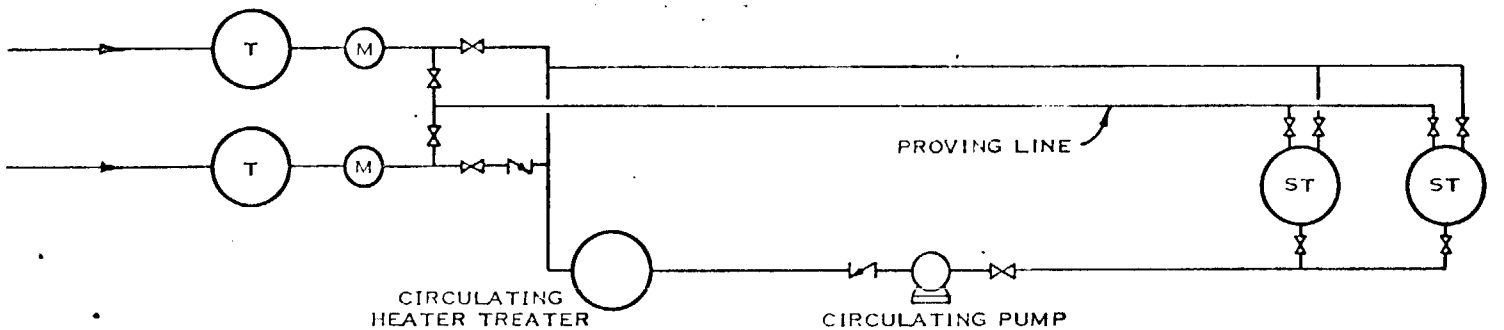
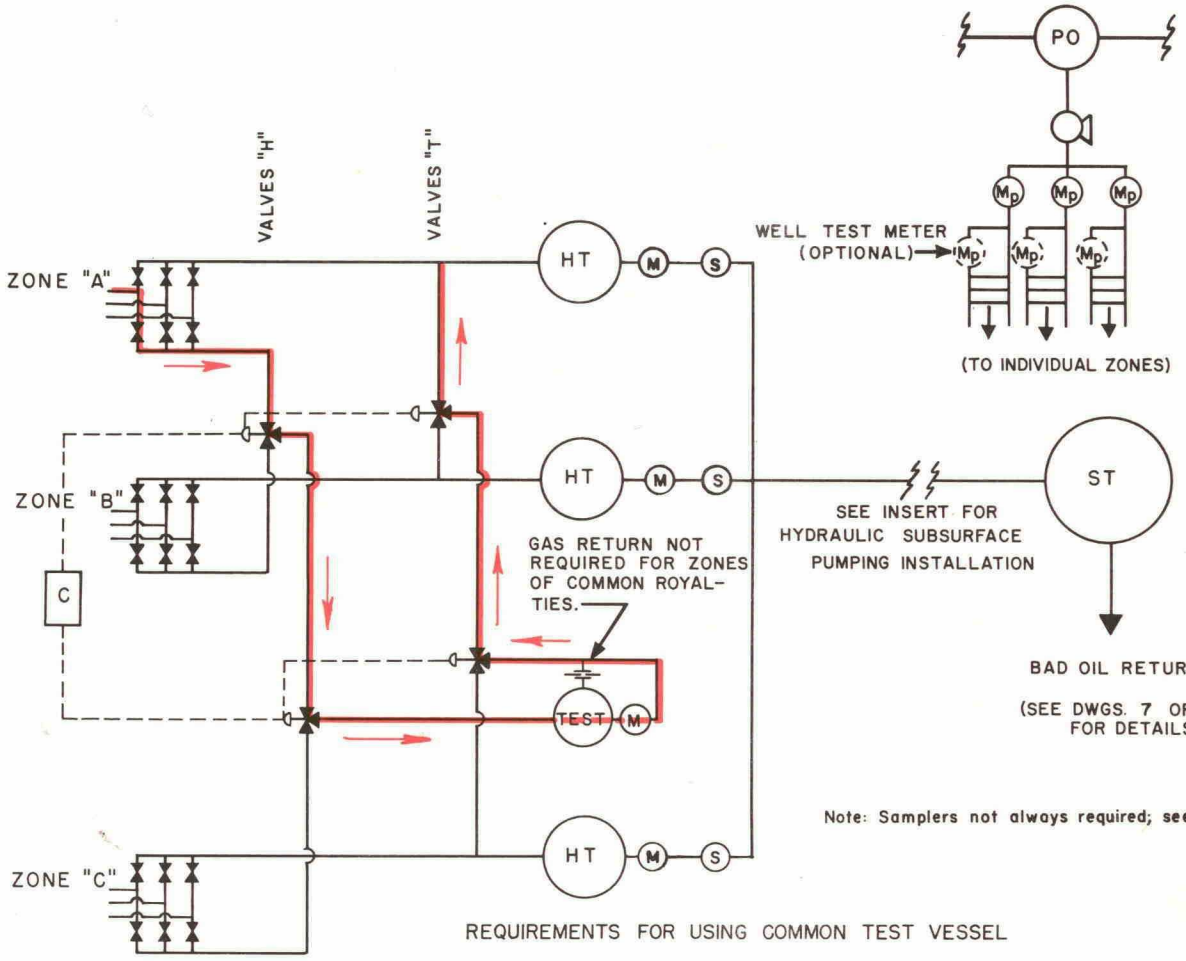


FIGURE II

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



Note: Samplers not always required; see rules.

REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

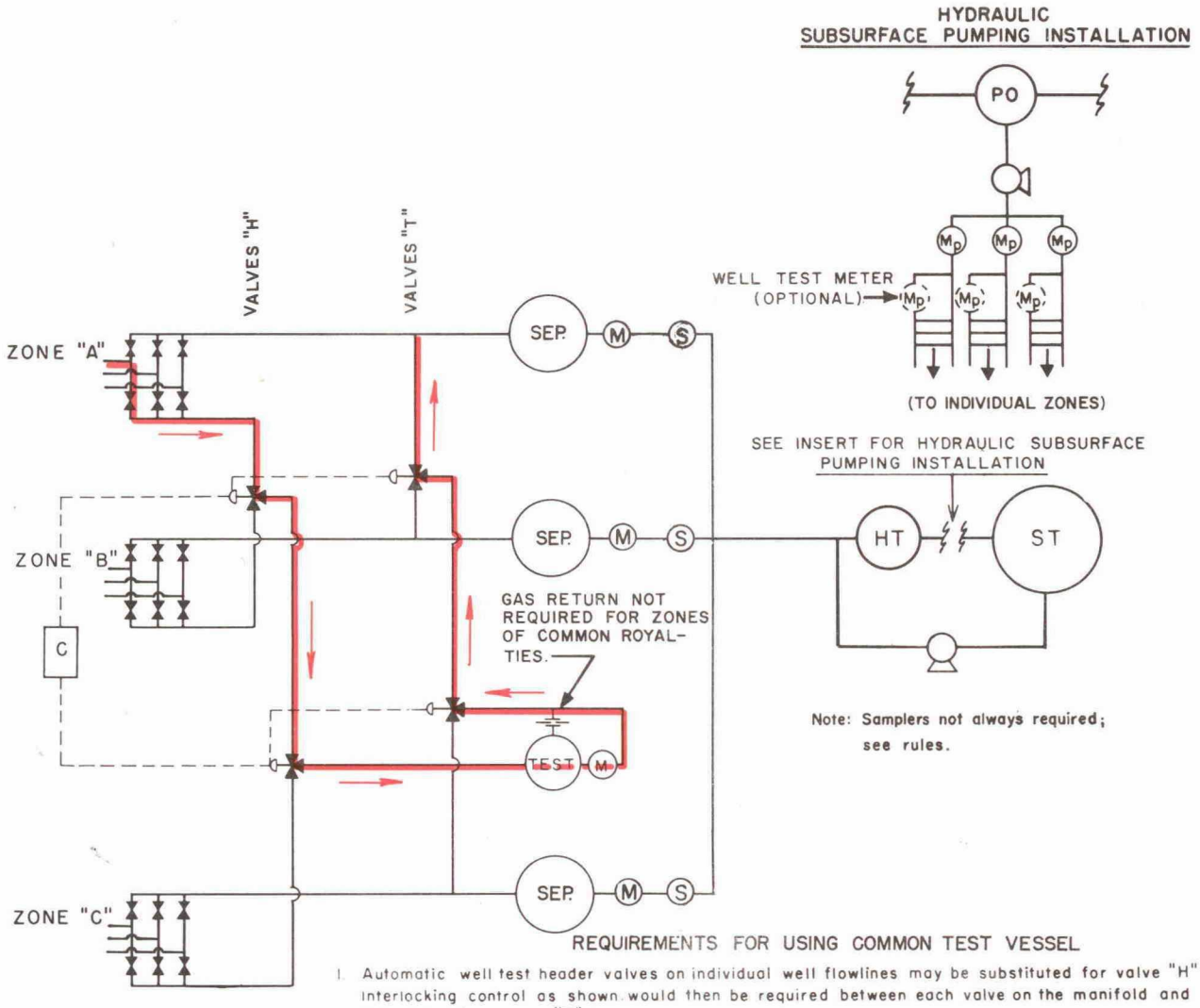
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (S) SAMPLER

Red line indicates path followed by production from a Zone "A" well while on test.

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE OWNERSHIP
NEW MEXICO OIL CONSERVATION COMMISSION MANUAL FOR COMMINGLING
FIG. 1



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T"

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (S) SAMPLER

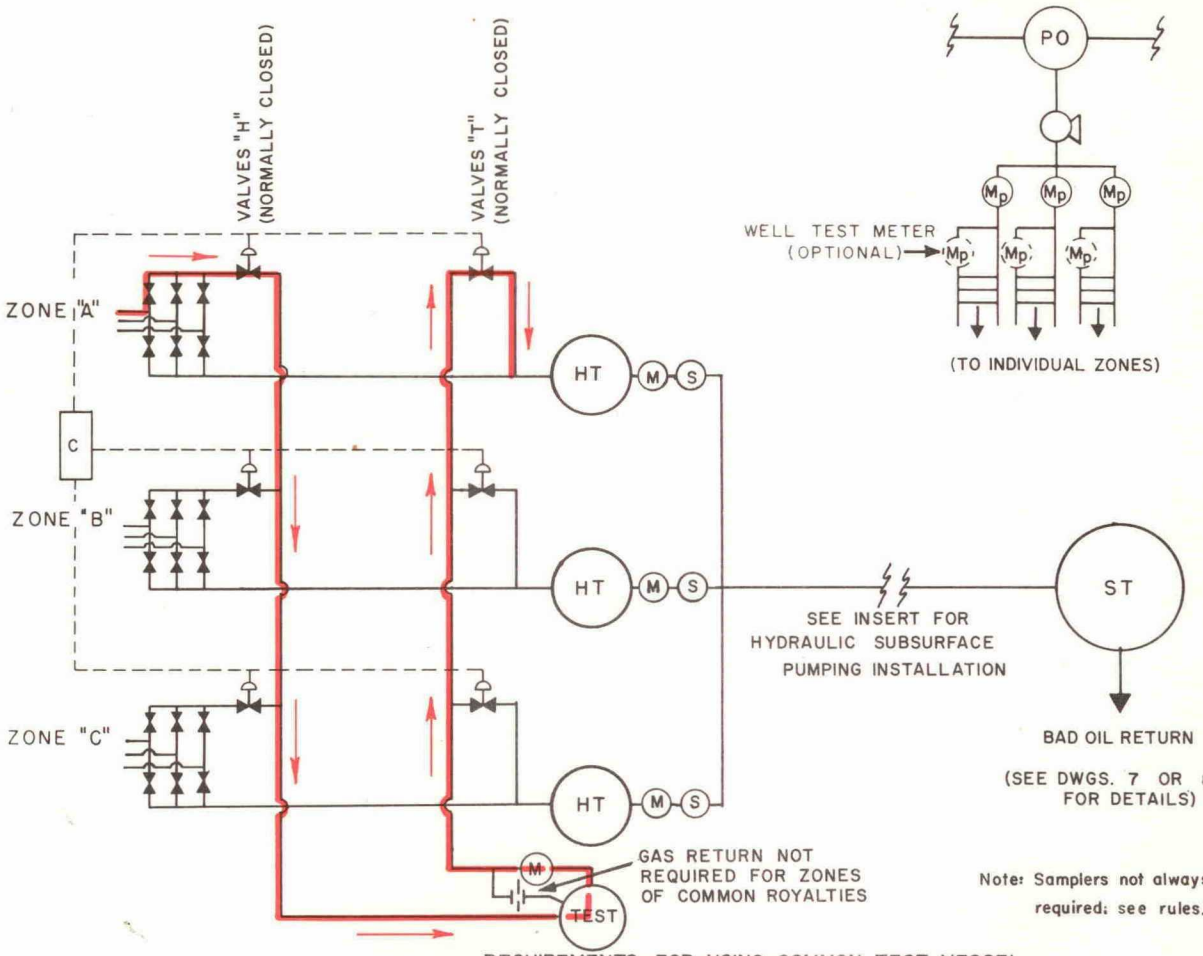
Red line indicates path followed by production from a Zone "A" well while on test.

COMMON TREATER USED IN COMMINGLING
COMMON OR SEPARATE OWNERSHIP

NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING

FIG. 2

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

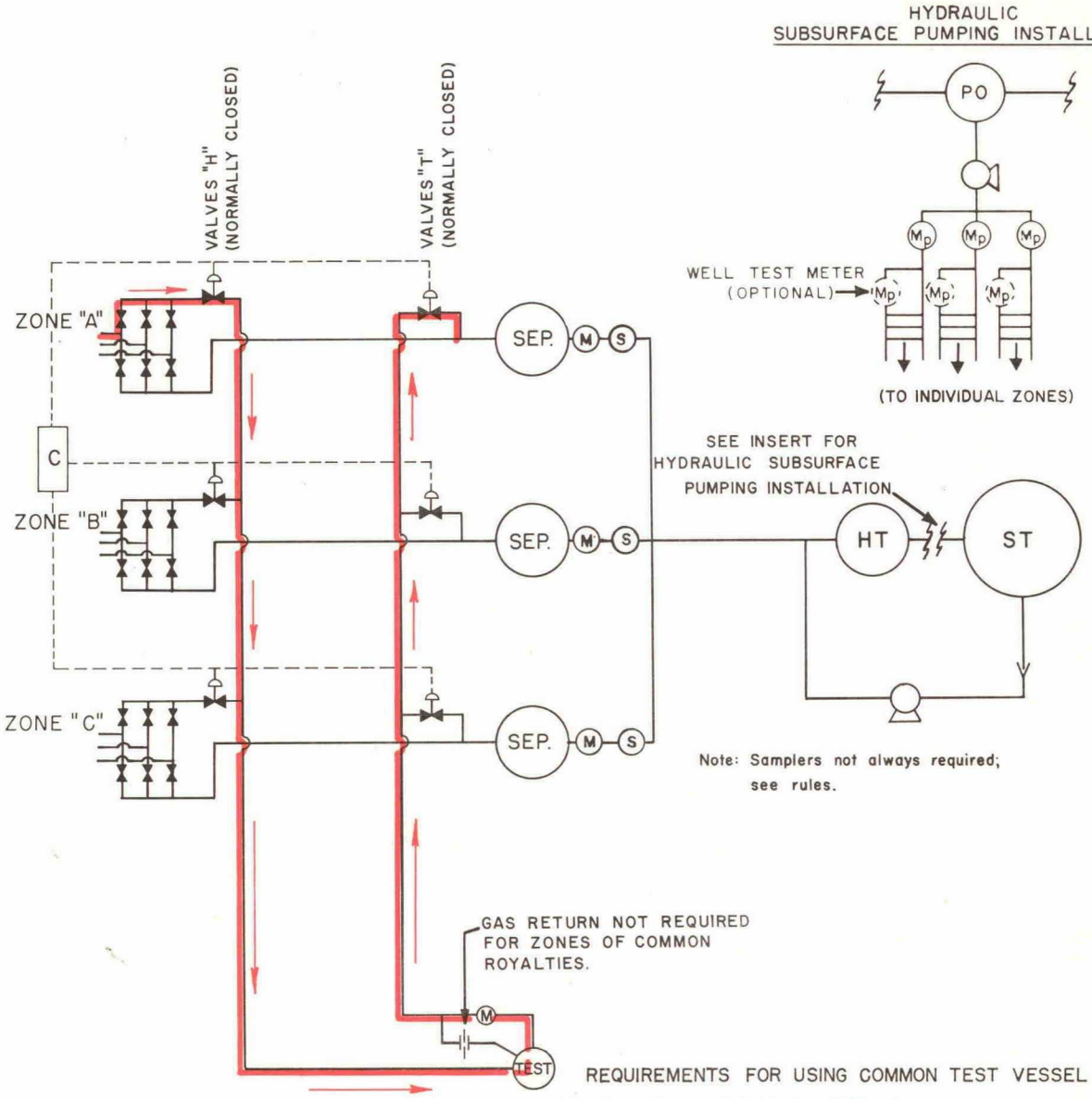
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (S) SAMPLER

Red line indicates path followed by production from a Zone "A" well while on test.

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE OWNERSHIP WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION MANUAL FOR COMMINGLING
FIG. 3



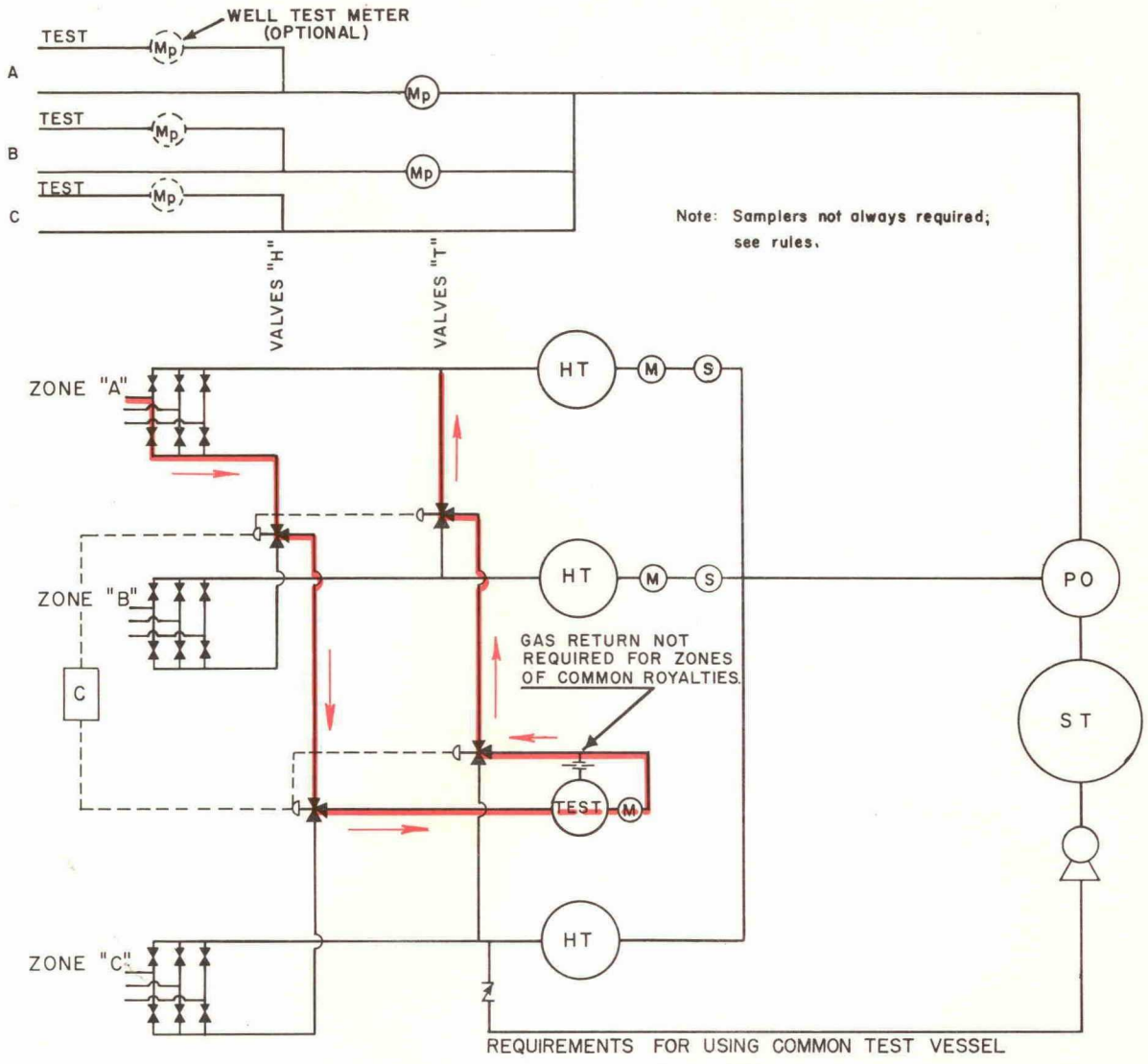
REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — **METER**
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR
- (S) — **SAMPLER**

COMMON TREATER USED IN COMMINGLING COMMON OR SEPARATE OWNERSHIP WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING
FIG. 4



REQUIREMENTS FOR USING COMMON TEST VESSEL

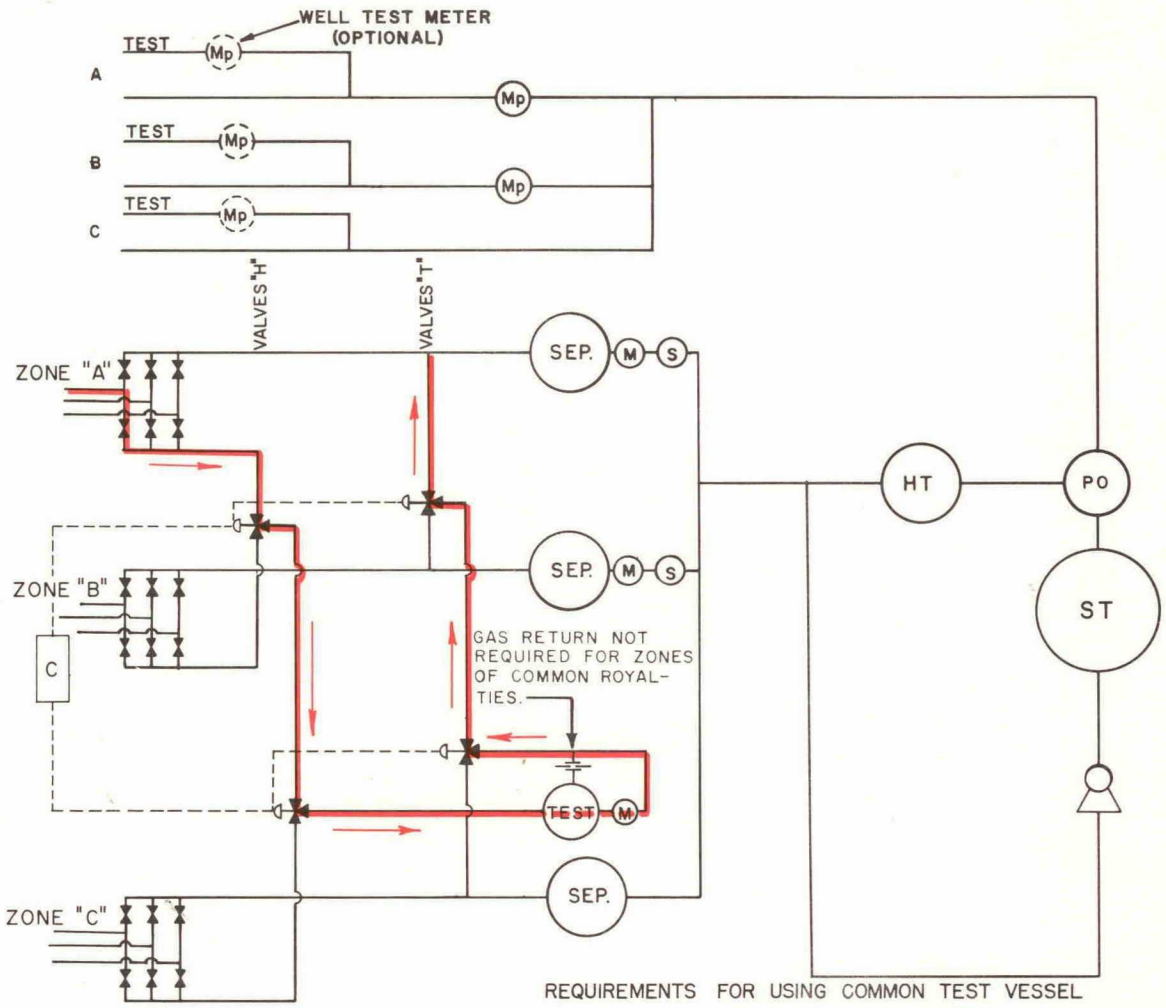
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.
4. If normally closed, two-way valves are to be installed, refer to drawing A-3.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (S) SAMPLER

Red line indicates path followed by production from a Zone "A" well while on test.

INDIVIDUAL TREATERS USED IN COMMINGLING ZONES OF COMMON OWNERSHIP BY SUBTRACTION METHOD
NEW MEXICO OIL CONSERVATION COMMISSION MANUAL FOR COMMINGLING
FIG. 5



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.
4. If normally closed, two-way valves are to be used, refer to drawing A-4.

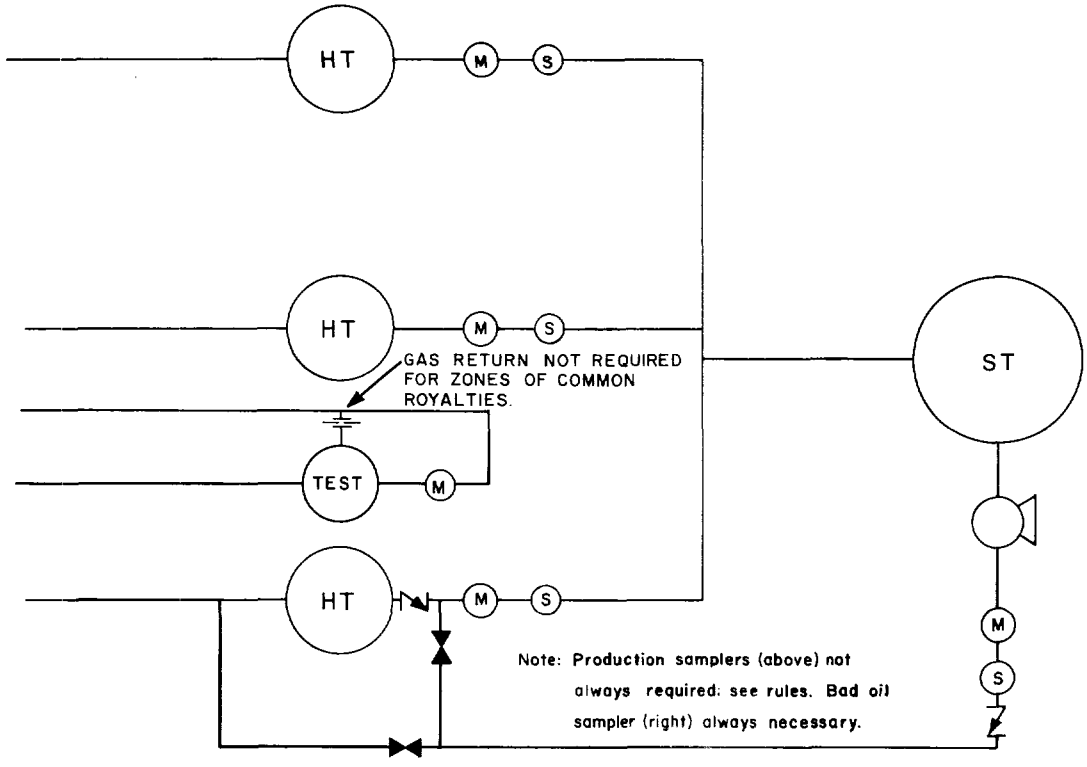
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (S) SAMPLER
- (SEP) SEPARATOR

COMMON TREATER USED IN COMMINGLING ZONES OF COMMON OWNERSHIP BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING

FIG. 6



SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (S) SAMPLER
- (SEP) SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 1)

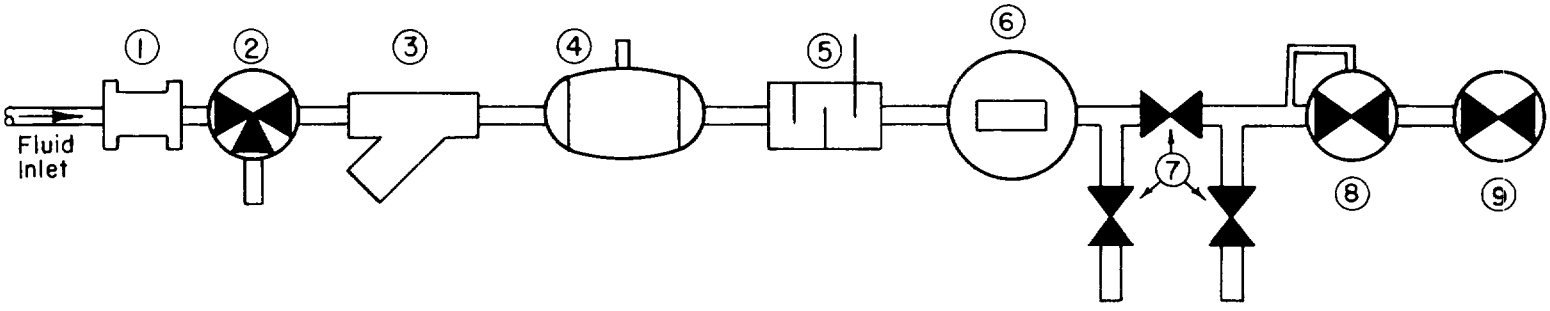
NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING

FIG. 7

Solid red line indicates path followed by production from a Zone "A" well while on test. Dashed red line indicates path followed by bad oil returned from stock tank through test treater. With this installation, wells cannot be tested while bad oil is being re-circulated.

ILLEGIBLE

POSITIVE-DISPLACEMENT METER SYSTEM



LEGEND

① BS & W Monitor (Optional)
② Reroute Valve (Optional) for rerouting non-merchantable oil
③ Strainer
④ Air & Gas Eliminator (If Needed) with Check in Vent
⑤ Sample Probe
⑥ P. D. Meter with Non-Reset Counter
⑦ Proving Connections
⑧ Flow Rate Controller
⑨ Dump Valve

Note:

No. 3 & 4 can be combined
No. 8 & 9 can be combined

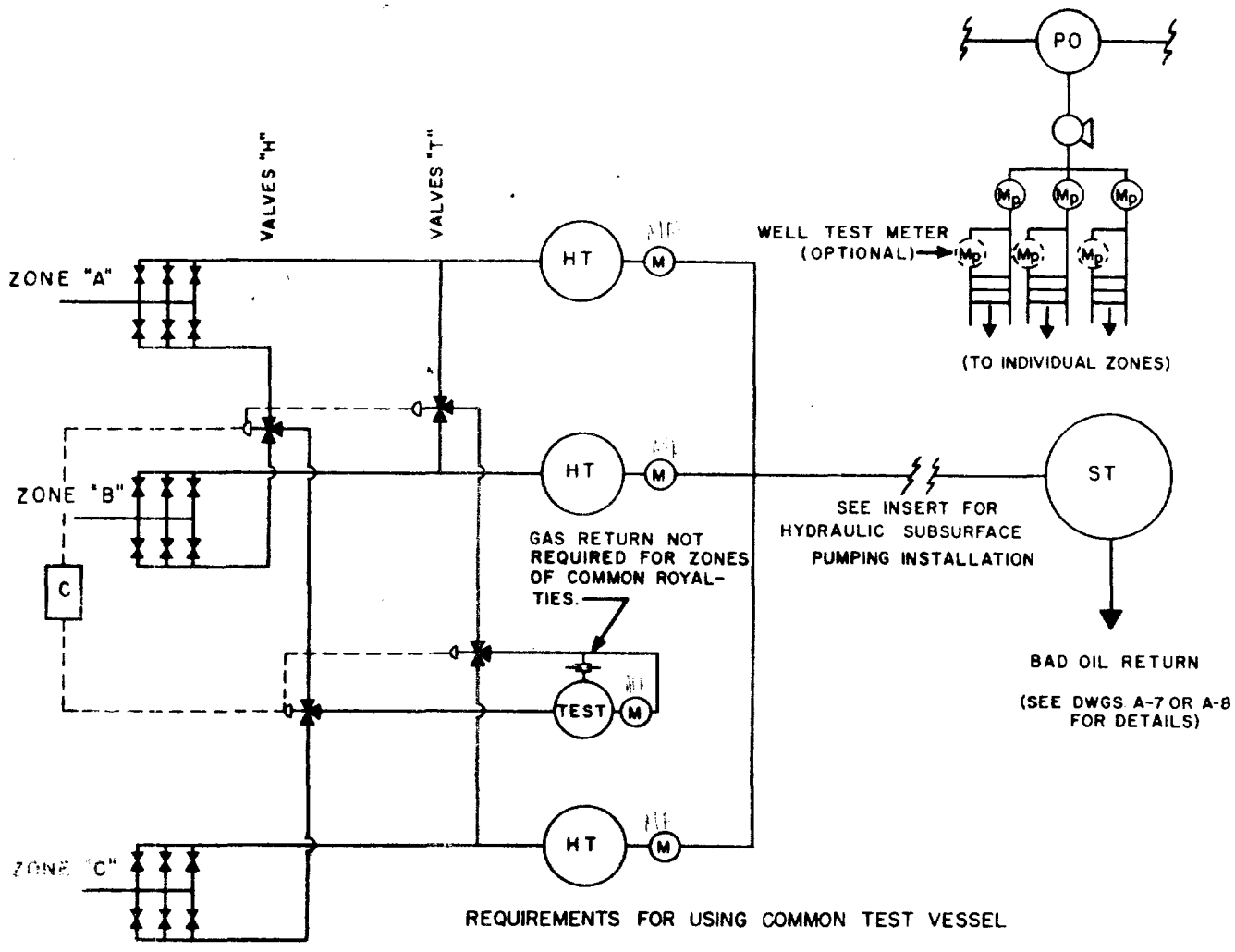
NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING
FIG. 9

ATTACHMENT NO. 1

PART I

Drawings A-1 through A-8

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

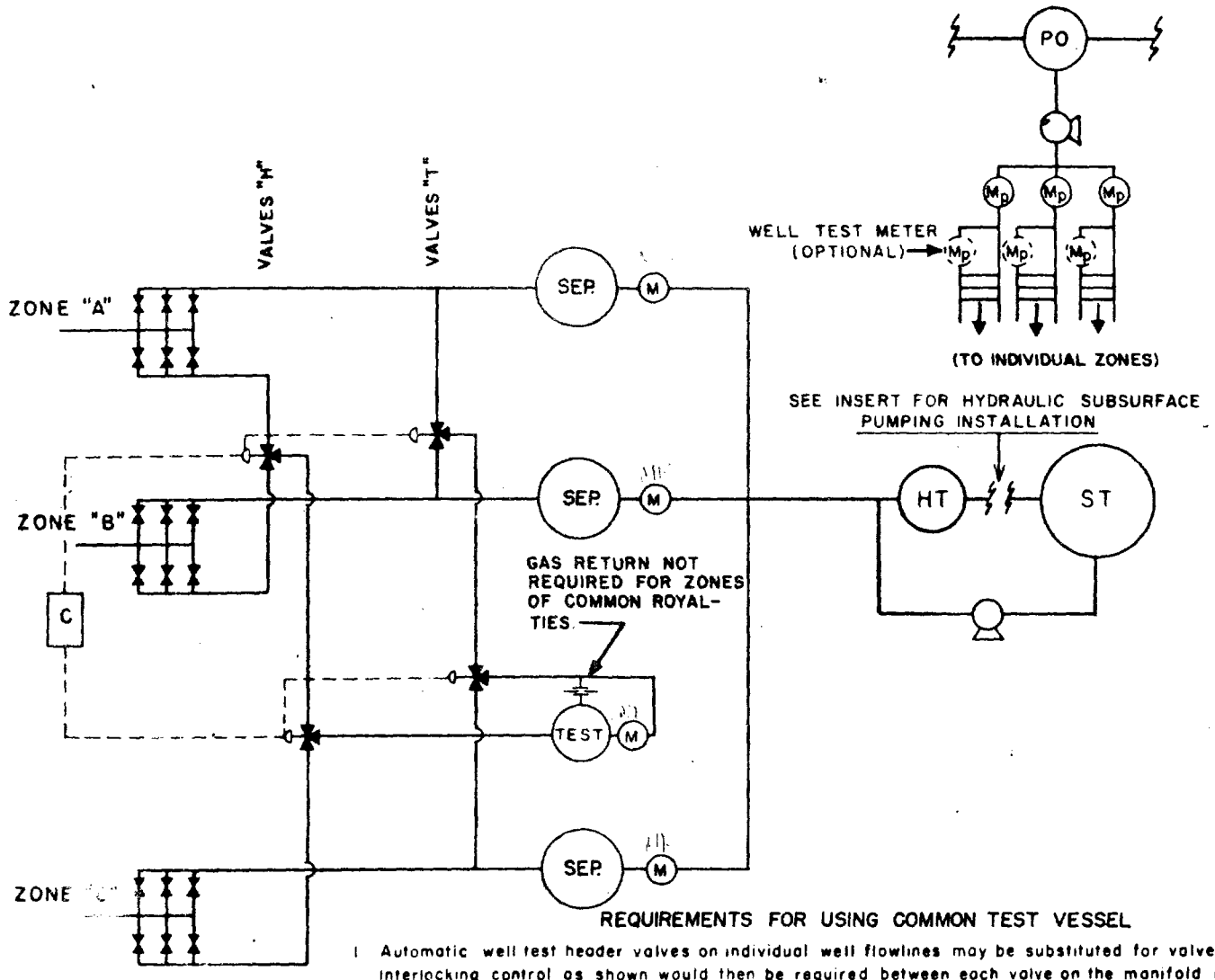
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (MF) LIQUIDS MEASURING FACILITIES (SHALL INCLUDE SAMPLER WHERE APPLICABLE)
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ~~ZONES OF~~ COMMON OR SEPARATE ROYALTIES		
NEW MEXICO OIL CONSERVATION COMMISION (COMMITTEE ON COMINGLING)		
DRAWN: H. M. S. APPROVED REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-1

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T"
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
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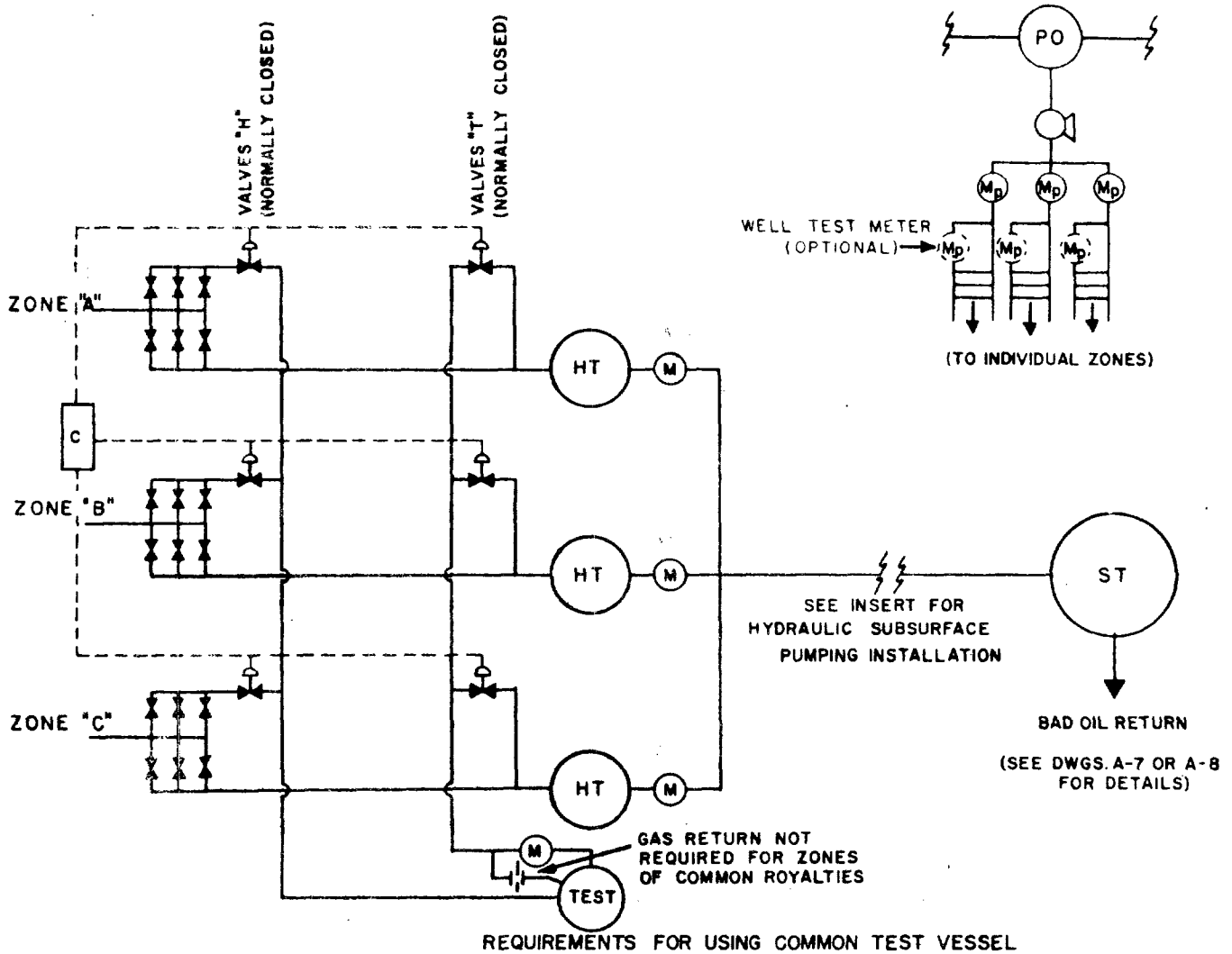
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

COMMON TREATER USED IN COMINGLING ~~ZONES OF~~ COMMON OR SEPARATE ROYALTIES		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S. APPROVED REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-2

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

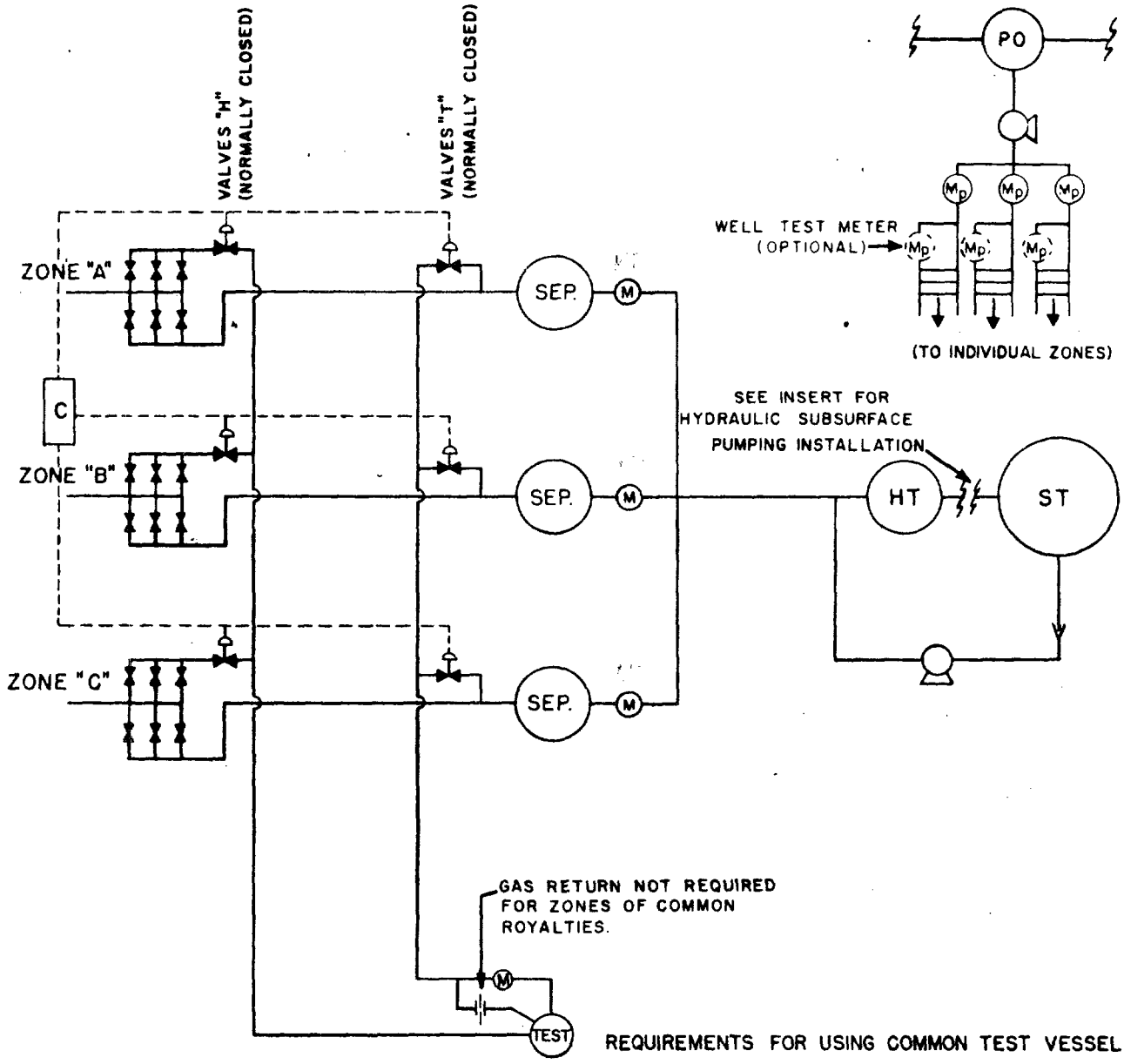
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR

when normally [illegible] three way valves are

INDIVIDUAL TREATERS USED IN COMINGLING ~~ZONES OF~~ COMMON OR SEPARATE ROYALTIES ~~WHEN MANUAL VALVES ARE NOT INSTALLED~~		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S. APPROVED: REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-3

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

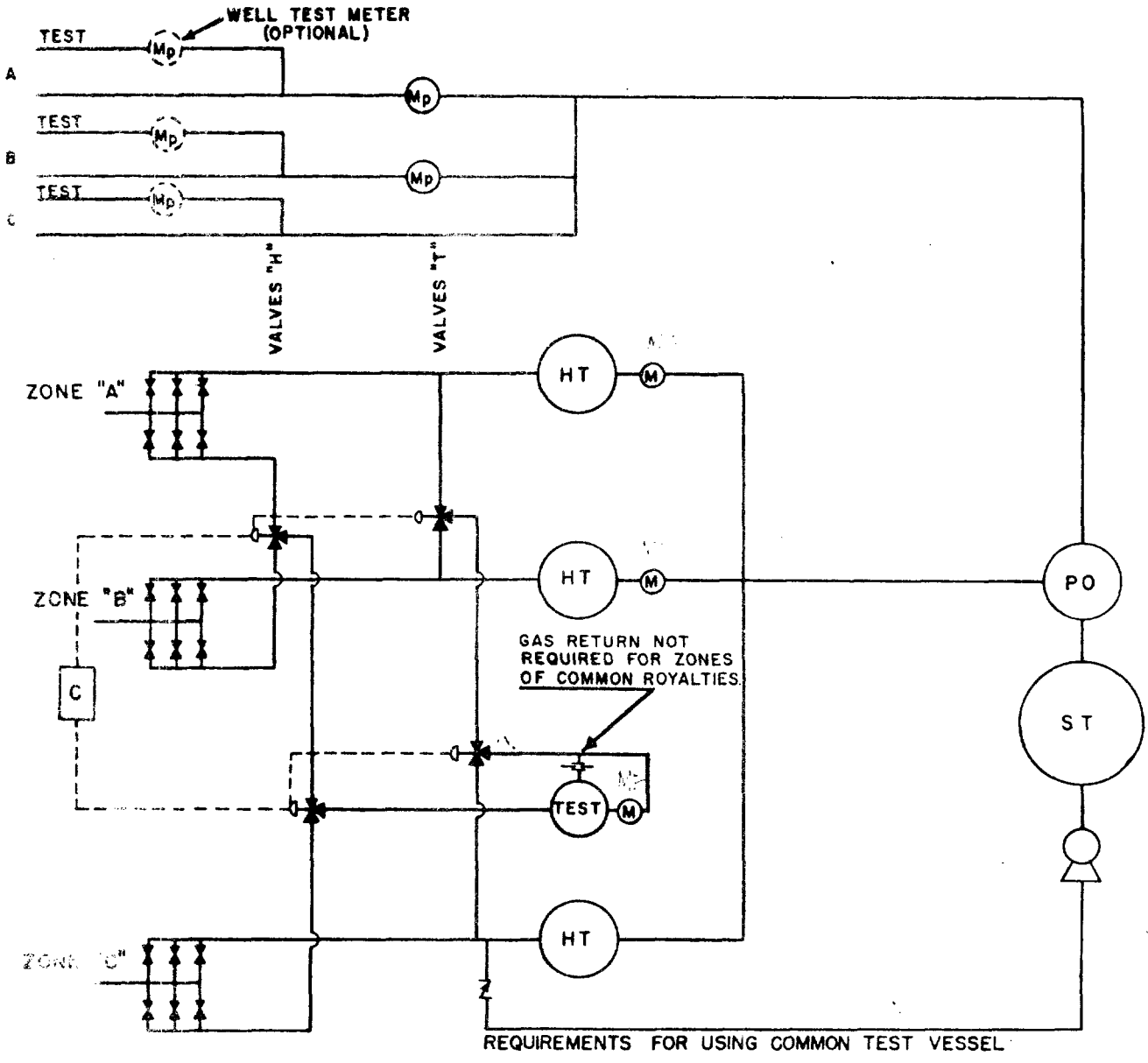
- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR

normal operations [illegible]

COMMON TREATER USED IN COMINGLING ~~ZONES OF~~ COMMON OR SEPARATE ROYALTIES
WHEN ~~MANUAL VALVES ARE NOT INSTALLED~~

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED:		A-4
REVISED		
APPROVED		



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".

2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [c] and control lines to valves are not required if mechanical interlock is provided for manual operation.

3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

4. [illegible] normally [illegible]

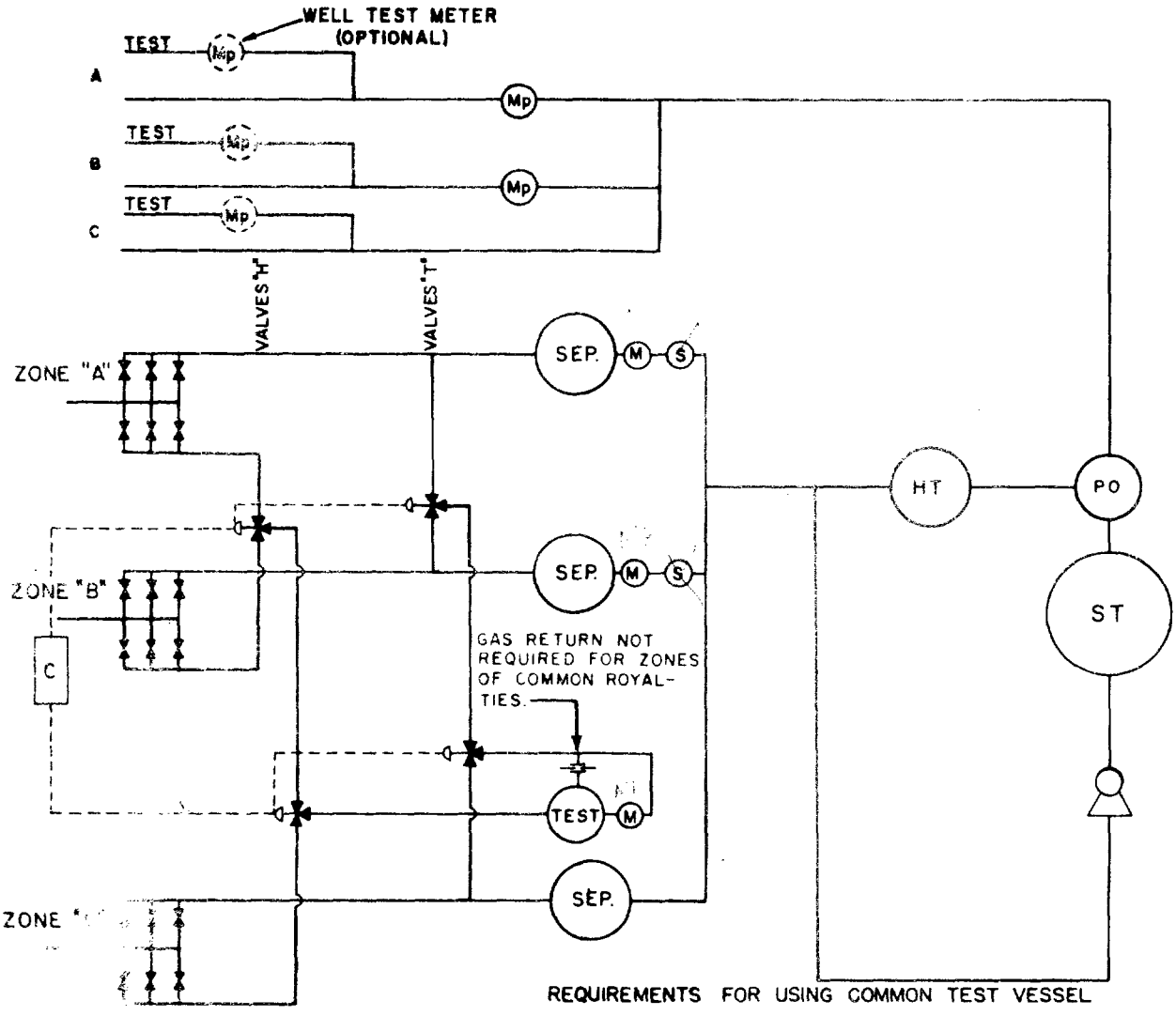
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.	DATE: 5-4-61	DWG.NO.
APPROVED		A-5
REVISED		
APPROVED		



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropiate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

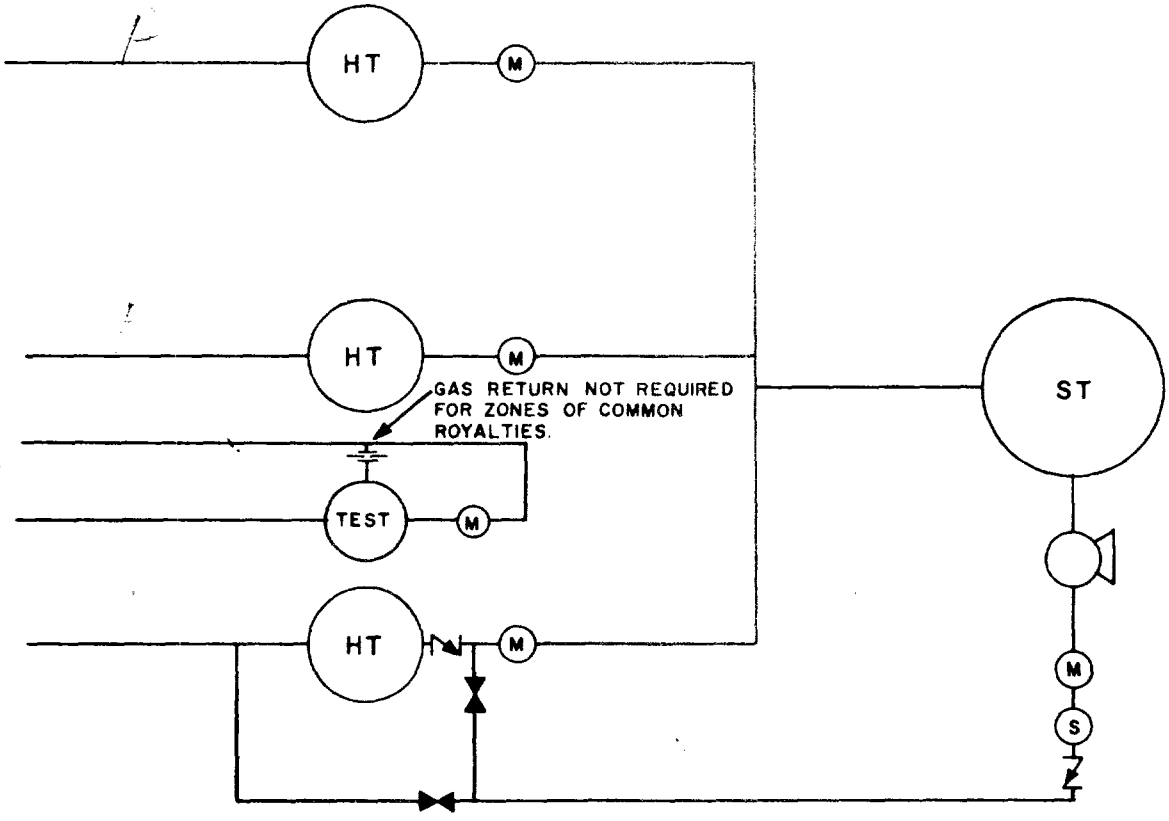
SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) LIQUIDS MEASURING FACILITIES
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (S) SAMPLER
- (SEP) SEPARATOR

COMMON TREATER USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISION
COMMITTEE ON COMINGLING

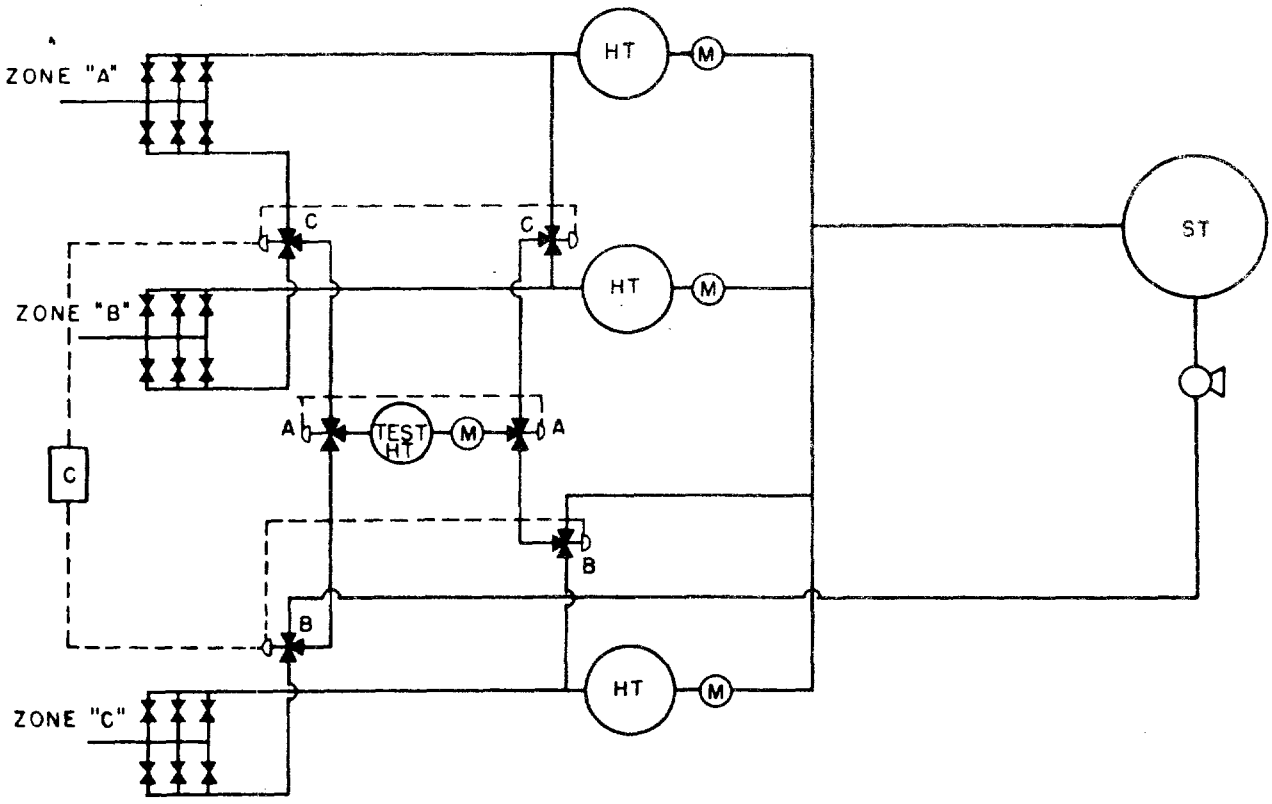
DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-6
REVISED		
APPROVED		



SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- S — SAMPLER
- SEP — SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 1)		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H.M.S. APPROVED REVISED APPROVED	DATE 5-4-61	DWG. NO. A-7



SYMBOLS

- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — LIQUIDS MEASURING FACILITIES
- Mp — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- SEP — SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 2) WHEN TEST TREATER IS INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISION COMMITTEE ON COMINGLING		
DRAWN: H. M. S. APPROVED REVISED APPROVED	DATE: 5-4-61	DWG. NO. A-8

ATTACHMENT NO. 2

PART II

Liquid Measuring Facilities

I ZONE ~~METERING~~ COMMINGLING (Common Royalty)

A. MARGINAL ZONES

B. ~~ALL ZONES METERED~~ (All zones metered)

ZONES WITHIN TOP ALLOWABLE WELLS

Zones in which all wells are below top allowable, commingling will be permitted, with allocation on the basis of periodic well tests.

(1) Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from individual zones to a central tank battery. The counter and meter registering mechanism shall be readily sealable.

(2) Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. ~~The sample container shall be of sufficient volume to store the sample for one month~~ normally or such lesser time as the Commission may approve. Both the sampler and sample container are to be readily sealable.

(3) Zone Production Allocation

a/ If a sampler is utilized, or if BS&W content is less than 2%, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized and BS&W content is 2% or more, the net zone production shall be determined by correcting the gross meter reading for meter factor only. If a sampler is installed on any one zone, then a sampler shall be installed on all zones metering fluid containing 2% or more BS&W.

b/ Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to determination of net zone production

c/ If the summation of the net production from all zones does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the difference will be apportioned to each zone by the ratio that each net zone production bears to the summation of net production from all zones. (See III-E, for Allocation Formula)

(4) Meter Provers and Procedures of Calibration

a/ Any of the following types of provers can be used for calibrating zone meters:

i. Strapped storage tank
ii. Serphin tank
iii. Master meter
iv. Piston displacement meter
v. Any prover facility that is developed having accuracies equivalent to 1-4.

b/ Each ~~zone~~ meter shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part in 100 (1%).

d/ If prover device is not automatically temperature compensated, the prover volume shall be corrected for temperature by correcting the initial and final volumes to 60°F.

C. WITH ALL BUT ONE ZONE METERED (Subtraction Method)

(1) Meter Equipment

Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from the individual zones to a central tank battery. The counter and meter registering mechanisms shall be readily sealable.

(2) Sampling Equipment

Any type of automatic sampler can be used for determining the BS&W content of the metered fluid. The sample container shall be of sufficient volume to store the sample for one month. Both the sampler and sampler container are to be readily sealable.

Samplers shall be required on all metered zones if the zones are metered prior to treatment for BS&W; however, samplers will not be required on the metered zones that have individual treating systems for removal of BS&W prior to metering.

(3) Zone Production Allocation

If a sampler is utilized, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor; however, if a sampler is not utilized, the net zone production shall be determined by correcting the gross meter reading for meter factor only. The unmetered zone production will be equal to the net pipeline runs, with beginning and ending stock adjustments, minus the summation of the net production from all metered zones corrected for meter factor and if a sampler is utilized, a correction for BS&W will be applied.

(4) Meter Provers and Procedures of Calibration

a/ The meter shall be calibrated into any vessel which simulates actual run conditions. The prover volume shall be weathered as long as the oil is normally retained in storage, not to exceed 24 hours.

b/ Each ~~zone~~ meter used in zone accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part of 100 (1%).

d/ Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60°F.

II LEASE OR ZONE ~~METERING~~ COMMINGLING (Royalty not common)

A. GENERAL REQUIREMENTS

The word lease used hereafter shall mean any lease or zone where the royalty is not common.

Metering facilities for the transfer of liquid hydrocarbons between individual leases or zones to a central tank battery shall provide proper means for quality determination (where required), net volume determination, fail-safe operation, and shall meet the requirements listed below. The overall accuracy of the system must equal or surpass the present hand gauging methods used in oil custody transfer.

(1) Meter Equipment

Any meter that has been previously authorized for use in an automatic custody transfer system by the New Mexico Oil Conservation Commission or otherwise approved can be used for the transfer of liquid hydrocarbons from individual leases to a central tank battery. The counter and meter registering mechanism shall be readily sealable. All measured volumes shall be corrected to a base temperature of 60°F. Temperature compensation for temperature-corrected meters shall conform with ASME-API Code 1101. Temperature measurement for correction of volume measured by tank or ~~un~~ non-temperature-compensated meter to standard temperature shall be made in accordance with API Standard 2500, "Part IV - Automatic Temperature Devices".

The meter shall be equipped with a non-reset counter.

All types of meter installations must meet certain fundamental requirements. These include accurate proving facilities; adequate protective devices, such as strainers, relief valves, and air or vapor eliminators; and dependable pressure and flow controls. A further fundamental installation requirement is that physical conditions during proving should simulate actual operating conditions.

a Each positive displacement meter system shall be equipped with the following auxiliary equipment, except the items indicated as optional. (See drawing on positive-displacement meter system.)

1/ BS&W Monitor and Reroute Control Valve (Both items optional)

2/ Strainer - A strainer shall be installed to remove from the liquid entrained particles which could stop or cause premature wear of the metering mechanism. However, where the liquid is clean, or where the type of meter installed does not require or warrant protection, the elimination of a strainer may be possible.

3/ Air and Gas Eliminator - (Optional) The system shall be installed in such a manner as to prevent passage of air or vapor through the meter. Combination air eliminators and strainers can be used.

4/ Sample Probe - Refer to section entitled "Sampling Equipment" for more detailed information on the sample probe.

5/ ~~P. D. Meter - The meter shall be equipped with a [redacted] counter registering in barrels.~~

6/ Proving Connections - See section entitled "Meter Provers and Procedures of Calibration" for more detailed information on proving requirements.

7/ Flow-Rate Controller - It is essential that the system be so designed as to provide an adequate head at the meter and to provide a sufficiently constant flow through the meter to insure that the rate of flow is in accurate range of the meter. ~~An automatic device such as a flow-rate controller~~ or restricting orifice shall be installed down-stream from the meter to prevent flows in excess of the maximum rated capacity of the meter. Where a pressure-reducing means is required on the inlet side of a meter, it shall be installed as far upstream of the meter as possible. It shall be adjusted so that sufficient pressure will be maintained on the outlet side of ~~the meter to prevent any vaporization~~ of the metered liquid.

8/ Dump Valve - In intermittent flow installations, the outlet control valve or dump valve must provide a positive shut-off to prevent drainage of the separator or treating system. Single-seated valves are recommended for this service. In continuous flow installations, pilot-operated or mechanically float-operated valves can be used. Pilot-operated valves shall be of the snap-acting, normally closed type; i.e., closing with pilot supply failure. The meter will be installed in the stream between the ~~separator~~ separating vessel and its dump valve to maintain adequate pressure on the liquid while metering.

(b) A positive volume or dump meter system shall be equipped with a sample probe, dump meter and proving connections. (See the following sections on "Sampling Equipment", meter provers and procedures of calibration for further details on the sample

probe and proving connections.) The internal walls of the dump meter should be as self-cleaning as possible in order that corrosion products, paraffin, and foreign matter will not collect inside the tank. Provision must be made for accurate determination in recording of uncorrected volume and average temperature, or of temperature-corrected volume.

(2) Sampling Equipment

Provision shall be made for representative sampling of the fluid transferred from each individual lease for determination of the BS&W content, and, if needed, for the determination of API Gravity. The lease oil handling arrangement must remove gas and sufficient free water prior to metering to insure that the oil, when measured, is sufficiently free from volatile fractions and water to permit accurate measurement and sampling. Since acceptable automatic samplers may be designed and constructed in a variety of shapes and forms, no attempt has been made to limit the mechanical design or materials employed to accomplish a satisfactory result. However, when the metering and sampling system is installed prior to treatment for removal of BS&W, a continuous type sampler shall be employed. A continuous sampler is defined as one which is designed and operated so as to transfer equal increments of liquid from the metered stream to the sample container at a uniform rate ~~of two or more increments per cycle or separator dump. Since some stratification of the liquid can occur in the separator, the two or more sample withdrawals per dump should be taken at various times during the dump cycle.~~

The sample probe and sample container shall meet requirements of API Standard 2500, Part V, Paragraph 1402 through 1403.2; either a closed or atmospheric type container can be used unless determination of API Gravity is necessary, in which case a closed container shall be used. The sample container shall be of sufficient volume to store the sample for one month and shall be equipped with gauge glasses or some other suitable device for visually determining the amount of sample at any time during the month. Both the sampler and sample container shall be readily sealable.

(3) Lease Production Allocation

Net lease production shall be determined by correcting the gross meter reading for BS&W content, meter factor and for temperature if an automatic temperature compensator is not utilized. If the summation of the net production of all leases does not agree with the net pipeline runs, with beginning and ending stock adjustments, then the ~~difference~~ will be apportioned to each lease by the ratio that each net lease production bears to the summation of net production from all leases (Refer to formula in III-B).

(4) Meter Provers and Procedures of Calibration

a/ Each meter used in lease accounting shall be proved monthly until adequate history of performance has been established to merit extension of the proving frequency.

b/ The proving system shall, ~~provide good flexibility, and in all cases the proving of meters shall,~~ as nearly as possible, simulate actual operating conditions. When open proving equipment is used, a meter-proving connection shall be installed and suitably valved so that flow may be diverted into the prover and still maintain the normal operating meter pressure and flow rate. Where closed proving equipment is used, a meter-proving connection may be installed upstream or down-stream of the liquid outlet control valve; however, means shall be provided to maintain the normal operating meter pressure and flow rate. Any of the following types of provers can be used for calibrating lease meters.

i. Positive displacement master meter: refer to API Standard 1101, Section III, Paragraphs 3036 and 3037. The master meter shall be proved at least every six months. ~~by a licensed company with proving equipment that has been approved by at least two pipeline carriers.~~ The minimum time for proving a lease meter with a master meter is the time required to produce at least 30 barrels or a ~~minimum~~ duration of 24 hours.

ii. ~~Strapped~~ Calibrated storage tank - A surge tank or storage tank may be used as the prover tank if the following described conditions can be met. A suitable portion of the surge tank should be equipped with sight glasses, graduated scales and thermometers. The surge tank portion to be so used should be calibrated by water displacement or other methods yielding equivalent accuracy. The minimum surge tank capacity so used is established by two factors. First, the diameter should be sufficient to provide the required volume within limits fixed by the second factor; namely, that the value of the maximum gauge-glass reading error, when expressed as a percentage of error by volume ratio in terms of depth of surge tank so used, shall not exceed 0.05% by volume, thus establishing the minimum depth of surge tank required. (In general, it is suggested that the minimum surge tank capacity so used should be not less than 10 times the maximum rated volume delivered per minute by the largest meter to be proved. It is also suggested that if the surge tank is to be calibrated by field-strapping methods, the portion of the surge tank used should be free insofar as possible from appreciable

API

changes in volume per increment, caused by items such as manhole boxes, significant intermediate dead-wood displacement, etc.)

iii. All proving devices described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met. ~~The proving device shall be calibrated and inspected annually until adequate history of performance warrants extension of the calibration and inspection interval.~~

c/ If prover device is not automatically temperature compensated the prover volume shall be corrected to 60°F.

III GENERAL REQUIREMENTS FOR ALL METERING SYSTEMS

A. The operator shall be required, for each meter~~ing system~~ used for accounting, to submit monthly with the C-115 Form or as an alternate keep records of the following items for a period to be specified by the Oil Conservation Commission.

(1) Beginning and ending readings of non-reset meter counter.

(2) Meter factor

(3) Percent BS&W

(4) Load oil movements and/or power oil

(5) Remarks (Explain load oil movements and/or meter or counter malfunctions.)

B. ALLOCATION FORMULA

$$Z'_1 = \frac{Z_1 \times A}{\Sigma Z's}$$

Where:

Z'_1 = Adjusted Net zone or lease production chargeable to the zone or lease allowable.

Z_1 = Net zone or lease production corrected for meter factor and BS&W, if applicable.

$\Sigma Z's$ = Summation of all zones or leases corrected for meter factor and BS&W, if applicable.

A = Net pipe line runs with beginning and ending stock adjustments

Example: 3 Zones or Leases

Z_1 = 500 bbls.

Z_2 = 500 bbls.

Z_3 = 500 bbls.

ΣZ's = 1500 bbls.

A = 1530 bbls.

Then:

$$Z'_1 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

$$Z'_2 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

$$Z'_3 = \frac{500 \times 1530}{1500} = 510 \text{ bbls.}$$

(c) Net power oil and/or load oil recycled with ~~and/or load oil~~ will be subtracted after the lease or zone meter is corrected for meter factor and BS&W.

(d) Meter Proving facilities must discharge downstream from any meter used for accounting.

(e) If the piping arrangement submitted with the commingling application does not conform with the piping arrangement actually installed, a drawing showing the revised piping arrangement shall be submitted to the Comm. for approval.

(f) No connecting lines between zones or leases other than those shown on Drawings A-1 through A-8 or lines around meters shall be permitted.

Midland, Texas
May 5, 1961

Mr. John Yuronka
Texas Pacific Coal & Oil Company
P. O. Box 4067
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Mr. Joe Ramey
Supervisor and Proration Manager
P. O. Box 2045
Hobbs, New Mexico

Mr. J. E. Robinson, Jr.
Texaco, Inc.
P. O. Box 3109
Midland, Texas

Mr. J. E. York
Pan American Petroleum Corp.
P. O. Box 268
Lubbock, Texas

Mr. Rex Schropp
Phillips Petroleum Company
Adams Building
Bartlesville, Oklahoma

Mr. Harold Frost
Atlantic Refining Company
P. O. Box 1610
Midland, Texas

Mr. Dan Nutter
Chief Engineer
P. O. Box 871
Santa Fe, New Mexico

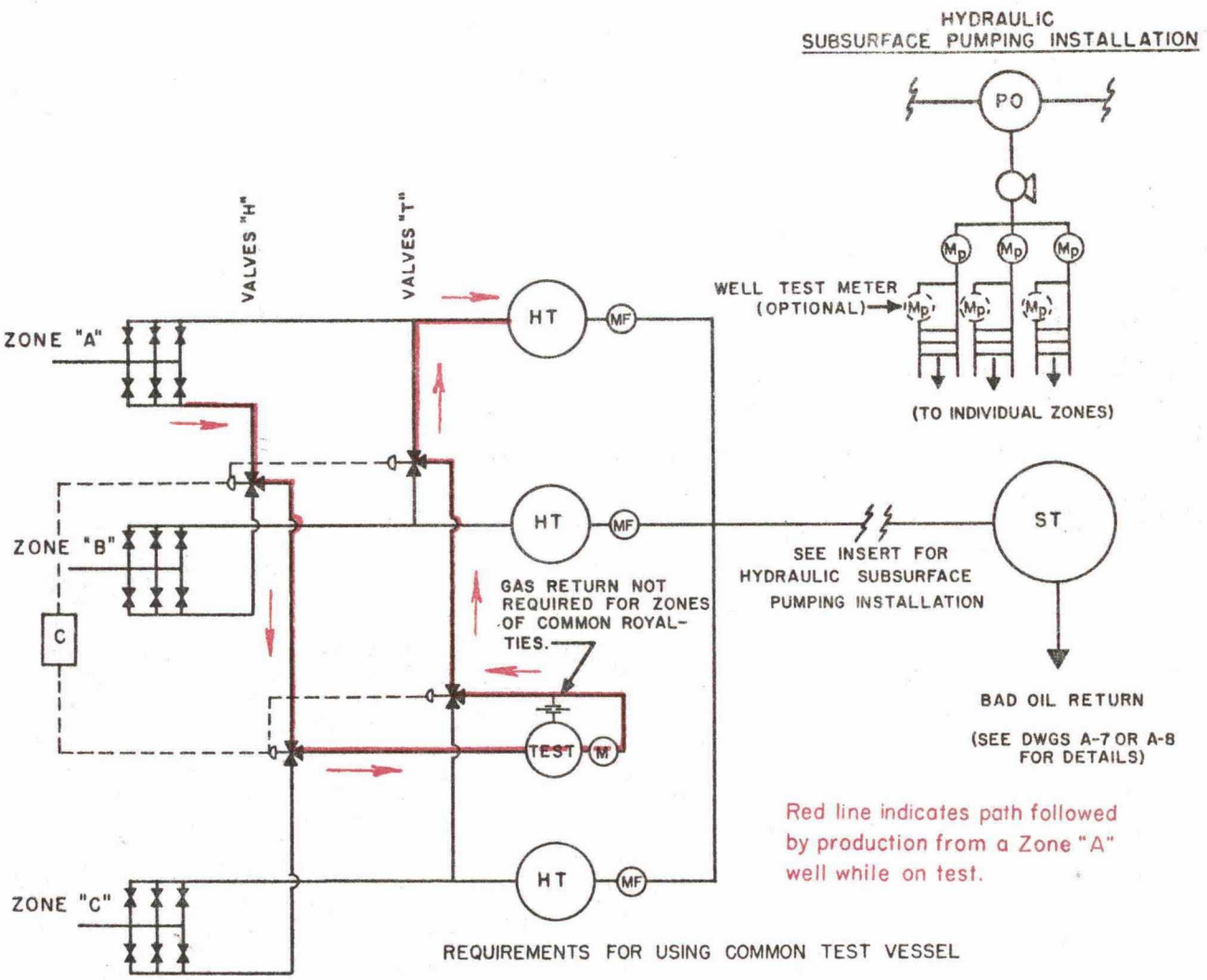
Gentlemen:

Attached for your review is a set of drawings A-1 through A-8 prepared from layouts developed at the Work Group Meeting of April 27, 1961. It is requested that you submit comments not later than May 11, 1961 on these proposed arrangements of equipment to insure proper handling of fluids produced in commingling operations in New Mexico. Final reproductions in reduced size will be prepared for the next Committee meeting on May 18, 1961.

Yours very truly,

W. M. O'Reilly
W. M. O'Reilly
Chairman of Special Work Group

WMO'R/cr



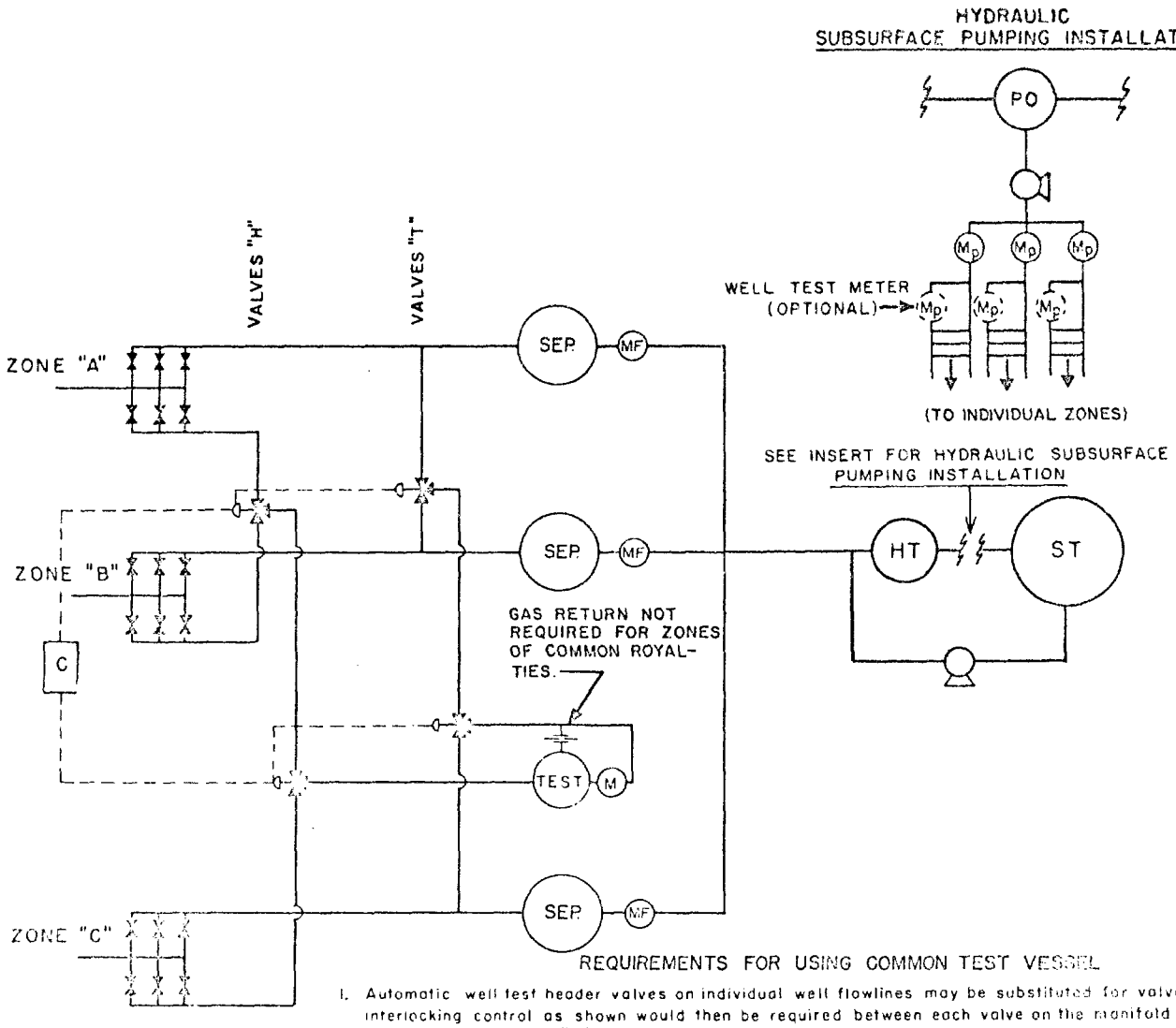
REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — TEST METER
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR
- (MF) — METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-1



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H" interlocking control as shown would then be required between each valve on the manifold and the respective valve "T"

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

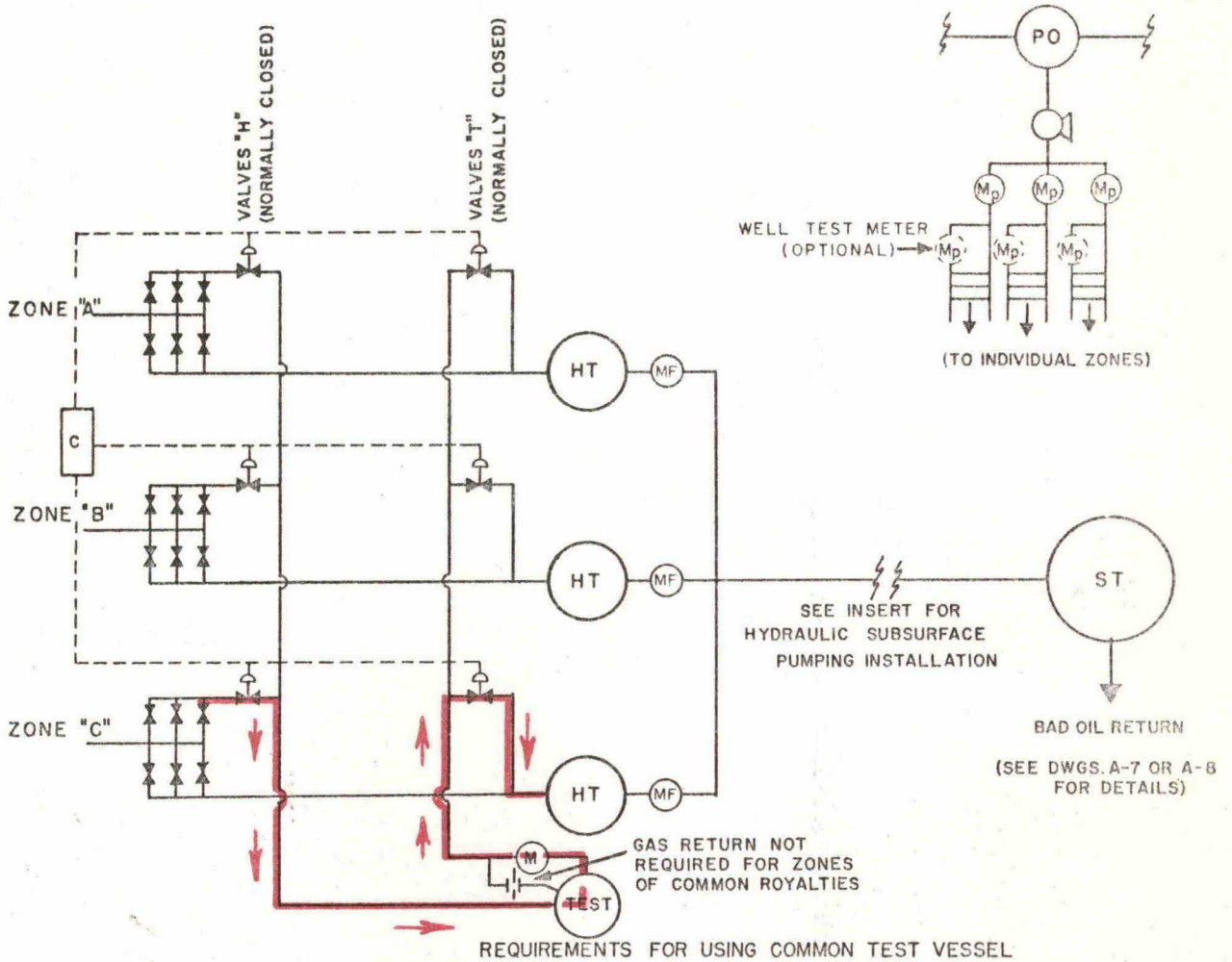
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- METER FOR POWER OIL
- (TV) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SE) SEPARATOR
- (MF) METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

COMMON TREATER USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-2

HYDRAULIC
SUBSURFACE PUMPING INSTALLATION



REQUIREMENTS FOR USING COMMON TEST VESSEL

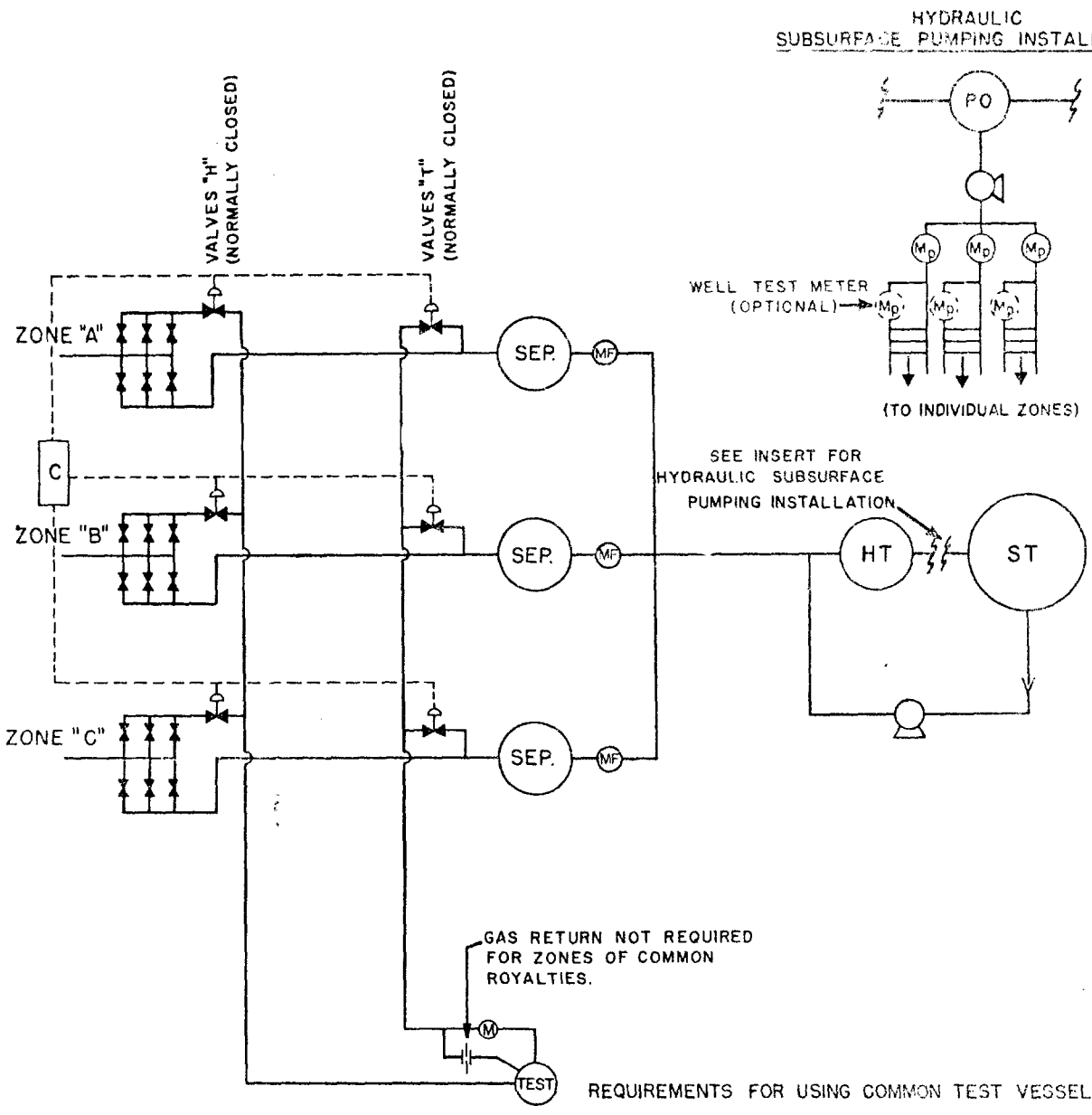
Red line indicates path followed by production from a Zone "C" well while on test.

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (MF) METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-3



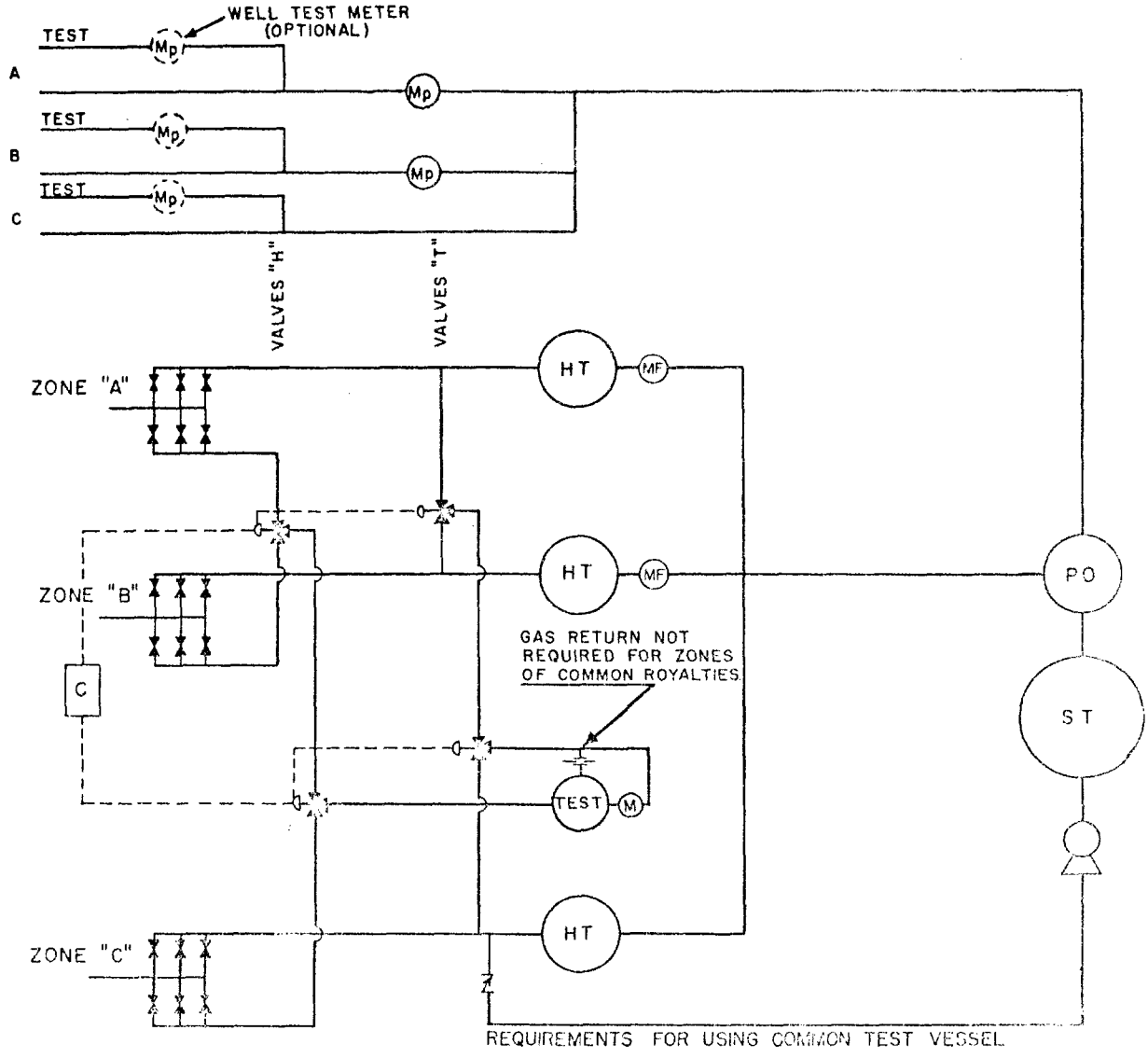
REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) — TEST METER
- (Mp) — METER FOR POWER OIL
- (TEST) — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) — HEATER TREATER
- (PO) — POWER OIL TANK
- (ST) — STOCK TANK
- PUMP
- (SEP) — SEPARATOR
- (MF) — METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

COMMON TREATER USED IN COMMINGLING COMMON OR SEPARATE ROYALTIES WHEN NORMALLY CLOSED, TWO WAY VALVES ARE INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-4



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".

2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.

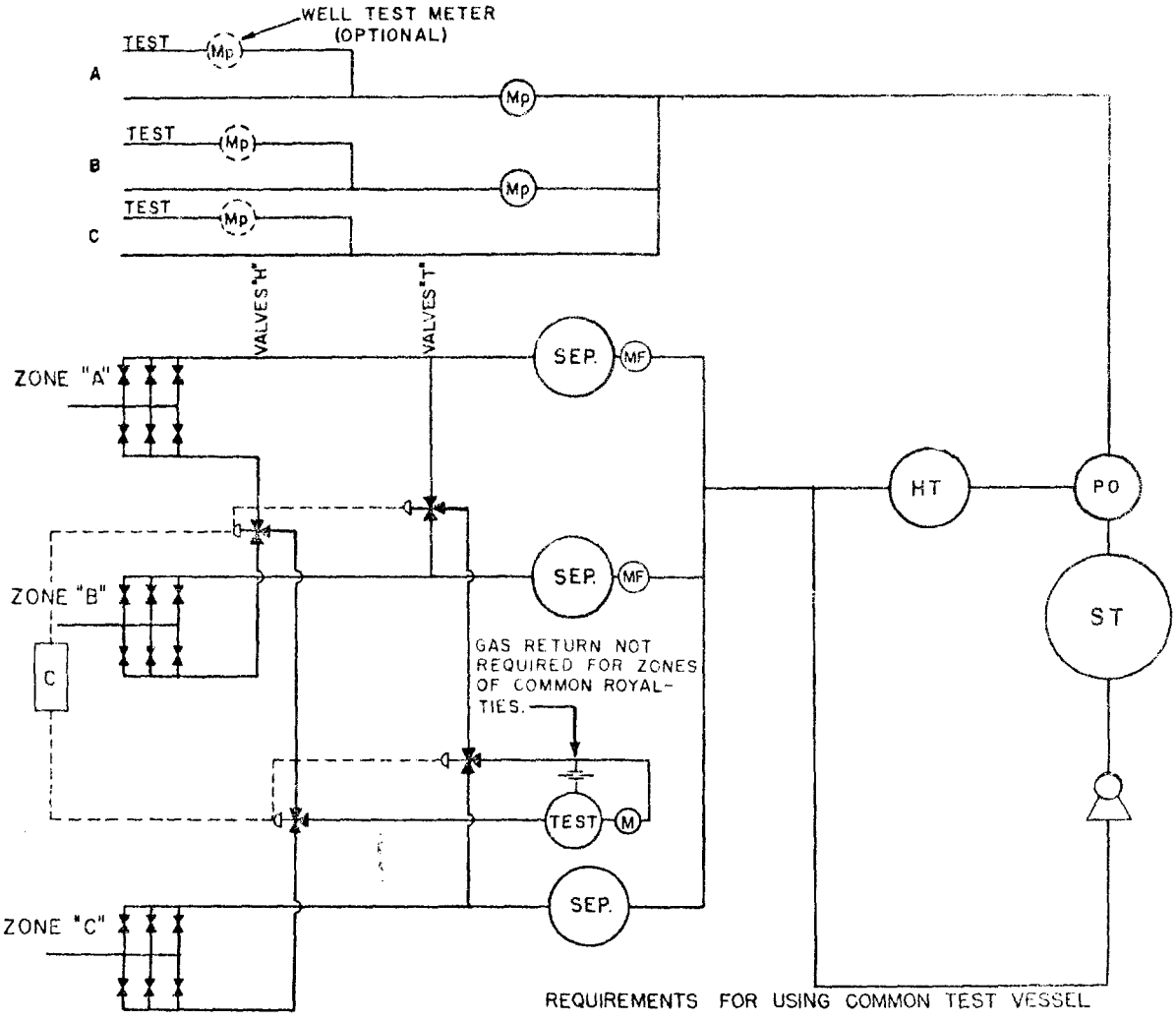
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.

4. If normally closed, two-way valves are to be installed, refer to drawing A-3.

SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (MF) METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)

INDIVIDUAL TREATERS USED IN COMMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-5



REQUIREMENTS FOR USING COMMON TEST VESSEL

1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate valve "H" and valve "T" as shown. Control panel [C] and control lines to valves are not required if mechanical interlock is provided for manual operation.
3. Manual overides on automatic well test header valves on individual well flowlines may be installed on production side only.
4. If normally closed, two-way valves are to be used, refer to drawing A-4.

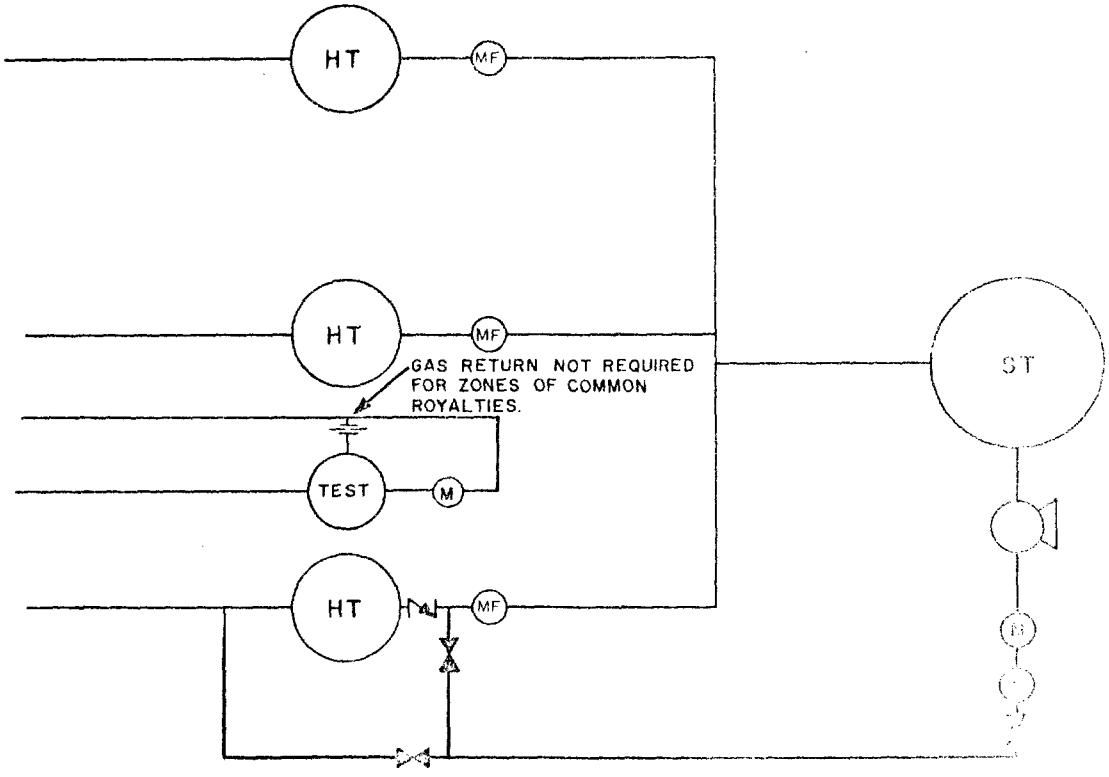
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- [C] CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (Mp) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (MF) METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)
- (SEP) SEPARATOR

COMMON TREATER USED IN COMMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-6



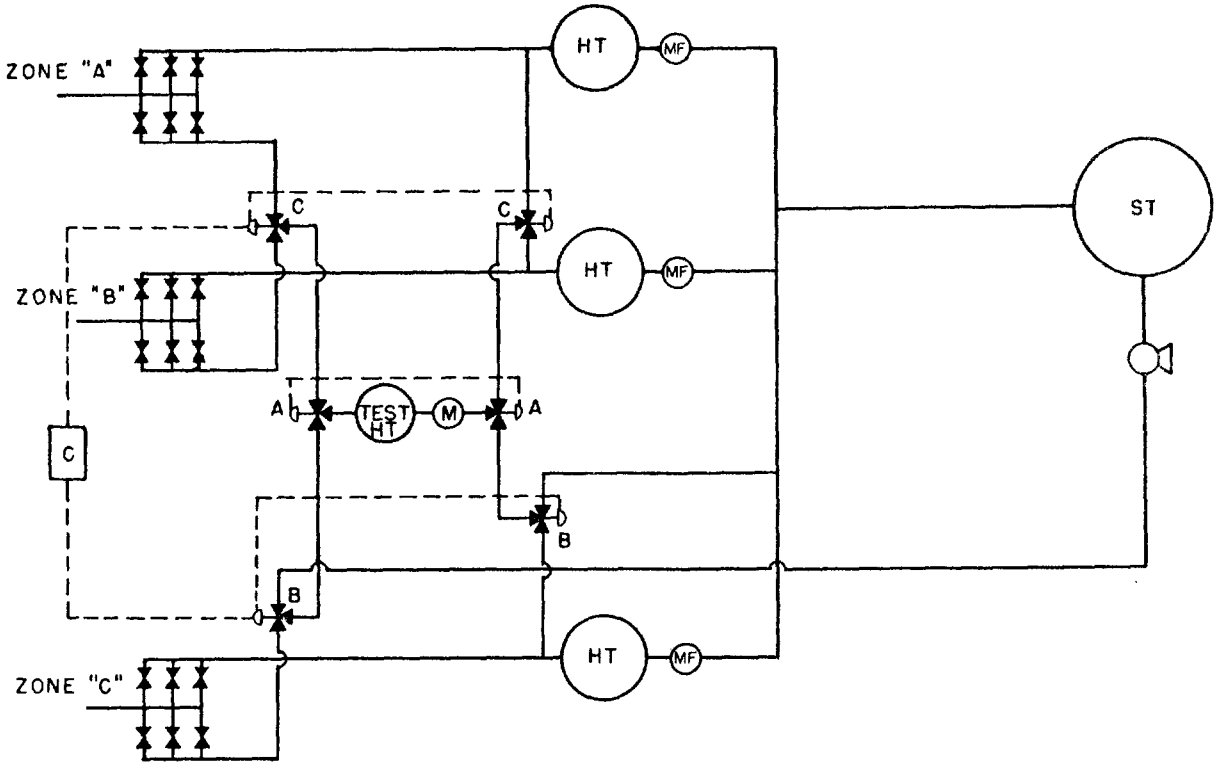
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- M — TEST OR BAD OIL METER
- MP — METER FOR POWER OIL
- TEST — TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HT — HEATER TREATER
- PO — POWER OIL TANK
- ST — STOCK TANK
- PUMP
- S — SAMPLER
- SEP — SEPARATOR
- MF — METERING FACILITIES(METER & SAMPLER IF APPLICABLE)

BAD OIL RETURN (ALTERNATE NO. 1)

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-7

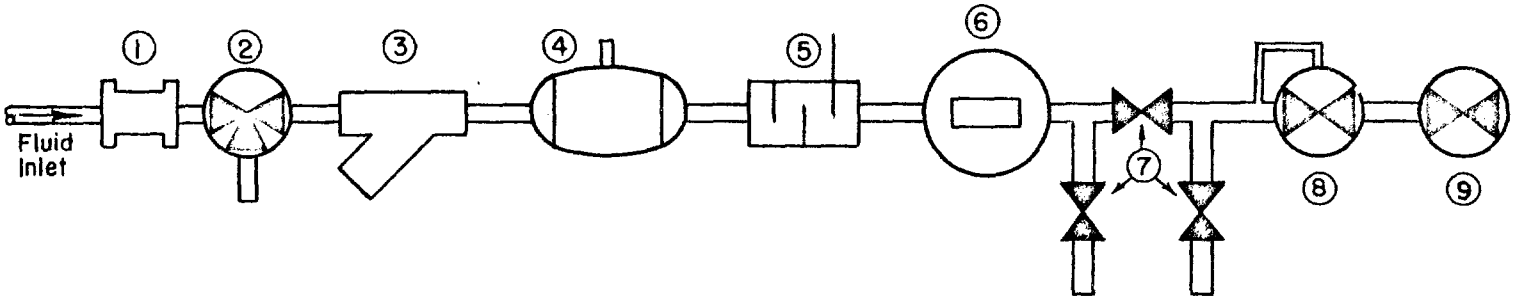


SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- C — CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- (M) TEST METER
- (M_D) METER FOR POWER OIL
- (TEST) TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- (HT) HEATER TREATER
- (PO) POWER OIL TANK
- (ST) STOCK TANK
- PUMP
- (SEP) SEPARATOR
- (MF) METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

BAD OIL RETURN (ALTERNATE NO. 2) WHEN TEST TREATER IS INSTALLED
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMMINGLING
DRAWING A-8

POSITIVE-DISPLACEMENT METER SYSTEM



LEGEND

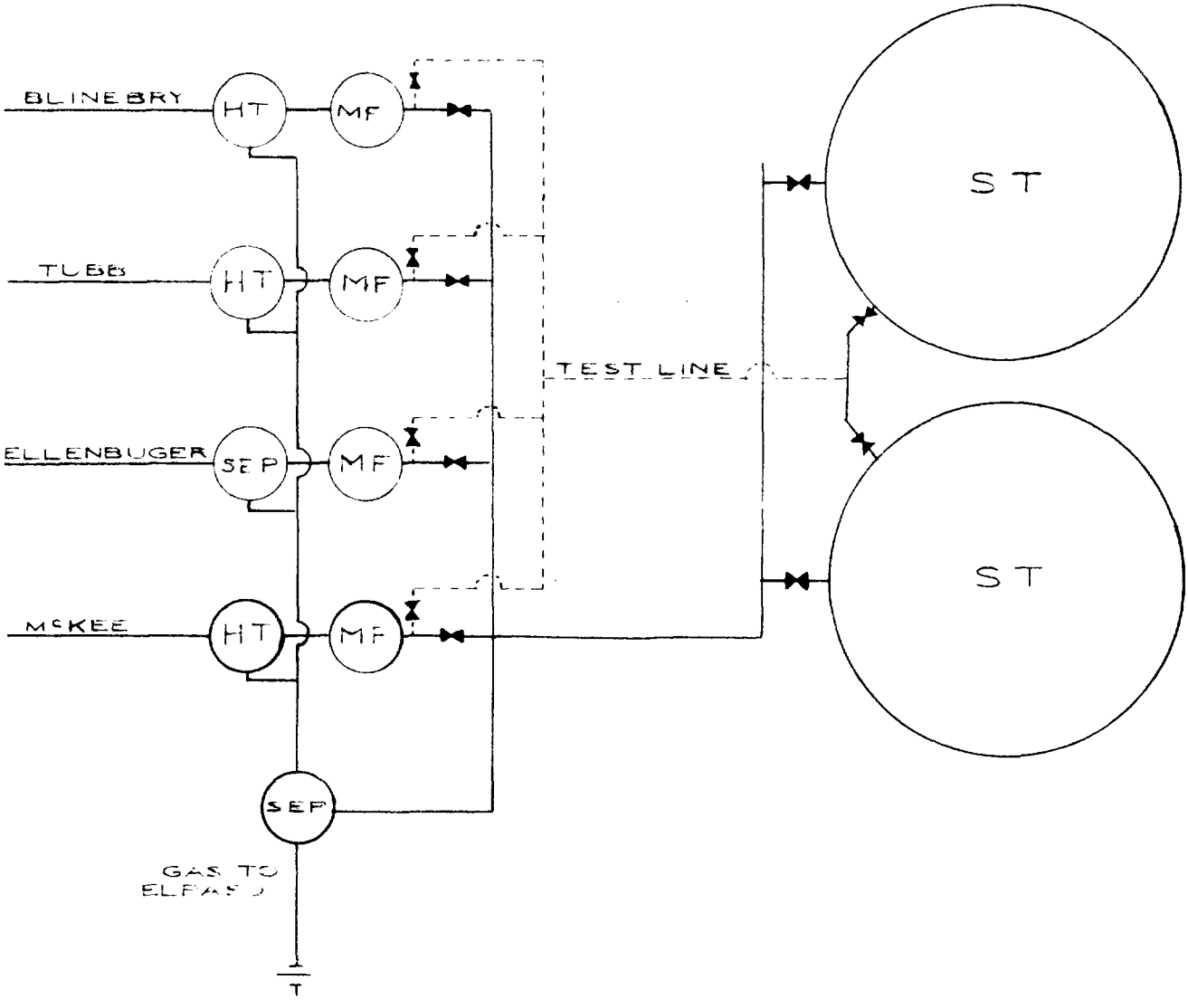
① BS & W Monitor (Optional)
② Reroute Valve (Optional) for rerouting non-merchantable oil
③ Strainer
④ Air & Gas Eliminator (If Needed) with Check in Vent
⑤ Sample Probe
⑥ P. D. Meter with Non-Reset Counter
⑦ Proving Connections
⑧ Flow Rate Controller
⑨ Dump Valve

Note:

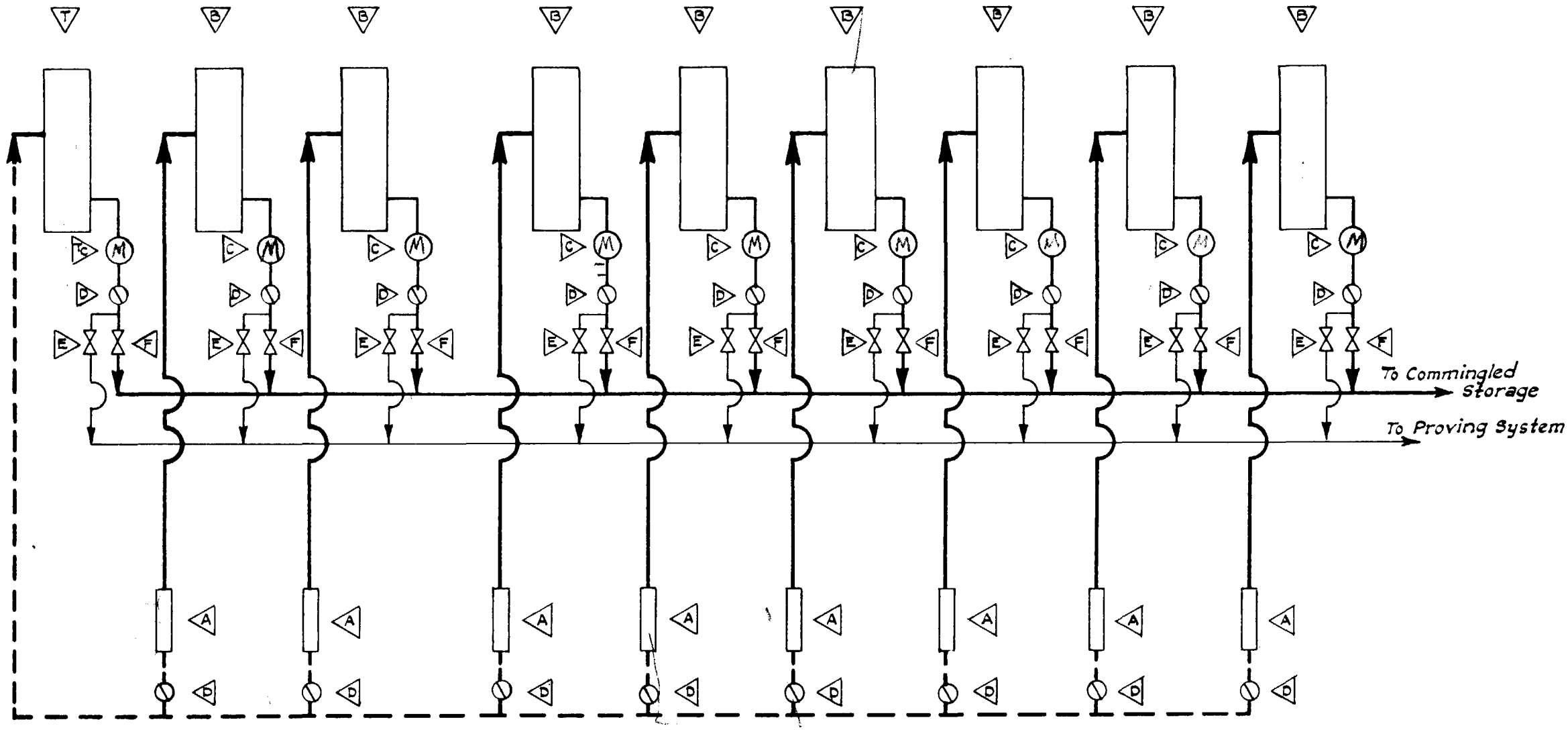
No. 3 & 4 can be combined
No. 8 & 9 can be combined

DRAWING A-9

SKELLY OIL COMPANY
HOBBS "A" LEASE



BLOCK VALVE
GAS METER
HEATER TREATER
STOCK TANK
SEPARATOR
METERING FACILITIES



PAN AMERICAN PETROLEUM CORPORATION

LEGEND

A. Well Flowline Headers
B. Lease Production Separators or Treaters
C. Lease Production Meters (And Sampler As Applicable)
D. Check Valve
E. Block Valve (Proving Heads)
F. Block Valve (Prod. Heads)
T. Test Separator or Treater
TC. Test Meter (And Sampler If Applicable)