

Case No.

2356

Application, Transcript,
and Exhibits, Etc.

CASE 2356: Application of the OCC
to consider revision of RULES 303
AND 309-B.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
AUGUST 16, 1961

IN THE MATTER OF:

CASE 2356 By call of the Oil Conservation Commission, on:
its motion, to hear the report of the Industry:
Study Committee on Commingling of Crude Oil, to:
consider the adoption of a Manual for the In- :
stallation and Operation of Commingling Facil- :
ities, and to consider the revision of Rules :
303 and 309-B to provide for administrative :
procedures for obtaining permission to com- :
mingle crude oil in conformance with said man- :
ual. :

-TRANSCRIPT OF HEARING-

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BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
AUGUST 16, 1961

IN THE MATTER OF:

CASE 2356 By call of the Oil Conservation Commission,
on its motion, to hear the report of the
Industry Study Committee on Commingling of
Crude Oil, to consider the adoption of a
Manual for the Installation and Operation
of Commingling Facilities, and to consider
the revision of Rules 303 and 309-B to pro-
vide for administrative procedures for ob-
taining permission to commingle crude oil
in conformance with said manual.

BEFORE:

Gov. Edwin L. Mechem
E. S. (Johnny) Walker
A. L. Porter

T R A N S C R I P T O F P R O C E E D I N G S

MR. PORTER: We'll take up next Case 2356, and this is
the case called by the Commission on its own motion to hear the
report of the Industry Study Committee on Commingling of Crude Oil,
and for the adoption of a Manual for the Installation and Operating
of Commingling Facilities, and to consider the revision of Rules
303 and 309-B to provide for administrative procedures for obtain-
ing permission to commingle crude oil in conformance with said
manual.

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Before we begin our testimony, I would like to call for appearances.

MR. MORRIS: At the Commission's request, Dick Morris appearing for the Industry Study Committee on Commingling.

MR. PORTER: Mr. Buell.

MR. BUELL: For Pan American Petroleum Corporation, Guy Buell.

MR. ANDERSON: R. M. Anderson, Sinclair Oil & Gas Company.

MR. CHRISTY: Sim Christy for Humble Oil & Refining Company.

MR. WHITE: Charles White for Texaco, Inc.

MR. JACOBS: Ronald Jacobs for Skelly Oil Company.

MR. KELLAHIN: Jason Kellahin for Amerada Petroleum Corporation and Continental Oil Company.

MR. SETH: Oliver Seth for Shell Oil Company.

MR. TUFFLY: Harry Tuffly, Tidewater Oil Company.

MR. PORTER: Mr. Morris, have you decided on the order of testimony?

MR. MORRIS: Yea, sir. If the Commission please, at the outset, I have a statement I would like to present before the testimony commences.

MR. PORTER: You may proceed.

MR. MORRIS: I refer to Commission's Memorandum No. 2-61, dated March 16, 1961, a copy of which is before you, and ask



that the Commission take administrative notice of its contents.

MR. PORTER: The Commission will take administrative notice of the Memorandum No. 2-61.

MR. MORRIS: This Memorandum reflects that in March of this year it came to the Commission's attention that abuses of the commingling privilege were probably occurring. The Commission then determined that in order to prevent further abuses, standards for commingling installations should be established. To this end the Commission appointed an Industry Committee to study all phases of commingling with the objective of proposing installations which would be as foolproof as possible.

The Committee thus appointed was requested to file a written report of its recommendations for minimum standards for commingling installation. The Industry Committee was constituted of Shell Oil Company, represented by R. L. Elkins, and R. Sumerwell; Gulf Oil Corporation represented by C. M. Bumpass; Humble Oil & Refining represented by W. M. O'Reilly; Atlantic Refining Company represented by H. T. Frost and N. McCaskill; Benson-Montin-Greer Drilling Company represented by A. Greer; Pan American Petroleum Corporation by A. J. Inderrieden and J. E. York; Continental Oil Company represented by V. T. Lyon; Texaco Inc. represented by J. E. Robinson; Phillips Petroleum represented by R. D. Schropp; Carper Drilling Company represented by C. E. Storm; Texas Pacific Coal & Oil Company represented by J. Yuronka; and New Mexico Oil Conservation Commission represented by Dan Nutter.

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Mr. Elkins of Shell served as Chairman of the Committee until his departure for New York in May, at which time he was succeeded by Mr. Sumerwell, also of Shell Oil Company.

Mr. Bumpass of Gulf served as Chairman of the Sub-committee on measuring methods, and Mr. O'Reilly of Humble as Chairman of the Sub-committee on assembly design. Messrs. Sumerwell, Bumpass and O'Reilly will testify today in presenting the report of the Committee to the Commission.

I would like to make clear at the outset of the testimony that the report of the Committee does not represent the unanimous opinion of all the Committee members. Instead, it represents the majority opinion of the members of that Committee. It should also be pointed out that the witnesses who will present the Committee report are testifying on behalf of the Committee, and their remarks should not be taken as necessarily representative of the position of the companies with which they are employed. With permission of the Commission, in order to facilitate the presentation of this report, the procedure we would like to follow would be to have Mr. Sumerwell, Mr. Bumpass and Mr. O'Reilly each testify before any cross-examination of any of them is permitted. At the conclusion of all of them, they will then answer questions, either as a panel or as individuals, depending on how the question is addressed to them. If that meets with the Commission's approval, we will proceed in that manner.

MR. PORTER: Mr. Morris, as I understand it, you'll

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have the three representatives of the Committee sit as a panel, and you would like for them to conclude their direct testimony before there is any cross-examination of either --

MR. MORRIS: Yes, sir, we will have three witnesses. I will direct questions to them as individuals rather than as a panel.

MR. PORTER: Surely.

MR. MORRIS: Then, at the conclusion of the testimony of all of them, then cross-examination will be allowed.

MR. PORTER: Yes, sir. Before we proceed with the case, I would like to say that the Commission has, by letter, thanked each member of the Committee individually, that is, with the exception of the Commission's Staff members, and we have thanked them personally. They have put in an awful lot of time on this Manual. When we gave them the job, we indicated to the Chairman that there was an urgency, and that they should proceed with due diligence, which they certainly did. We were sorry that Randy Elkins had to leave before the study was completed. Of course, we're also sorry for anybody that has to leave New Mexico and go to New York. But Mr. Sumerwell took over in good style, and the Committee proceeded, and those of you who have seen the Manual, which they have come up with, probably realize the amount of work that went in on this thing; there were numerous meetings held.

Regardless of your views as to the Manual and its feasibility, I know that you, along with us, appreciate the work of the individual

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Committee members, and the time that they have sacrificed to put in on this project.

Mr. Morris, we'll have your three witnesses called at this time and have them sworn.

(Witnesses sworn)

R. L. SUMERWELL,

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Sumerwell, will you please state your full name, for the record?

A R. L. Sumerwell.

Q By whom are you employed and in what capacity and where are you located?

A Shell Oil Company as a mechanical engineer, in Roswell.

Q Mr. Sumerwell, did you serve as the Chairman of the Industry Study Committee on comingling of crude oil, appointed by the Commission?

A Yes, sir.

Q Do you have a preliminary statement to present to the Commission at this time?

A Yes, sir, I sure do. This final report, of minimum standards for comingling crude oil represents the combined efforts of the Industry Study Committee appointed by the New Mexico

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Oil Conservation Commission in March of this year. To fulfill the Commission's request, the Committee gave primary consideration to the design of commingling installations which would minimize the possibilities of failures or accidental mismeasurements and which would facilitate detection of purposeful mismeasurements of commingled crude oil. However, it was redognized early in the work of the Committee that the design of a completely "foolproof" system would be improbable and impractical. This final report represents the majority opinion of the Committee members and is not in every respect the unanimous opinion of all Committee members. This fact is mentioned since there is difference of opinion among industry representatives regarding the strictness of regulations that should and could be imposed on commingling authorizations.

Ten oil company representatives along with members of the Commission staff attended four, full committee meetings. The first three meetings were held in Hobbs and the fourth and final meeting was held in Santa Fe. In view of the amount and complexity of work to be done by the Committee, it was deemed prudent to divide the Committee into two Subcommittees. The Subcommittee on "Measuring Methods" worked on the written section of the report 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). Part III of the written section covers



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general requirements for zones and leases with common or different royalty interests. API Standards were used, or referred to, where possible. The Subcommittee on "Assembly Design" worked on the drawings or appendix of the report, which covers several proposals for the assembly and design of commingling installations utilizing a variety of equipment and layouts. These drawings and designs include what the Committee considers are minimum requirements for utilizing a common test vessel, routing of nonmerchantable oil from a common storage tank and handling of power oil used in subsurface hydraulic lift systems. In these drawings the actual metering facilities are shown by the symbol MF, and the requirements of the metering equipment, sampling equipment, method of proving, and method of production allocation are covered in the written section of the report.

In the preparation of this report very little consideration was given to existing commingling installations nor to how they might be modified to comply with these recommendations.

It was believed by the committee that such installations, if changed, should be considered individually.

This report, therefore, applies primarily to installations which might be approved in the future.

In addition, the committee believes that these or any other commingling requirements which might be adopted should be reviewed periodically to ascertain whether changes are needed in view of new developments in equipment or techniques.



It might also be noted, in going through the report, that the wording is somewhat general. This was with the purpose -- as most of you might know, it's difficult to come up with any standard without general wording. In addition, trying to be specific would probably date the report at an earlier time than general wording. We've also tried to leave the Commission some leeway to pin down specific items.

(Whereupon, Committee's Exhibit No. 1 was marked for identification)

Q Mr. Sumerwell, I hand you what has been marked for identification as Committee's Exhibit No. 1 in this case, and ask you to state what it is, please?

A This is the Report of Minimum Standards For Commingling Crude Oil prepared By The Industry Study Committee.

MR. MORRIS: If the Commission please, we'll offer Committee's Exhibit No. 1 in evidence at this time.

MR. PORTER: Without objection, the Exhibit will be admitted to the record.

(Whereupon, Committee's Exhibit No. 1 was received in evidence)

MR. MORRIS: If the Commission please, we will direct the testimony at this time to Mr. O'Reilly, and return later to Mr. Sumerwell.

W. M. O'REILLY,

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called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. O'Reilly, will you please state your full name, for the record?

A W. M. O'Reilly.

Q By whom are you employed and in what capacity, and where are you located?

A I am a supervising engineer with Humble Oil & Refining Company in Midland, Texas.

Q Mr. O'Reilly, did you serve on the Commingling Committee as Chairman of the Sub-committee on the assembly design?

A Yes, I did.

Q Now, referring to the Appendix of the Committee report containing assembly diagrams, would you briefly describe all of the diagrams and explain what they're intended to depict?

A The drawings 1 through 8 illustrate arrangements devised by the Committee to minimize or facilitate the detection of mismeasurement of crude oil production where common tests or treating facilities are used.

Basically, the Committee determined there would be three distinct ways in which crude oil could be handled. One would provide individual treaters on zone or leased production. Another would be where common treaters were used, and the third would be the use of a method which is referred to as a subtraction method.

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Q Were these drawings intended to cover all the comingling installations that were considered by the Committee?

A No. There are other possible conditions which could arise. Basically, as long as common vessels or common connecting lines are not used ahead of individual production meters, the valving arrangements, which are shown on these drawings, would not be required.

MR. MORRIS: At this point I would like to state that the drawings that we have hung on the wall behind the Commission are intended for purposes of demonstration only, they are not Exhibits in this case. They're identical to the drawings contained in the Appendix of Commission's Exhibit No. 1.

Q (By Mr. Morris) Mr. O'Reilly, now refer to what is labeled as drawing No. 1, and describe its arrangement, please.

A This is drawing No. 1. It is entitled Individual treaters used in comingling common or separate royalties. Individual treaters refers to the fact there is an individual treater provided on each zone or lease before the production from that zone or lease is comingled with other production from other zones or leases. In order to expedite the description of all the drawings, I will go into some detail on this drawing that we will eliminate on the later ones. Schematic flow from individual wells is designated to come in these lines. This flow is then separated, in one instance, to a production manifold header, and the other valve to a test manifold header. Proceeding on, the flow

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from the production side is directed through a heater-treater, and then through the metering facilities, which are provided and designated as MF, and after the production from that zone has been metered, it is then commingled with other production which has been treated in a similar manner. This commingled production is then directed to a stock tank for sale to the purchaser.

I will describe the flow where common test facilities are provided. In this case, the common test facility may be either a separator or a heater-treater. In the case of individual wells which are desired to be tested, their flow would be directed, as shown by this red line, and thus a well from Zone "A" would be directed into the proper flow channel directed through this valve, which is labeled Valve "H" in this diagram, directed through this valve, which is also a Valve "H," "H" meaning header, and then into the test separator or treater, as the case may be.

After proper tests have been made, the flow from this vessel is directed through a paired valve, through a second paired valve, and back into its proper production line, after which it proceeds through its heater-treater, is directed through the metering facilities and is handled in the same manner as the ordinary production. In this way all of the oil or production from Zone "A" is retained in the channels of Zone "A", and cannot be misdirected into Zone "B" or "C."

Now, before we go further, I would like to read these notes and explain them, such as necessary. The automatic well test



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header valves on individual well flowlines, that would refer to the valves shown coming from the individual wells into the test header manifold, may be substituted for valve "H," which is this first valve, interlocking control as shown would then be required between each valve on the manifold and the respective Valve "T."

Now, this interlocking valve or interlocking control referred to is shown by these dotted lines coming from each paired valve set to a Control Panel "C." This is covered in the Note No. 2, which says that "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 a mechanical interlock is provided for manual operation."

In this case, these valves would be three-way, two-position valves, and they will be controlled manually, pneumatically or electrically. A mechanical interlock could be a bar connecting the two valves so that when one valve was operated, the other valve would be directed in the same corresponding position. A pneumatic or an electrical interlock would by its characteristic action, take care of this position. In this manner, all the flow would be retained in its proper channel so that no zone could be diverted into another zone accidentally or deliberately. Manual overrides on automatic well test header valves on individual well flowlines may be installed on the production side only. In the event of a mechanical, or, let's say, an electrical or pneumatic failure of these interlocking arrangements, if you have automatic well test



header valves on individual well flowlines, it would be permissible to install a manual override on the production side only. It could not override manually the valves into the test header manifold. This would permit straight production in the event of such power failure, but it would prohibit testing during these times.

Now, we'll move on down to this break in the line. We have an insert shown here which would provide for the hydraulic sub-surface installation when HS pumps are used.

In such an installation, we would provide a power oil tank in this break. Oil from that oil tank would be directed through a pump, then through a production meter, to the respective zone which it was serving, and at the operator's option, he may install for test purposes a second production meter which would be manifolded in the manner shown.

There is a line shown from the stock tank which is referred to as the Bad Oil Return, and it refers to Drawings 7 and 8, which I will now describe.

In this case, where individual heater-treaters are used, and a separator is used for the test vessel or if a heater-treater is used, and it is desired to reroute the bad oil through the heater-treater of one of the individual zones, this is the alternate which would be employed.

In this case, the bad oil would be directed through a pump, through a meter, through a sampler, a check valve, as shown, and thence back through this open valve into the heater-treater, where



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it would be treated in an attempt to provide good oil. This arrangement is shown here which includes a second valve ahead of the heater-treater, which is included for the purpose of permitting calibration of this meter on the return oil line. That's the purpose of this valve, as indicated here. Check valves are required in these instances to prevent oil being directed ahead of this production zone meter, and thence into the stock tank.

In this second alternate we have provided a test heater-treater specifically, and it is desired to use this test heater-treater as the return bad oil vessel for treating. In this arrangement, the meter, the sampler, the check valve arrangement, are eliminated, and this stock tank bad oil is treated in a manner exactly as if there were a fourth zone being handled in this commingling installation.

In this arrangement, when bad oil is being treated from the stock tank, it would preclude the testing of any normal production zone because the bad oil would be handled, as I said, in the manner that a fourth production zone would be handled. So, in the case of bad oil return where this arrangement is used, it would be satisfactory to employ either of those alternates.

Q Mr. O'Reilly, in Drawing No. 1, as in the other Drawings that you will discuss, is it the intent to arrange the valving system so that it would be virtually impossible for the production from one zone to ever be contributed to another zone?

A This is correct.



Q And this was the prime object of this drawing and of all the drawings that were considered?

A That's correct. It was the intent of the Committee, at the Commission's request, to prepare an arrangement in which the production from each zone would be completely independent at all times of production or facilities from another zone.

Q And it's the feeling of the Committee that the valve interlock arrangements, as you have depicted them here, is a feasible method of obtaining that objective?

A Yes, sir.

Q Would you refer, now, to Drawing No. 3, and compare it, its similarities and its differences with Drawing No. 1?

A Drawing No. 3 again includes a separate heater-treater for each zone or lease. In this manner it is identical, the power oil insert is identical, the bad oil return is identical. All things appear to be exactly comparable to Drawing No. 1, except the valving arrangements, as shown for the manifold leading to the common test vessel.

In this case we used what is referred to as a two-way, two-position valve, whereas in Drawing No. 1 we used a three-way, two-position valve, and, as you can see from the drawings, the path of direction of the produced fluid is somewhat different..

In this case it proceeds through a pyramid arrangement to get to the test vessel. In this case it proceeds through a straight line arrangement to get to the test vessel. There is a distinct

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difference in this feature, and that is that the control panel, which is employed, is the only control which may be used. A mechanical operation is not tolerable in this arrangement. Control of these valves must be either pneumatic or electrical and cannot be manually controlled. This is the only difference between the arrangement of Drawing No. 3 and Drawing No. 1.

Q Now, in Drawing No. 3, your two-way, two-position valves are normally closed?

A Normally closed, correct.

Q It's only feasible in using this arrangement to operate one pair of the valves at that time. The other pair must remain closed?

A Correct.

Q Whereas, in Drawing No. 1 it's so designed that it wouldn't hurt if both pairs, as depicted there, were operated at the same time, would it?

A They have to operate at the same time.

Q Yes.

A Yes, sir. This is correct. They have to operate at the same time in order to complete the cycle.

Q Would you refer, now, to Drawing No. 2, to show a typical installation using a common heater-treater with individual zone separators?

A In Drawing No. 2 we have provided on each zone or lease a separating vessel, not a heater-treater, the heater-treater being



a vessel common to all zones or leases after commingling has been done.

In this case, as previously described, the wells flow into the individual well flowlines, as shown. The flow is directed through the production side, through the separator, through the metering facilities, and thence commingled with production handled in similar manner from their zones. Wells on test are directed in a manner comparable to Drawing 1, previously described, in the three-way, two-position valves, which may be manually, pneumatically or electrically controlled through the test vessel and directed back to their proper production zone, where they are then joined with wells as they are being produced through the separator. They are all metered through the production meter for that zone, and then commingled.

The difference actually between Drawing 1 and Drawing 2 is the fact that treating occurs after the production from all zones has been metered. In this case, the commingled production from all zones is directed to the common heater-treater; from the common heater-treater it's directed to the stock tank where it's sold to the purchaser. Then again we have a break in this line between the heater-treater and the stock tank, which indicates the insertion of the hydraulic subsurface pumping installation, as shown in the insert, which is identical to that previously described. In these installations, the bad oil, such as may show up in the stock tank, need not be directed back to a zone or lease facility to be cleaned

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up, but may be directed simply as shown through a pump into the line ahead of the heater-treater, where it is treated and redirected to the stock tank.

Q Would you now refer to Drawing No. 4, and point out the similarities and differences of that Drawing to Drawing No. 2?

A No. 4 differs from Drawing No. 2 in the same manner that Drawing No. 3 differed from Drawing No. 1. Specifically, it's in the arrangement of the valves, the type of valves which are used on the test manifold, and in this case, again, we are using two-way, two-position valves, whereas in Drawing 2 we indicate three-way, two-position valves. The same limitations apply. There are no manual controls permitted on this test header installation.

I would like to note that manual overrides on automatic well test header valves, on individual well flow lines, may be installed on the production side.

Q Mr. O'Reilly, now, a point of clarification here as to why manual interlocks cannot be used here. Is it because only one pair of valves can be operated at a time, and if you used manual interlocks, there would be no safeguard against more than one set being operated at a time?

A This is correct. If manual interlocks were permitted and manual operation, the interlock likely would be only between the pair of valves on Zone "A", separate interlock on the "T" Zone between the pair of valves on Zone "B" and between the pair of valves on Zone "C," so that if this were positioned to open at Zone "A,"

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Zone "B" were positioned to open feasibly, production from Zone "A" could flow into Zone "B" production line and be metered and allocated to Zone "B." So this is the reason for not permitting the use of a manual interlock on any of these valves shown in Drawings 3 and 4.

Q Mr. O'Reilly, before we leave Drawings 1 through 4, is there any further comment you would like to make on the valving arrangement shown on those Drawings?

A No. I believe I have no further comment, Mr. Morris.

Q Refer, now, to Drawings Nos. 5 and 6, and I believe those drawings deal with the subtraction method of commingling which will be detailed in the written part of the report a little bit later. Will you refer to those Drawings and point out the system that you have devised there?

A All right. In the commingling by the subtraction method, it is calculated that one set of facilities less than the total number of zones to be commingled will be employed.

Q May I interrupt you there, Mr. O'Reilly, --

A Yes, sir.

Q -- for just a moment? The subtraction method, as will be pointed out later, is designed only for use in zone commingling, not on lease commingling, is that correct?

A This is correct. The facilities that I referred to as being one less in this case are the metering facilities as designated in Drawing A. 5, we have shown an installation using in-



dividual heater-treaters on each zone, and only metering facilities on Zone "A" and Zone "B" were non-indicated for Zone "C".

In this case flow would be directed, as previously described on Drawings 1 and 3, through these three-way, two-position valves where tests through a common vessel is obtained, and flow would be as shown from Zone "A" through this three-way, two-position header valve, and, hence, through this second paired valve through the test vessel, and redirected by these interlocks, which have been discussed on previous Drawings. The production from Zone "A" would be metered through the facilities indicated. The production from Zone "B" would be metered through the facilities indicated for Zone "B." Commingled streams from Zone "A", "B" and "C" would then be directed through a stock tank for sale to the purchaser. Production from Zone "C" would be determined by subtracting Zone "A", plus Zone "B" from the total production indicated.

Q If I may interrupt, that allocation procedure will be discussed more fully at a later time?

A This is correct. The power oil is shown in this case to be ahead of the stock tank, and is directed back through appropriate zone meters, production meters, registering power oil return.

In this case where Zone "A" production is metered and Zone "B" production is metered with the meter power oil directed to Zone "A" and to Zone "B" respectively, Zone "C", whose production is determined by the subtraction method, may also receive power oil

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by the subtraction method. In this case where you have bad oil in the stock tank and wish to treat this oil, you may employ the heater-treater on Zone "C." Without the facilities previously described in Drawings 7 and 8, you did not require a meter and sampler. This pump directs the oil back through a check valve, as shown through the heater-treater, and thence into the commingled stream.

Q Would you refer, now, to Drawing No. 6 and show how it differs from Drawing No. 5?

A Drawing No. 6 is the installation shown for commingling by the subtraction method in which a common heater-treater is installed to treat commingled production from all leases which have been handled by individual separators, as indicated on zone production. Metering facilities are indicated again for Zone "A" and for Zone "B" and none are shown for Zone "C."

The manner of handling power oil is as described on Drawing 5, in that Zone "A" and "B" respectively are metered. In this case, the bad oil, which may collect in the stock tank, is directed through a pump, returned to the common flow treater, where it is treated and returned to the stock tank for sale.

Q Mr. O'Reilly, I understand that Drawing 9 will be referred to at a later time. Do you have anything further you would like to offer now with respect to Drawings 1 through 8?

A Yes, sir. At this time I would like to comment on Drawings 5 and 6. Drawing 5 is quite similar in arrangement, the three-way, two-position valve, particularly, to Drawings 1 and 2.



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Drawing 6 also is similar in the valve arrangement, namely, the three-way, two-position valve, to Drawings 1 and 2. We did not show the subtraction method in drawing form, which may be employed using two-way, two-position valves, as shown on Drawings 3 and 4. These installations would be allowed by the Committee, and there is a note on these drawings which refers to this Note No. 4 on Drawings A-5 and A-6, which says "If normally closed, two-way valves are to be installed, refer to drawing A-3." This Note on Drawing 5 and Drawing 6, it requests that you refer to Drawing A-4.

I point this out so that you will observe that two-way, two-position valves would be an acceptable alternate for these drawings shown.

Q Do you have anything further, Mr. O'Reilly?

A No, sir.

MR. MORRIS: At this point, if the Commission please, we'll proceed with the written portion of the report, and we will have another witness or two to explain this part of the report.

MR. PORTER: You may proceed, Mr. Morris, with your next witness.

C. M. BUMPASS,

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Bumpass, will you please state your full name, for



the record, please?

A My name is C. M. Bumpass.

Q By whom are you employed and in what capacity, and where are you located?

A I am employed by Gulf Oil Corporation as area petroleum engineer of the Hobbs office at Hobbs, New Mexico.

Q Mr. Bumpass, did you serve on the Commingling Committee as Chairman of the Sub-committee on measuring methods?

A Yes, sir, I did.

Q Would you refer to Part I of the Committee report entitled "ZONE COMMINGLING (Common Royalty)" and explain the Committee treatment of this subject, first outlining the general classification of this part of the report?

A Part I is the Committee's minimum standard for commingling of crude oil from different zones of common royalty. This is decided in three main sections, namely, Marginal Zones, Zones With Top Allowable Wells (All zones metered), and, lastly, Zones With Top Allowable Wells (All but one zone metered, referred to as the subtraction method, and in this there are provisions and requirements of metering and sampling equipment, zone production allocation, meter proving and calibration procedures are covered.

Q This section deals only with commingling between zones on the same lease where the royalty is common in all zones?

A That is correct.

Q Now, if you would refer to Section A. of Part I, en-

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titled "MARGINAL ZONES" and explain how this subject is treated in the report, please.

A Section A. MARGINAL ZONES possibly was beyond the scope of the Committee's work. However, as this type of commingling now requires a hearing, for convenience to all, this Section was included. And reading verbatim, is as follows: "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."

Q Would you proceed?

A The next main item is Item B. ZONES WITH TOP ALLOWABLE WELLS (All zones metered). Continuing on verbatim: Item 1 is Meter Equipment. "Any acceptable meter equipped with a non-reset counter can be used for the transfer of liquid hydrocarbons from one individual -- pardon me -- from individual zones to a central tank battery. The counter and meter registering mechanism shall be readily sealable.

Item 2. Sampling Equipment. Any type of automatic sampler can be used in order to determine 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.

Item 3. is Zone Production Allocation. Sub-paragraph a/ If a sampler is utilized, or if BS&W content is less than two per cent,

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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 BW&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.

Q If I may interrupt you there, Mr. Bumpass, the wording in this paragraph assumes that the operator knows whether or not his oil contains more or less than two per cent BS&W. How does he make this determination?

A There are various methods of doing that, and one would be to take a manual grind out of the flow string, and the other would be reference to his periodic well tests. That's two methods that he could use to determine what per cent BS&W his flow stream is.

Q That's not specifically covered in this report, though, is it?

A No, sir.

Q Also referring to this paragraph, the wording is somewhat complicated as to the meaning of this paragraph, that if BS&W content is two per cent or more, that the operator has the option to either take the loss or install a sampler, is that correct?

A That's the intention of the report.



Q I see, BS&W content is less than two per cent whether or not a sampler is used, an operator can produce fluids in excess of the zoned allowable to the extent of that BS&W content, is that right?

A That's correct.

Q Would you proceed on, Mr. Bumpass, please?

A Sub-paragraph b/ under Zone Production Allocation, reads as follows: Such corrections as are necessary to correct for known equipment malfunctions shall be made prior to the determination of net zone production.

Sub-paragraph 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 zone -- pardon me, strike zone -- of net production from all zones.

Q Is this paragraph intended to correct the inherent differences that exist in all metering systems?

A Yes, that is true, and furthermore, to provide a uniform method of handling such inherent errors. This Section, I didn't finish reading it. Parenthesis Roman Numeral III, Paragraph B for Allocation Formula will be covered.

Q Would you proceed, please?

A Item 4 is entitled "Meter Provers and Procedures of

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Calibration, Sub-paragraph a/ Any of the following types of provers can be used for calibrating zone meters: (1) Strapped storage tank, (2) To-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).

Q Mr. Bumpass, if a strapped storage tank is used as a prover, is it contemplated that the use of auxiliary equipment, such as thermometers or outside sight gauges would have to be used?

A As permanent fixtures on that tank, no, sir.

Q Would you proceed, please?

A Sub-paragraph b/ states: 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.

Q Is it the intent of the Committee in this paragraph that the Commission would determine when an adequate history of performance had been established, rather than the operator?

A From a review of the data submitted by the operator, the Commission would so determine.

Q Proceed.

A Sub-paragraph c/ The minimum volume for proving shall be sufficient to read volume in prover to the degree of 1 part in 100 parenthesis 1% parenthesis.

Sub-paragraph 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 de-

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degrees Fahrenheit.

Q Now, Mr. Bumpass, if you would please refer to Section C of Part I, entitled "ZONES WITH TOP ALLOWABLE WELLS (All but one zone metered - known as the subtraction method," and please explain to the Commission the Committee treatment of this method. In doing so, please refer back to Drawings 5 and 6 that Mr. O'Reilly has previously referred to.

A I'll be glad to do so. Essentially without repetition providing in paragraph C for the subject you just mentioned, we provided requirements for the subtraction method here in the report as we did in the previous one where all zones metered.

Q In other words, paragraph entitled No. 1. Meter Equipment is the same as under Part B?

A That is correct.

Q I believe also that the first paragraph under 2, Sampling Equipment, is also the same?

A That is correct. That brings us to the Drawings that Mr. O'Reilly has covered, which Drawings are A-5 and A-6, and will be read verbatim: "After this examination of these drawings, the requirements point out that in drawing A-5 where you have the individual heater-treaters, the sampler is not required. However, where we have in Drawing A-6 the metering facilities prior to the treatment of the fluid for BS&W samplers are required.

Q Samplers would be required on the two zones that require metering facilities, but not on the one zone unmetered?

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A That is correct. Samplers will be required here and here downstream of each separator, and this zone does not have measuring facilities (indicating).

Continuing with paragraph 2 of sub-paragraph 2, 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.

Q That just reiterates what you said with reference to Drawings 5 and 6?

A Yes, sir.

Q Would you proceed with an explanation of the allocation procedure in the subtraction method?

A Paragraph 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.

Q Now, in this paragraph where it talks about if a sampler is used or not used, it's referring back, is it not, to the para-



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graph, the second paragraph under 2, Sampling Equipment. In other words, the second paragraph under Sampling Equipment specifies what sampler must be used, and when it does not need to be used?

A That's correct.

Q Then, in this paragraph 3 dealing with allocation, you have no further option; your option has been determined?

A That is true.

Q Would you proceed with the method of meter proving and calibration?

A Item 4. Meter Provers and Procedures of Calibration, sub-paragraph 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.

Q Now, Mr. Bumpass, in this sub-paragraph, what reason is there for requiring proving under simulated actual run conditions?

A Well, the thought there is by so doing that we will know that the shrinkage for each zone will be properly taken care of.

Q You are not going to distribute all the shrinkage to the unmetered zone, but rather you are going to try to distribute the shrinkage to each individual zone?

A That is correct. Sub-paragraph 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. This is as it was when zones were all metered.

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

Sub-paragraph d/ Prover volumes shall be corrected for temperature by correcting the initial and final volumes to 60 degrees Fahrenheit.

Q Do you have anything further to add to your testimony, either with regard to the subtraction method, or with regard to zone commingling where there's common royalty?

A I believe not, Mr. Morris.

MR. MORRIS: If it please the Commission, we will continue to go through the written portion of the written report now and the testimony will be elicited from Mr. Sumerwell.

MR. PORTER: You may proceed, Mr. Morris.

R. L. SUMERWELL,

recalled as a witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Sumerwell, referring to Part II of the report entitled LEASE OR ZONE COMMINGLING (Royalty not common), what are the basic differences in the requirements of any part compared to the previous part testified to just now by Mr. Bumpass?

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A Well, I think the approach of the Committee was entirely different in tackling lease commingling where the royalty was not common, and our detail is probably more detailed and perhaps more stringent than lease commingling requirements.

Q Would you proceed and outline the Committee treatment of this subject?

A In view of the detail, I won't try to read the whole report, but try to read what I think are pertinent parts, and the other parts will be on record.

The first part is GENERAL REQUIREMENTS. The word "lease" used hereinafter shall mean any lease or zone where the royalty is not common. The 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.

Q Now, Mr. Sumerwell, what is meant in this paragraph by "quality determination (where required)?"

A The intent of that is to cover commingling installations which might involve two zones on two different leases. In this particular installation, it would be mandatory that gravities from each zone and each lease be determined to properly allocate production. However, where only two leases are commingled, it is



not intended that gravity be determined on each lease.

Q Would you proceed, now, with the requirements for meter equipment?

A The first paragraph I have just read is the premise that we worked on, that fail-safe operation, such as that. Item No. 1 is 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 degrees Fahrenheit. The 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.

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Q At this point, Mr. Sumerwell, does the Committee report contain more specific requirements on the more common metering installations used in the industry, specifically the positive displacement meter system, and the positive volume or dump meter system?

A Yes, sir. We tried to cover the two most commonly used types, and they are what you indicated, and they are covered in sub-paragraphs a/ and b/.

Q Do you care to read or explain the contents of sub-paragraphs a/ and b/?

A If I could, we'll refer to Drawing A-9, which merely shows the drawing of the components that would be required in a PD meter system, and as, also is shown, some of the items are optional.

a/ Each positive displacement meter system shall be equipped with the following auxiliary equipment, except the items indicated as optional.

(1) BS&W Monitor and Reroute Control Valve. Both of these are optional and up to the operator whether he would like to use them or not.

(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.



Q The wording of that sub-paragraph just about makes the strainer optional also?

A Yes, but I think a little more at the discretion of the Commission, rather than the operator.

Q All right.

A (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 - This will be referred to in section Sampling Equipment for more detailed information on the sample probe.

(5) P.D. Meter has been covered. However, the meter shall be equipped with a counter registering in barrels.

(6) Proving Connections - This will be covered in Meter Provers and Procedures of Calibration.

(7) Is a 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-

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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.

Sub-paragraph b/ covers the positive volume or dump type meter. This 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.

Q In this past paragraph, paragraph b/, what is meant by "self-cleaning?"

A It was the intent of the Committee here that if the crude is of the type that paraffin would form on the walls of the container, that possibly some type of coating should be installed inside the vessel so that the turbulence of the fluid coming in would try to clean the walls of the vessel. However, if the fluid is not a paraffin based type crude, disposable coating would not be needed.

Q In the last sentence of the paragraph, what did the

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Committee have in mind by specifying the "average temperature?"

A That merely means that if an automatic temperature device that continuously corrects for temperature is not installed on the meter, that some provision should be made for continuously recording temperature so that an average temperature for each flow rate can be computed to correct the volume to 60 degrees Fahrenheit.

Q It doesn't mean two temperatures taken over a long period of time averaged, or one temperature taken each day at the hottest part of the day, or something like that, it means a continuous temperature?

A Right. It's a recording that can be an average, can be computed for each flow period.

Q Would you continue your requirements for sampling equipment?

A "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. Again, this Gravity applies to two zones and two leases. 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 re-

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sult. 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."

Q By "uniform rate," you mean a rate sufficient to get a representative sampling?

A Yes, sir, without being real specific we intended that to mean adequate frequency to insure an accurate sampling. "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.

Section 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 auto

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matic 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, 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. Again, this will be covered more explicitly in the Formula later.

Section 4. Meter Provers and Procedures of Calibration.

Part 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.

Item 2 is a Calibrated Storage Tank, and is an excerpt from an API Standard, I won't read it. There are more requirements on this than the strap storage tank required in zone commingling.

Item 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.

Item c/ If prover device is not automatically temperature compensated, the prover volume shall be corrected to 60 degrees Fahrenheit.

Q Mr. Sumerwell, do you have any further comments with respect to commingling zones or leases where the royalty is not common, this part of the report that you have just testified to?

A I think not. I think we have covered it pretty well.

Q Would you refer, now, to Part III of the report, entitled GENERAL REQUIREMENTS FOR ALL METERING SYSTEMS, and explain what is meant by this Section?

A Well, as general applies, it does apply to Part I and Part II of the report. It was written into the report. Some items in it are to enable the Commission to more definitely audit commingling installations, and provides the operator with a clear method of allocating any discrepancies that exist in most any

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metering system; slight discrepancies. They're just general comments covering the whole report.

Q Would you proceed with the General Requirements, pointing out the more important ones, if you would?

A Item 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.

Item No. 1 is: 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 malfunction.)

Q Would you explain what you mean a little more specifically on the last two items there?

A Load oil movements and/or power oil. The oil, power oil would just be proper accounting of any oil that's removed from the lease and then returned through a lease meter. That would need to be included with this data. The power oil is the same way. It's required to actually audit the system. Then, the Remarks. It was intended that inevitably we can have malfunctions in any type of meter. The only known way to correct these malfunctions is to estimate any readings that might have been altered by the malfunction.



tion and to record that estimate, and, again, load oil movements must be included in this.

Q Mr. Sumnerwell, the next item is ALLOCATION FORMULA AND EXAMPLE. I don't believe it would be necessary to go through the Example in detail, but would you point out the Formula?

A The symbols are quite arbitrary Z_1 . We've labeled that as the "Adjusted net zone or lease production chargeable to the zone or lease allowable." And that is equal to $Z_1 \times A$, over the summation of Z_1 's, where Z_1 one would equal net zone or lease production corrected for meter factor and BS&W, if applicable, and that BS&W if that were in the sample used, it would be applicable.

The summation is merely summation of all zones and leases corrected for meter factor and BS&W. A equal to net pipeline runs with beginning and ending stock adjustments. This is, in essence, the net production from all leases for the month.

Q I believe you can skip the example, it is self-explanatory. It is intended, however, as part of the report, and proceed with paragraph C.

A Item 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 comingling application does not conform with the piping arrangement actually

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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.

Q Mr. Sumerwell, do you have anything further concerning this Section on General Requirements?

A I think not.

Q Do you have anything further to add concerning the report, as a whole?

A No, sir. I should just like to take this opportunity for Mr. Elkins and myself to thank all the Committee members for the work that they have done. The cooperation was tremendous, everyone cooperated as well as anybody could expect.

MR. MORRIS: Mr. O'Reilly, do you have any comments you would like to make on the report, as a whole, at this time?

MR. O'REILLY: No comment.

MR. MORRIS: Mr. Bumpass?

MR. BUMPASS: I believe not.

MR. MORRIS: If the Commission please, that concludes the direct testimony of the three witnesses, explaining the report of the Industry Study Committee on Commingling. As I pointed out in my opening statement, these witnesses probably after lunch will sit as either a panel or as individuals to answer questions that might be directed to them. I would like to also point out, as

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stated at the beginning, that it should be remembered that these witnesses are sitting as a representative of the Committee. Their statements here today have not necessarily reflected the position of their specific companies on this matter, and their testimony on cross-examination should not be so construed.

MR. PORTER: I think I detected a hint there that Mr. Morris was hungry. As I understand Mr. Morris, when we resume the cross-examination, the questions will be directed to an individual on the panel.

MR. MORRIS: This is not necessarily true, Mr. Porter. It is thought that the best arrangement might be for any question coming from the audience to be directed to the panel, as a panel, if at all possible. In that way the person most familiar with the question can give the answer. If you direct a question to one person in particular, he may not be too familiar with that portion of the report.

MR. PORTER: If it's too hot to handle, he can always refer it to the next man.

MR. MORRIS: No. I would like to point out that I don't want that procedure followed, if possible. If a question is directed to a particular member of the panel, then that member of the panel should answer the question.

MR. PORTER: The hearing will recess at this time until 1:15.

(Whereupon, a recess was taken)

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MR. PORTER: The hearing will come to order, please.

Does anyone have any questions of the panel?

MR. CHRISTY: Sim Christy of Hervey, Dow & Hinkle. I have one or two short questions to the panel. I wonder if the panel had considered the cost of this installation over and above the cost of installation of commingling facilities that are now being utilized in the New Mexico area?

MR. O'REILLY: Mr. Christy, we will refer as a basis to the use of individual well tests for commingling, and in this case where this type of equipment is employed, we considered cost. We did not detail cost. This was brought up in Committee discussion and in sub-committee discussion. We did arrive at an estimate, and it is the Committee's opinion that approximately a thousand dollars per zone cost would be required to install the facilities on zone commingling, approximately fifteen hundred per lease on lease commingling.

MR. CHRISTY: Mr. O'Reilly, would any additional benefits be gained to the operator or the royalty owner in instances where you had a prudent operator, by the installation of this system as to other leases?

MR. O'REILLY: In the operations of this prudent operator, I'll answer this personally because this was not one of the considerations of the Committee, but in the operations of the operator, I personally can see that there would be no operational advantages to themselves or to the royalty owner in the use of this



equipment.

MR. CHRISTY: Thank you.

MR. PORTER: Any further questions? The panel may be excused.

MR. MORRIS: If the Commission please, I will change hats and represent the Commission Staff, rather than the Committee. On behalf of the Staff, we have one witness that we would like to present to comment on the report of the Committee, and to recommend certain rule changes.

MR. PORTER: You may call your witness.

MR. MORRIS: Mr. Nutter.

(Witness sworn)

DANIEL S. NUTTER,

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Nutter, will you please state your full name and position, for the record?

A Daniel S. Nutter, Chief Engineer for the New Mexico Oil Conservation Commission.

Q Mr. Nutter, have you examined the report of the Com-mingling Committee and heard the testimony presented by the Com-mittee in this hearing today?

A Yes, sir.

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Q What comments do you have concerning the report of the Committee that you would like to offer at this time?

A First of all, on behalf of the Commission Staff, I would like to compliment and to thank the members of the Committee for the work they have done on this report. The Commission was fortunate in having men of their caliber to study this problem and to make such a thorough and comprehensive analysis of it. They have worked hard and done a good job, and certainly deserve much credit.

At the outset of my testimony, I wish to go on record as recommending adoption, by the Commission, of this report, with certain modifications, as a manual for the installation and operation of comingling facilities in the State of New Mexico.

I would like to make it clear, and I believe that the manual itself should make it clear, that these are minimum standards, compliance with which would be mandatory for administrative approval of comingling installations.

Further, I believe that these standards should serve as a guide for the design and operation of any facility for which approval is sought after notice and hearing. I believe that the Commission should give very serious consideration to the matter prior to approving any installation which does not conform in principle to these standards.

People have asked me whether these standards may not be excessive and may not impose too great an expense upon the operator

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who desires to save some money by commingling.

In reply to this, I would first point out that the rules strictly provide that the production from each lease and from each pool shall be measured, stored, and marketed separately. Commingling of production from one or more leases then, or from one or more pools, or from both, becomes an exception to the rules. And when any operator seeks an exception to the rules, he must be willing to go along with certain other rules governing the exception to the rules. This is for the benefit of all, and provides for more orderly development and depletion of our resources. As far as cost is concerned, the installations contained in the Committee's report will cost no more than some of the more elaborate installations heretofore put in. And the operators of those installations saved money on them. The recordkeeping as required by the proposed standards probably is more detailed and probably will cost more money than the records heretofore kept, but certainly some minimum standards of bookkeeping are indicated as required.

The Commission has, in the past, authorized many different types of commingling installations. Some were Model T arrangements. Some were Cadillac-type facilities. Almost all, regardless of the amount of money spent on them, left the door open for the pumper or the farm-boss, whether through innocent error, or because of over-eagerness to make the allowable, or whatever other reason, to cause oil from one lease or pool to be attributed to another. As most systems are presently designed, a pumper could

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in many cases accidentally divert oil from one place to another and not be able to tell it himself the very next day.

We have reason to believe, as the result of our own investigations as well as those of the Federal Petroleum Board, that in quite a number of instances that we know about, and perhaps in other instances which we do not know about, that this accidental or purposeful transfer and mismeasurement of oil has occurred.

Several times I have heard the inquiry, "Well, then, why doesn't the Commission prosecute the violators rather than appoint a Committee to design such costly installations?"

In reply, I might point out that several investigations are being conducted, and have been for some time. Prosecution of several cases can be expected in the near future.

Certain of these investigations, as a matter of fact, helped point out the need for more adequate comingling design and record-keeping. As mentioned before, in some of these systems, which were formerly thought to be adequate, it is impossible to tell from one day to the next which zones or leases produced how much oil or when. In systems like these, it is extremely difficult, if not impossible, for a company itself, let alone the Commission, to detect purposeful mismeasurement of oil.

Without numerous additions to the Commission's field inspection staff, I believe that it will be impossible to properly observe the operation of the existing comingling installations, not to mention the many new ones we can expect in the future.

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For these reasons, the Commission, in appointing the Committee, requested it to design installations which would be as fool-proof as possible.

The Committee members accepted this charge, and devoted many hours of work to it. They have designed installations where mis-measurement of oil is possible but not easy. Deliberate tampering and falsification of records would probably be necessary to divert oil. In most cases, this tampering will result in mechanical alterations which we believe can be detected.

For the good of all concerned, and the overall protection of correlative rights, I believe that this report should be considered by the Commission as a criterion for the ideal installation.

I, therefore, urge its adoption, but would also recommend the following changes be made:

On Page 1 of the written report, in Section A. MARGINAL ZONES, I would recommend that the word "below" in the second line be stricken and replaced by "not capable of producing," so that the sentence would read: "Zone commingling without metering will be permitted where all wells in the zones to be commingled are not capable of producing top allowable, and insert the following: This shall not include those cases where wells are capable of producing top allowable for the pool, but are restricted on account of high gas-oil ratios. This has been a matter that we have on several occasions been confronted with at hearings when operators have sought to commingle without measuring the oil, and based the re-

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quest on the ground that the wells weren't making top allowable; however, the wells were actually capable of making top allowable, and without strict control of gas production, it's impossible to tell how much fluid would come from one zone or the other in some cases. For that reason, I believe that the penalized wells should probably be metered.

In Section B. sub-section 1, I would replace the word "acceptable" with "Commission accepted" meters. There are several other minor changes on this page, they're not substantive.

I think it would be well to try to clarify Paragraph 3 a/. Perhaps clarify other points on the page, I don't know. No substantive changes would have to be made, however, outside of the one I mentioned.

Q Mr. Nutter, if I might interrupt. In general, it's anticipated, is it not, that certain wording, as contained in the report, would have to be changed in order to make it acceptable as a manual, just from the standpoint of the type of wording used?

A Yes, sir, I believe that's probably true.

Q You are not going to indicate in each instance where that type of wording would have to be changed, are you?

A No, sir. No, sir. As I said, things like that are not substantive, and I think that the wording in some cases may be a little too complex for a manual to be generally distributed.

Q For instance, in Paragraph 3 a/ of Part I, it might be that it would be reworded, but retain the same overall meaning?

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A Yes, sir. I wouldn't recommend any change in the Requirements as far as measuring BS&W, and getting credit below 2% and below 2% and all that.

Q Right.

A The meat of the thinking is proper. I have no other suggested changes here for Section A or B. However, when we get down to Section C, ZONES WITH TOP ALLOWABLE WELLS, I'm making no recommendation as to whether this section should be included in the manual or not. At the present time I don't believe there's sufficient evidence on record in the files of the Oil Conservation Commission to support the contention that the subtraction method is accurate enough to rely upon, even when commingling pools underlie a single lease. There's a possibility that this is a suitable method. If the Commission decides it is, and wants to adopt subtraction as a commingling method, Section C should be adequate as contained in the report, with one or two minor changes, neither of which is substantive. I think perhaps another section should be added to this Section 1, which would be D, and cover leases commingling with common ownership in the proposed Rule change that will come through later. We have the situation where the ownership of the leases is identical throughout, and can be commingled without separate measurement of the production from the two leases. In other words, since they are identical leases, the Commission has treated them as a single lease, and perhaps a wording covering that point should be in the manual. It's not in the manual, but

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it would be in the Rule change.

I think this report covers the field very adequately. When we get over to the General Requirements for all metering systems, the Committee has stated that "the operator should 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."

I think it would be well for the Commission to specify that time in its manual, and I would suggest that the words "to be specified by the Oil Conservation Commission" be stricken and substituted with the following words "of not less than two years." Therefore, the records would be kept for two years, at least. The rest of III is adequate, in my opinion, except that I would add one sub-paragraph G to the very end of it there, and it would read as follows: "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 in the Appendix." That's just for ease in handling working on these things. Those are the only changes that I would suggest be made in the report.

I think that the report should include a preface which would outline that this is a manual for administrative approval installations, and should be used as a guide in designing and operating systems that you seek after a hearing. Of course, that wouldn't certainly close the door to an application being filed for an in-

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stallation that didn't comply with these.

Q Mr. Nutter, do you contemplate, if this manual, if adopted by the Commission as you've recommended, would have to be changed from time to time as new equipment might be made available or as other conditions might warrant?

A If new equipment came in that wasn't covered by the general language that the Committee attempted to use, then certainly the thing should be amended to take care of that new equipment, providing it was reliable equipment. As circumstances or conditions warranted, maybe the thing would have to be periodically reviewed, I don't know. I don't think we ought to set a time at which it should be reviewed. Just let the need become apparent, and call the hearing.

Q Do you have any further comments you would like to make with regard to the Committee's report before we take up the consideration of Rule changes?

A No, I don't believe so.

Q Now, Mr. Nutter, as presently executed, do the Commission's Rules on commingling take into account compliance with a manual such as you've recommended today?

A No, sir, they don't.

Q What Rules affect the regulation of commingling?

A Rules 303 and 309 are the two Rules that are affected by commingling. 303 is the Rule that requires the production from a pool must be kept separate. 309 is the Rule that requires that

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the production from a lease must be kept separate.

Q Are you prepared at this time to recommend proposed Rule changes of both of these Rules?

A Yes, sir.

(Whereupon, Oil Conservation Commission Staff's Exhibit No. 1 was marked for identification)

Q I hand you what has been marked as Oil Conservation Commission Staff's Exhibit No. 1, and ask you if this is a copy of the proposed Rule changes that you are recommending?

A Yes, sir, it is.

Q Referring, now, to your proposed change in Rule 303, would you explain it to the Commission, please?

A Yes, sir. As the Exhibit shows, paragraph (a) would be the same as the existing Rule. Paragraph (b) would be the same as the existing Rule, but add on the end of the first paragraph the words "in accordance with the applicable provisions of the Commission 'Manual for the Installation and Operation of Commingling Facilities,' then current."

Q I might interrupt you there, and ask you why the words "then current" were added on the end of that paragraph?

A This is to take into consideration the point we mentioned a moment ago, that the manual might be changed from time to time as conditions or circumstances warranted.

Q In which event, you wouldn't have to have a Rule change to conform the new Rule to a manual that might be adopted?

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A That's right.

Q Proceed.

A Now, I want to make another little change here. It says that the same paragraph would be the same as the existing Rule, but add this on the end.

Coming back to the last sentence of that paragraph; it says -- in essence, it says that the Secretary-Director of the Commission shall have the authority to grant an exception and permit the commingling of two pools without notice and hearing, provided that the production from each pool is accurately measured and determined prior to such commingling. I would suggest that the word "and" be replaced by the word "or." It was pointed out to me that over here in the first section of the manual, or the report, where it provides for marginal zones to be commingled without measure but the allocation to be made on the basis of periodic well test, that wouldn't be in compliance with the existing paragraph (b) of Rule 303, because it says that the production must be measured and determined. Now, I think if we would replace the "and" with an "or" the determination of the production could be on the basis of the well tests. It's just a little point that might ought to be clarified there.

Paragraph 2 of Section 2 would be identical to the existing Rule, and paragraph 3 would be replaced to read as follows: "Applicant shall furnish evidence that all persons owning any interest of record in the subject acreage, which interest appears in the

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Applicant's files have been sent a copy of the application by registered mail." We will replace that with the words, "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."

We would leave the fourth paragraph as it is. In 309-B.

Q Mr. Nutter, would you explain why you feel that a revision of the third paragraph is necessary?

A This paragraph was written when we had the hearing back in January of 1960, and at that time we were trying to accommodate several different suggestions in one sentence. The wording is extremely awkward in there. It's difficult to interpret exactly what it means. We have quite a few requests for interpretation of what the paragraph means. I think the way it's suggested here, it may be a little easier to understand.

Q Do you have any further comment with respect to the proposed revision of Rule 303?

A No, sir.

Q Refer, then, please, to your proposed revision of Rule 309-B, and explain that to the Commission.

A 309-B at the present time is the one I was mentioning before, which "permits the commingling of production from two or more"-- I am quoting from the Rule -- "two or more separate State, Federal, Indian or patented oil or gas leases in a common tank

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battery without notice and hearing, provided that the application has been filed in due form and provides further several requirements. It does not require the measurement of the oil prior to the commingling. It's based on the fact that the ownership is identical in every respect.

What we're trying to do in changing 309-B is taking care of the situation where there is a diversity of ownership, as well as cover the situation where the leases are identical. Would you like for me to go through the 309-B?

Q Yes, if you would, please.

A 309-B, as proposed, would read as follows: "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:"

309-A says, "The production from each lease must be kept separate to permit the commingling".... and so forth.

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Now, we come back to Rule 303, which is the previous Rule we talked about, to get permission to commingle between the Pools. Then, if you had that permission, and you wanted to commingle two leases, which had more than one pool completed on them, you would have to have an exception, of course, to 303 and 309. Paragraph 2. "Adequate facilities will be provided for accurately determining production from each well at reasonable intervals." I think most of it is self-explanatory, without going into any detail, unless you have some questions.

Q Mr. Nutter, some question might be raised with reference to sub-paragraph 3. Would you explain the necessity, in your opinion, of having the consent in writing of all interests in the lease and all operators of adjoining leases?

A I think that any party owning an interest in the lease certainly has the right to the knowledge, at least, that this lease is being commingled with another lease, particularly if it's being commingled with properties belonging to someone else. That is, farmer Jones has a right to know that the production from his lease is being commingled with farmer Smith's production. The operators of adjoining leases shouldn't have any real basis for objection to an operator commingling, providing that his next door operator is a prudent one. That portion, as far as the offsetting operators, could be stricken, I believe. However, I know, as a matter of fact, that the two largest royalty owners in the State, being the Federal Government and the State of New Mexico, want to



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know about it when their leases are commingled. The few patented leases in this State, some of the farmers may want to know about it, and some may not. I think, to take care of the two large royalty owners and the other ones of the patented owners that want to know about it, we ought to have the provision in here. Monies can be affected in here, and where monies are affected, people are interested.

Q Do you have anything further you would like to add with reference to the proposed revision of Rule 309?

A No, sir. Just urge its adoption.

Q Do you feel that an adoption of the proposed Rules 303 and 309 would conform them to be operational if the Commission also decides to adopt a Manual based upon the report of the Commingling Committee?

A I wouldn't recommend that either of these Rules be amended unless the report were adopted.

Q In your opinion, would adoption of the proposed Rules and the Commingling Manual, as you have proposed, tend to protect correlative rights?

A Yes, sir, I believe that it will.

Q Do you have anything further you would like to offer at this time?

A No, sir.

Q Mr. Nutter, did you prepare the proposed revisions of Rules 303 and 309?



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A Yes, sir.

MR. MORRIS: At this time, Mr. Commissioner, we would offer Oil Conservation Commission Staff Exhibit No.1, in this case into evidence.

MR. PORTER: Any questions concerning Exhibit 1? It will be admitted, for the record.

(Whereupon, Oil Conservation Commission Staff's Exhibit No. 1 was received in evidence)

MR. MORRIS: That concludes the direct examination of Mr. Nutter.

MR. PORTER: Anyone have a question of Mr. Nutter? Mr. Christy.

MR. CHRISTY: I have one or two questions.

CROSS-EXAMINATION

BY MR. CHRISTY:

Q I notice the word "registered mail" has remained in your proposed revision. Would there be any objection to "certified mail?" There's a substantial saving.

A No, sir, there is no objection to the substitution of "certified" and/or "registered."

Q As I understood your direct examination, you did not feel it was necessary to notify offset operators?

A No, sir. I have given this some serious thought lately. Mr. Christy, and the Commission periodically puts out a memorandum listing all of the administrative approval, whether it be for no-



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flare exceptions, dual completions, any kind of an exception to the rule that is handled administratively, and I think that any prudent operator is going to be interested in knowing what the next-door operator is doing, but he's not going to object to this operator's commingling, I don't believe, but he does want to know that the man is commingling just so he can keep his eye on the installation, and he can get this information from the periodic memorandum that comes out. I don't think it's necessary to notify the man at the time that you are making the application.

Q I quite agree with you, at least that far. The last question I had, I noticed in Rule 303-B, in your third paragraph substitution, that you have provided for proof of the fact that all parties owning an interest have been notified. In the present Rule, am I correct that it says "all parties owning an interest as reflected by the files of the operator shall be notified;" my question being, how can the operator know at the last moment that he has notified all persons owning an interest unless he checks the records every time he gets ready for a hearing?

A The other one would depend on him checking his files, wouldn't it?

Q Yes. I wonder why you deleted that provision.

A Because his files might not be complete.

Q So, do I understand you, that you are proposing that we would have to check the records every time we made an application under this Rule?



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A If the files weren't complete, that's possible.

Q Don't you think that would be an onerous burden on an operator to have to check the records every time under 303 or 309?

A Well, I have to answer the question, Mr. Christy, by asking a question, can you rely on the operators' files as being complete as to the ownership of the lease?

Q We feel our files are complete before we pay royalty on them.

A Well, perhaps the old Rule, then, in that respect is more suitable.

Q I noticed that you deleted it, and I wondered why. We might be in a position here of having to run to Aztec or Lovington every time we want to file an application.

A Yes, sir. Well, we wouldn't have to abstract the whole record there to find out who owns it.

MR. CHRISTY: Thank you very much.

MR. PORTER: Anyone else have a question of Mr. Nutter? He may be excused.

(Witness excused)

MR. PORTER: Is that all you have, Mr. Morris? Mr. Morris, have you used up all your hats?

MR. MORRIS: I think I have used up all my hats except one, and at the end of the testimony if there is to be any more from other sources, I have several communications I would like to read into the record on behalf of various interested parties, stat-



ing their position, for the record.

MR. PORTER: Mr. Morris, the Commission will give you an opportunity to do that as soon as the testimony has been concluded. Does anyone else desire to present testimony in this case at this time?

MR. KELLY: Booker Kelly, substituting for Mr. White, who was called away. I would like to present some testimony from Texaco.

MR. PORTER: You may proceed, Mr. Kelly. Have your witness sworn.

MR. KELLY: I have one witness.

(Witness sworn)

J. E. ROBINSON, JR.,

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. KELLY:

Q Would you state your name, employer and position, please?

A I am J. E. Robinson, Jr. I am employed by Texaco, Inc., Midland, Texas, as a petroleum engineer.

Q Have you previously testified before this Commission --

A Yes, sir, I have.

Q -- and been qualified?

A Yes.

Q Were you a member of the Industry Study Committee?

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A Yes, I was.

Q What does Texaco seek in your proposed testimony today, Mr. Robinson?

A If any part or parts of the proposed minimum standards are adopted, Texaco wishes to go on record in supporting Part I, C of the minimum standards of commingling crude oil. In other words, we are supporting the subtraction method for commingling.

Q Part I of zone commingling is for zones with common royalty. You are proposing the subtraction method for zones of common royalty, and not for zones of anything under common royalty?

A Yes, we are proposing the subtraction method for zones of common royalty only.

Q What is the subtraction method?

A The subtraction method is an accurate method of allocating production to different zones by using one less meter than the total number of zones being commingled, and proportioning the difference between the pipeline runs and the summation of all meter readings to the zone that is unmetered.

Q In using the subtraction method, you always use one less zone meter from the total number of zones that you are commingling, is that correct?

A Yes, that's correct. When commingling two zones only, one meter would be used, and when commingling three zones only, two meters would be used, and so forth.

Q Is the subtraction method an accurate method for deter-



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mining the zone's production?

A Yes, we believe it's an accurate method. Not only is it accurate, but economical.

Q Has Texaco previously been on record in supporting this subtraction method?

A Yes, sir. At the Statewide Hearing to revise Rule 303, on January 13, 1960 Texaco proposed the subtraction method. At that time there was some doubt in the Commission's mind that this was an accurate method since the unmetered side would account for all weathering, and the request was not granted. We believe that if a meter is proven into a stock tank, that any evaporation losses will be included in the meter factor. A large percentage of evaporation occurs as the oil is initially flashed into the stock tank. Any weathering losses can be incorporated into the meter factor by allowing the crude to stand for any determined length of time. If necessary, the crude could be weathered for the average length of time that it takes for a tank to go on pipeline stream.

Q Has Texaco run any weathering tests on different gravity crude, and, if so, will you explain how the tests were run and what the results were?

A We have run weathering tests on crudes in the Monument, the Vacuum, and the Justis, Ellenburger and McKee Pools. The tests were run by Texaco engineers using the presently installed lease tanks. Gravities and temperatures were taken at a depth of 3 feet



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below the top of the liquid. The engineers used an engineering scale to mark the gauge line to measure the depths. All tanks were top filled, and were being filled prior to the start of the test, and were isolated at the start of the test. We selected three different gravities, ranging from 31.9 degrees to 44.9 degrees API to conduct our weathering losses. These ranges were selected since the larger part of New Mexico crudes are within this range.

(Whereupon, Texaco's Exhibit No. 1 was marked for identification)

Q Will you explain the weathering tests for the crudes in the Monument Pool, and in so doing, refer to what has been marked Exhibit 1?

A The lowest gravity crude that we tested was on the State of New Mexico "G" Lease in the Monument Pool. On all of our charts, we start on the left-hand side. We have our "Hours" that each measurement was taken. The next is the "Gauge" depth that we found the crude to be occupying in the tank. Next is the "Temperature" in the degrees Fahrenheit that we observed from three feet below the top of the fluid. The next is the "Observed Gravity." The next column is our "Tank Chart Volume." These charts are from the strap table that were made from each of the individual lease tanks. Our next column is the "Gravity" corrected at 60 degrees Fahrenheit, and our next column is our "Volume in Barrels" at 60 degrees. This is based from the 1952 ASTM Petroleum Crude



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Measurement Tables. And our last column is the "% Change in Initial Volume at 60 degrees Fahrenheit." So, on our lowest crude that we tested, which was a 31.9 degree crude in the Monument Field, 2½ hours before we started our test, we had 13 feet 5/12/16" in the tank. The observed temperature was 81 with the gravity corrected at 31.8, and we had a volume of 441.75.

Now, after the tank had been filling for 2½ hours, we started our test. We started out with an initial gauge of 14 feet, 7-12/16". The initial temperature was 90 degrees. The observed gravity was 34.0. The tank chart volume was 483.97 barrels. The gravity was 31.9. We started this test with initial volume of 478.21 barrels. After the crude had weathered for one hour, our engineers measured the tank again. This time it was 1/16th of an inch less. The temperature was 96 degrees, the gravity was the same. The corrected volume was 476.87 barrels. So, you see, roughly, that we have a weathering loss of about a barrel and a half if you disregarded any of the other tests. If you only had these two figures, well, you would look, and you would say, "Well, we have, oh, about .2800 of 1 percent weathering loss." We don't believe that this is necessarily true, and I believe I can point it out later on.

After two hours, we had the identical gauge depth reading as we had before, but our temperature has risen to 101 degrees. Our gravity in this measurement was 32.3, our volume is 475.95 barrels. So we have lost about ninety-two hundredths of another barrel from



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the end of one hour to the end of two hours. This is equal to about forty-seven hundredths of one percent change in the total volume.

We let our crude weather another two hours, or at the end of four hours, we still had the same measurement here, but our oil has cooled down one degree. We have a gravity of 31.8 degrees. We now have a volume of 476.15 barrels, or actually in these two measurements we have gained about two-tenths of one barrel between the two-hour figure and the four-hour figure, or this represents about forty-three hundredths of one percent change in total volume.

The next we allow the crude to weather another four hours, or at the end of eight hours we still have the same gauge depth here. Our crude has cooled off some more. It has cooled off to 98 degrees. Our gravity is 31.7, but we have started showing an increase now in volume of 476.53 barrels, or about thirty-eight hundredths of a barrel increase between the end of the four-hour and the eight-hour test. This represents about thirty-five hundredths of one percent change.

Now, we allowed the crude to weather another four hours, or at the end of twelve hours we have lost about one-sixteenth inch in depth, but our crude has cooled off considerably. This measurement was taken at night, and when the ambient temperatures had fallen. We have a gravity of 31.7, but our volume corrected back to 60 degrees now is 479.63 barrels. Actually, we have gained about a barrel and a half from our initial start of our weathering



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test, so at the end of twelve hours, we're actually showing a gain of twenty-nine hundredths of one percent in our total volume.

After the crude was weathered for twenty-four hours, it now has a temperature of 83 degrees. The gravity is still 31.9. We have a volume of 478.21, which is identical to the volume that we started out with, after this crude had weathered for twenty-four hours. There is no difference in the percent change. Now, we allowed the crude to weather an additional twenty-four hours, or after forty-eight hours we have a height of 14 feet, 7 1/16" in the tank. Our temperature is 85 degrees, we have a gravity of 31.9, our volume is 477.31 barrels, which is, roughly, about nine-tenths of a barrel loss, or a net change of 18/100ths of one percent. We started out with a test where the temperatures were fairly high. We ended our test when the temperature of the crude was down. Now, we have no accurate method of measuring the temperature of the shell of the tank. However, we have to make the basic assumption that our temperature in our tank and the temperature of the shell of the tank have to be associated. So the coefficient of steel expanding and contracting with the degree change has to accommodate this percentage change here. We know that weathering has taken place, but yet after twenty-four hours we don't show any weathering. So the only thing that this can be based on is that as the tank heats up it will expand, and then as it cools off, it will contract. On all of these temperatures, each time the temperature went up, we had a larger percent loss, but as



it started cooling down, we started gaining on volume again.

Q Do you want to go on to Exhibit 2 in the Vacuum Pool, now?

(Whereupon, Texaco's Exhibit No. 2 was marked for identification)

A Exhibit 2 was the intermediate gravity that we tested. This was taken on our State of New Mexico "L" & "M" Leases. When we started out, the tank was being filled, and at 9:00 o'clock on June 1st they shut the tank in. It was isolated. The initial temperature was 79 degrees, and our initial volume was 242.13 barrels. At 10:00 o'clock A. M. the temperature had raised four degrees. We now have a volume of 241.64 barrels, or a loss of approximately a half a barrel. This results in a net percent change of about two-tenths of one percent.

At 11:00 o'clock A. M. our temperature was 82 degrees; our volume was 241.76. So, actually, even though weathering has been taking place between one and two hours, we have gained about twelve-hundredths of a barrel from the one-hour reading, and this results in a net change of fifteen-hundredths of one percent.

At 12:00 o'clock noon the temperature was 84 degrees, the volume was 241.52 barrels. We are now showing a loss between 11:00 o'clock and 12:00 o'clock. This is equal to twenty-five-hundredths of one percent.

At 1:00 o'clock, or at the end of four hours, we have a temperature of 83 degrees, our volume is 241.64. We have now gained

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twelve-hundredths of a barrel back, and in our weathering loss which results in a reduction in the percentage change to approximately twenty-hundredths of one percent.

After the crude had weathered for eight hours, or at 5:00 P. M. on June 1, the temperature was 84 degrees, the volume was 241.69 barrels. Now, this shows that our crude is one degree warmer. Normally, you would expect that we would have lost some volume here, but that may not be necessarily so.

At 1:00 P.M. the shell of the tank could have been possibly a hundred or maybe a hundred ten degrees, whereas the crude was only 83, because the shell of the tank has to heat up first to then heat the crude, and then as it cools off, the shell of the tank will be the first one to cool off, too.

After weathering for eight hours, we now have a difference of about forty-three-hundredths of a barrel, or eighteen-hundredths of one percent of the total volume.

After weathering for twelve hours, or at 9:00 P.M., our temperature was 81 degrees, for a reduction of three degrees from the previous reading. We have now gained thirty-seven-hundredths of a barrel from the previous reading, and this represents two-hundredths of one percent change in the total volume.

After weathering for twenty-four hours, or at 9:00 o'clock the next morning, the temperature is at 82 degrees, or three degrees warmer than when we started out. It has a volume of 241.85 barrels, or a percent change of approximately eleven-hundredths of



one percent.

After weathering for forty-eight hours, we now have a temperature of 80 degrees, or one degree more than what we originally started with. We have a volume of 241.84 barrels, and this represents approximately twelve-hundredths of one percent change in the total volume.

(Whereupon, Texaco's Exhibit No. 3 was marked for identification)

Q Now, going on to Exhibit 3, would you explain that to the Commission?

A Exhibit No. 3 was taken on our C. E. Penny NCT-4 Lease. This is a commingled battery commingling Justis Ellenburger and Justis McKee Pools. In this test here we have tried to select different tests to show the Commission what the differences are. This particular test over here, we started out with a higher temperature and ended up with a lower temperature. This one is more or less constant, but this one here, we start out with a temperature that is fairly low, and then end up at a higher degree temperature. We took our first measurement at 1:20 A.M. in the morning. We did not start our test, though, until 3:55 A.M. We had eight feet 11 and 7/8ths inch with a temperature of 71 degrees. The gravity was 44.6. The volume was 184.59 barrels. One hour later, at approximately 5:00 o'clock in the morning, we have the same gauge depth, our temperature has cooled off one degree. We now have a volume of 184.68 barrels, or nine-hundredths of a barrel

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increase. This represents four-hundredths of one percent increase in the change from our original volume.

Two hours and twenty minutes later, at 6:15 in the morning, which is probably about the coolest part of the day, at least, our test got our minimum degrees at this time. The temperature was 68 degrees, we had 184.66 barrels. We have shown two-hundredths of one barrel loss from the measurement of one hour, but we're still ahead of the original volume, or three-hundredths of one percent.

At 7:30 in the morning, three hours and thirty-five minutes later, our temperature is 74 degrees. We now have a volume of 184.10 barrels, or a loss of about a half a barrel. This represents twenty-six-hundredths of a percent change.

After four hours thirty-five minutes, our temperature is one degree warmer, we're showing more loss now. We're showing thirty-one-hundredths of one percent change.

After eight hours and fifteen minutes' weathering, or 12:10 P.M., our temperature is 81 degrees, our volume is 183.26 barrels. The percent change is seventy-two-hundredths of one percent. Now, as the temperatures go up, we show more percent change in our total volume.

At 4:00 P.M., after the crude had weathered for twelve hours, we reached our highest temperature of 83 degrees. We now have 182.50 barrels, or about two barrels less than what we originally started with. This represents 1.13 percent change in total volume.

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After this crude had weathered for twenty-five hours, or 5:00 o'clock the next morning, the temperature has dropped down to 76 degrees, or an eleven-degree change in temperature. We have now increased our volume from $182\frac{1}{2}$ barrels to 183.29 barrels, or an increase of about seventy-nine-hundredths of one barrel. We now have a loss of about seventy-hundredths of one percent.

After weathering for forty-eight hours, our temperature is 78 degrees. We have 182.92 barrels, or about a barrel and seven-tenths barrel change. This represents a change of ninety-hundredths of one percent.

More or less assuming all of the tests, the lowest test, or the lowest gravity, naturally, we don't have very much weathering. This is what you would normally expect in a lower gravity crude that you don't have as much volume tolerance in the lower crude as you do a higher gravity, but after twenty-four hours it was zero. On the intermediate gravity we are showing approximately twelve-hundredths of one percent, which is a very small percentage, and then in our higher gravity it would be all dependent upon when you selected your weathering loss. If you wanted to select after two hours, you can actually show an increase in volume, or if you selected at that time when the temperatures were extremely high, then you would have more loss than you would at a cooler temperature.

Q What conclusions do you draw from these tests?

A In our opinion, the tests firmly established the follow-

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ing facts: That weathering losses are not nearly as great as some in industry would believe. (2) That the variation of the tank volumes caused by the changes of the ambient temperature is a much greater contributing factor to the total volume of the crude than is the weathering factor. (3) That the weathering factor is of but minor importance. (4) Even though we feel that weathering is of little importance, we feel that it can be combined in the meter factor to accurately account for all weathering losses.

Q Why did you select these particular pools for your tests?

A We attempted to select different gravities that the larger percent of New Mexico crudes would fall in.

Q In your opinion, are these tests fairly representative of the weathering of crudes in the various pools throughout New Mexico?

A Yes, we believe that they are. But, of course, as the ambient temperature in the warmer summer months increases, as in August, one would expect more weathering to occur than these tests indicate. However, during the fall and the winter months, when the seasonal temperature is lower, there is less weather.

Q When were these tests conducted?

A June of this year.

Q What economic advantages do you see in the use of the subtraction method?

A The economical advantages will be dependent upon the



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method of production of a particular lease. The subtraction method will eliminate one zone meter, plus the bad oil return meter, and a sampler for all installations, and this savings is approximately one thousand dollars per installation. Using the subtraction method on a lease where the production is obtained by the use of hydraulic subsurface pumping installation, it is possible to eliminate two samplers and three meters; this savings is approximately sixteen hundred dollars.

Q At the beginning of your testimony, you stated that you served on the Industry Committee. Do you offer your testimony today as a member of that Committee?

A No, sir. I offer it only on behalf of Texaco, Inc.

Q Do you have anything else you wish to state?

A No, that's all.

Q Were Exhibits 1, 2 and 3 prepared by you or under your direction?

A The Exhibits were run by Texaco engineers who submitted the data to me, and I prepared it in this form.

MR. KELLY: I offer the Exhibits 1, 2 and 3 in evidence.

MR. PORTER: Without objection, the Exhibits will be admitted in evidence.

(Whereupon, Texaco's Exhibits Nos. 1, 2 and 3 were received in evidence)

MR. PORTER: Does anyone have a question of Mr. Robinson? Mr. Nutter.



CROSS-EXAMINATION

BY MR. NUTTER:

Q These tanks which you were conducting these tests on, were they pressure tanks or vented to the atmosphere?

A They were carrying a small amount of back pressure on them. It was run under normal operating conditions.

Q Assuming that the Commission should adopt the Manual, and assuming that they would adopt the subtraction method, do you think it would be appropriate that the requirement be that this subtraction method be limited to the tanks that did hold a back pressure on them?

A No, sir. You can't limit all of them. I would have no objections to it, but there might be some operators that on a low gravity oil, he might not have at this time tanks with back pressure vents on them, what not. I'd have no objection to having it stipulated in it.

Q Well, as a matter of fact, don't most tanks have pressure vents on them?

A Yes, sir.

Q What is the standard practice now?

A As a general rule, they do unless you get into some of the old fields where maybe the tanks are corroded, and they are not capable of holding back pressure on the tank, and then I would think that you would probably find quite a few installations where they didn't have it.

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Q You mentioned that you would expect more loss by weathering from the higher gravity crudes than you would from the lower gravity. Do you think that the provision in the Manual should be to limit it to any particular gravity range?

A No, sir. I think that all New Mexico crudes should be included in it. We're proposing this for a lease of common royalties, and we are testing or proposing to prove our meters into a tank which even though the higher gravity oil will have more weathering losses as it is initially flashed and as it is allowed to stand and weather, however, the meter factor on a higher gravity oil would have a larger meter factor than a lower gravity oil would. So I think the method would be accurate for all crudes.

Q How about the case where high gravity gas well liquids are commingled with oil?

A I would think as long as the meter is proven into a tank, then you could incorporate in the meter factor the weathering losses, and you could be very accurate with these losses.

Q So you feel that the gravity of the crude or whether it's crude or distillates doesn't matter as long as your meter factor contains the weathering factor?

A That's correct.

MR. PORTER: Anyone else have a question? Mr. Morris?

BY MR. MORRIS:

Q Mr. Robinson, would Texaco concur, then, with the recommendation of the Committee concerning the subtraction method?



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A They would, if it is adopted.

Q Texaco would concur with the report as it is submitted?

A I'll leave my comments for my closing statement. When I started my testimony, I stated that we were supporting this part of the minimum standards, if any part or parts of it are adopted.

Q I wasn't trying to ask a trapping question. I just wondered if Texaco had any recommendation beyond those of the Committee's recommendations.

A No, sir, we do not. We are supporting the subtraction method. We would like to see the operators at least be given the advantage of what we believe to be an accurate method, but have one which is also economical, if any part is adopted.

MR. MORRIS: Thank you.

MR. PORTER: Anyone else have a question? The witness may be excused.

(Witness excused)

MR. PORTER: Does anyone else desire to present testimony in the case?

MR. MORRIS: If the Commission please, before any statements are taken, I would like to read into the record several communications that I have received in the ^{event} statements might like to be based upon the statements that I would read.

MR. PORTER: You may go ahead and read those statements, Mr. Morris.

MR. MORRIS: I have a communication from Shell Oil



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Company, signed by Mr. C. A. Nyhof, Crude Oil Department - Midland. It's quite lengthy, but I'll read it into the record in its entirety. Addressed to the New Mexico Oil Conservation Commission, Attention: Mr. A. L. Porter, Jr.

Gentlemen:

It is noted that the final report by the Industry Study Committee on Minimum Standards for Commingling Crude Oil and Hydrocarbons in New Mexico has been submitted to the Oil Conservation Commission and that at the regular hearing on August 16, 1961 the Commission probably will consider incorporating such standards as part of Rules 303 and 309-B.

There is no doubt that the adoption of the Committee's study would be a big help to the Commission and to the operators in establishing uniform procedures. However, in cases where the interest ownership is diversified the commingling of crude oil from wells, zones, or leases presents a problem to the purchaser of the production insofar as proper allocation for payment is concerned. Due to difference in price the commingling of high gravity condensate with crude also presents another problem. It is our feeling that the purchaser has the right to refuse to purchase any commingled production if means or facilities are not available to properly determine quality and ownership at the time and place of receipt. In other words, the purchaser, in taking the commingled production, will not rely upon breakdown data compiled and furnished by the operator.



It is therefore recommended that even though the Commission may grant permission to commingle it should be with the understanding that the operator should not start commingling operations until he has first consulted and made satisfactory arrangements with the purchaser of the production.

In the case of diversified ownership one possible solution is for the purchaser to require that the operator assume the full responsibility of disbursing payments to all interest owners. For protection and indemnity to the purchaser this would require that the operator, in some cases, obtain approval from each interest owner whereby such interest owner would agree to look to the operator for payment. This could possibly be done at the time the operator obtains consent to commingle as is now provided in Rule 309-B.

We respectfully call this to your attention so that our recommendation may be given proper consideration when the matter comes up for hearing on August 16, 1961.

MR. PORTER: Mr. Morris, I would assume that any operator would do that because it would seem to be a rather futile gesture for an applicant to get approval for a commingling installation and then not be able to sell his oil.

MR. MORRIS: I think that's a reasonable assumption. I have a further communication from Gulf Oil Corporation, signed by Mr. W. A. Shellshear. Addressed to the Oil Conservation Commission, Attention Mr. A. L. Porter, Jr., Reference Case No. 2356 Scheduled for Consideration at the Statewide Hearing to be Held in

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Santa Fe on August 16, 1961

Gentlemen:

The following are Gulf's comments in regard to the above referenced case.

The Industry Study Committee on Commingling of Crude Oil has done an excellent job in setting up standards to minimize the possibilities of failure and accidental or purposeful mismeasurements of commingled crude oil. However, it is our opinion that the standards which were set up to comply with the Commission's directive add to the cost of installations at a time when producers are attempting to reduce costs by commingling. The standards do tend to minimize the possibilities of purposeful mismeasurements; however, prudence on the part of the producer has been and still will be a prime factor.

Gulf desires the opportunity to commingle crudes from multi-pay leases having common royalty on top allowable zones as well as on marginal zones without prior metering, with allocation of production being made to the respective pays based on well tests. Based on increasing cost trends an operator must continually exploit all means of reducing or minimizing costs. By the elimination of individual measurement a great saving can be realized in investment, operating and maintenance costs and also a substantial reduction in reporting and keeping of records would result in further savings. It is our opinion that this approach is a practical one.

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It is recommended that the new rules, if adopted, not require seals on metering facilities because of the burden of resealing that would be placed on the Commission and the operator.

It is further recommended that provided the new rules apply to installations already installed as approved by the Commission that the need for any modifications be determined after individual consideration.

Reference is made to the portion of the proposed revision to Rule 309-B which reads, "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." We feel that the obtaining of approval from offset operators of the adjoining leases is not necessary and only serves to add a paper-work burden upon the producer.

I have a communication addressed to the New Mexico Oil Conservation Commission, Attention: Mr. A. L. Porter, Jr., from Mr. J. D. Wheeler, Division Manager, The Ohio Oil Company, Houston Division. "Reference Case 2356, August 16 Hearing. The Ohio Oil Company concurs in the proposal to authorize administrative approval of applications to commingle crude oil provided the safeguards and minimum standards recommended by the June 21 report of the Industry Committee are complied with. We agree that consent of royalty owners should not be required and that notice to royalty owners and offset operators may be dispensed with if those safeguards and minimum standards are adopted."

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I have another communication, addressed to the New Mexico Oil Conservation Commission, signed by Mr. R. D. Hanley, vice president, Mobil Oil Company, entitled "Socony Mobil's statement on commingling at August 16, 1961 NMCCC Hearing. Socony Mobil Oil Company, Inc. recommends adoption of the proposed commingling standards. We also urge that the Commission not require the notification of royalty owners and offset operators for administrative approval of commingling requests. We support Shell Oil Company's position regarding notification of royalty owners and offset operators. We feel that the notification requirements are unnecessary and a burden that should not be placed on the industry. Where minimum requirements are not to be followed, the Commission, after proper public notice, should require a hearing prior to approval."

One further communication, addressed to the New Mexico Oil Conservation Commission, signed by R. W. Ely, Assistant Division Superintendent, Cities Service Petroleum Company. Attention: A. L. Porter, Jr: Cities Service Petroleum Company recommends the revision of Rules 303 and 309-B to provide for administrative procedure for obtaining permission to commingle crude oil under the minimum standards as proposed by the Committee on Commingling of crude oil June 21, 1961. Cities Service Petroleum Company further recommends that the Commission consider revision of that portion of these Rules whereby it is necessary to obtain consent in writing from royalty owners and owners of adjoining oil and gas leases to commingle production from separate leases or separate producing

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zones."

MR. PORTER: Does anyone else have a statement to make in the case? Mr. Seth.

MR. SETH: If the Commission please, I would like to read a statement on behalf of Shell Oil Company which relates to the notice provisions of the proposed rule change.

"Shell Oil Company endorses the proposal by the New Mexico Oil Conservation Commission to adopt minimum standards for commingling installations and to provide in the regulations for administrative approval of same. We respectfully and urgently request, however, the Commission's reconsideration of the proposal that operators be required to inform all royalty interest owners and offset operators of the proposed installation.

As you are aware, many leases are on record with hundreds of separate interests. We are sure that the Commission will appreciate the enormous amount of nonproductive paper work that will be created if operators are required to solicit approval of these interest owners for their operations. Under an oil and gas lease, the lessee is granted the privilege of operating the property in any reasonable and proper manner and is accountable under the law to see that the royalty owner receives his share or interest in the production from his lease. We feel that the royalty owner is adequately protected and that the practice of commingling is prudent and in the interest of both the lessee and the lessor. Therefore, the operator should be allowed to apply this practice without the

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specific permission or notification of the royalty owner.

With regard to notification of offset operators, it is our opinion that no operator would object to a proposed commingling installation but only to the improper operation of same. Virtually all of the representatives of the industry whom we have asked have indicated that they would consider such notification unnecessary. We urge, therefore, that this notification not be required.

We would like to reiterate that among the many problems facing the industry today is the enormous amount of routine paper work which is adding steadily to our already large overhead. We believe that it is in the interest of the State of New Mexico, the lessors, and the industry in general to make every attempt to minimize non-productive efforts and costs.

We therefore urge the Commission's reconsideration of the requirements to notify royalty interest owners or offset operators when requesting administrative approval of commingling installations.

Now, if the Commission please, over the past years, we have all seen a number of attempts to suggest that the Commission interest itself in the relationship between the operator and the royalty ownership. In this case, Case 1850, that was referred to here, this suggestion is accomplished, it's incorporated in the Rule, and it's been done before, but I think more and more recently we're seeing this attempt to push the Commission into this area of a relationship which is strictly a legal matter. Obviously, the

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relationship between the royalty owner and the operator is a legal one, contractual one, determined by the lease, and all the case law and statute law that surrounds them.

If the Commission gets into that area and attempts to adjudicate these rights, I think it's getting into a whole new and entirely different world, as far as its past history is concerned. If these royalty owners, in response to the notices, should come in before the Commission and object to the installation of a commingling facility, they will object on the ground it's a violation of their terms of the lease, the obligation of the operators. It's difficult to see how the Commission is going to decide that question without deciding whether it's entirely a contractual or legal matter. We feel this notice is not necessary, because the royalty owner is entirely, otherwise, entirely protected by this large body of case law, and the statutory law, and the contractual arrangement that has been created. I don't believe the Commission really wants to get into this matter of possible contention and dispute. The parties ought to be left to the negotiation and the Court in that area rather than the Commission hearing the matter. That's why we are going a little bit overboard on this notice. We see it coming in in other areas of Regulation by the Commission. We think it's going to cause the Commission some serious administrative trouble if it's pursued any further. Thank you.

MR. PORTER: Anyone else have a statement?

MR. HUGHES: R. N. Hughes, representing Phillips Petroleum

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Company. Phillips wishes to state its endorsement of the New Mexico Oil Conservation Commission proposal to adopt minimum standards for commingling installation and to provide for administrative approval. We further endorse at the close of the Texaco, Inc. testimony the subtraction method be adopted for administrative approval. We respectfully request the Commission's approval of this proposal.

MR. SCHNEIDER: A. E. Schneider, Amerada Petroleum Corporation. Amerada is generally in agreement with the report that has been submitted, and we hope that the Commission will see fit to adopt these recommendations. We feel that satisfactory installations have been made and can be made along this line in an economic manner. The one thing that the Texaco presented about the subtraction method, we agree with them on that. We believe that the subtraction method can accurately be used. Also, we are in agreement with the letter that Mr. Seth read from Shell proposing that we not have to notify the royalty interests, especially in the leases that we are attempting to commingle.

MR. PORTER: Mr. Jacobs.

MR. JACOBS: Ronald J. Jacobs, attorney and engineer for Skelly Oil Company. I have a statement I would like to read, and then file with the Commission.

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.



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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 fool-proof 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.



MR. PORTER: Mr. Buell.

MR. BUELL: Guy Buell, for Pan American Petroleum Corporation. We would like to make two suggestions in this case. First, the minimum standards as presented here today, provide that any time you meter downstream of the treater, you must install a sampler. Samplers are expensive. For that reason, we would recommend to the Commission that that language be amended to provide that a sampler only be installed when the water production from that lease is in excess of two percent. We would further recommend that none of these standards be applied retroactively to previous installations already approved by the Commission, and certainly under no conditions without notice and full hearing on changes.

MR. PORTER: Mr. Christy.

MR. CHRISTY: Sim Christy for Humble Oil & Refining Company. I might say at the start to the Commission that Humble, at the request of the Commission, was pleased to furnish a member to serve on the Industry Commingling Committee. First, it appears evident that the arrangements devised before this Committee may be employed to minimize or to facilitate detection of mismeasurement of crude oil production. Humble does not advocate the adoption of mechanical standards for a commingling. Periodic well tests are believed to be satisfactory for this purpose. It is recommended by Humble that the arrangements devised by this Committee not be required of any operator unless the Commission finds in a specific case that such is necessary in specific instances for proper regu-

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lation of commingled production. Secondly, we would mention that in the event the proposed minimum standards for commingling are adopted by the Commission, that it is recommended that the notification to the royalty owners and the offset operators not be required when requesting administrative approval for commingling installations. This later matter seems to have support from Amerada, Shell, Mobil, Ohio, Gulf, and as to the offset operator, Mr. Nutter.

I could not personally close without one comment in support of Mr. Seth's position. I think it would be unnecessary to advise this Commission that the State and the Federal Government, as royalty owners, have sufficient rules and powers to protect themselves. As to the fee royalty owners, the practicalities are that about ninety percent of them don't even know what you sent them, two percent never receive it, and the other seven or eight percent are in a fight or an agent on a lease contract problem, and that would mean that this Commission is going to be right into a law suit type of hearing as to contractual rights between the operator and the royalty owners. For that reason, I would strongly recommend to the Commission the deletion of notification to the offset operators and royalty owners.

MR. PORTER: Mr. Robinson.

MR. ROBINSON: J. E. Robinson. Texacc, as an operator in the State of New Mexico, does not agree with the minimum standards that have been proposed here today by the Industry Study Com-



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ALBUQUERQUE, NEW MEXICO

mittee. The adoption of such minimum standards will destroy much of the economic advantage that is gained by commingling these minimum standards which have been proposed because of the operations of the imprudent operator. The operator who diligently strives and obeys all laws and regulations of this Commission must now be penalized with an economic burden because of the actions of a few imprudent operators. We believe that the Commission should require operators that are guilty of unethical practices to install these minimum standards, if they are adopted. However, we urge the Commission not to require these standards for the prudent operator. If the Commission now sees that it must adopt strict commingling standards to minimize the illegal transfer of oil from one zone to another, Texaco strongly recommends that the Commission adopt, as one system, the subtraction method.

We believe that the testimony given here today clearly indicates that this method accurately measures each individual zone's production, and reaches the objectives that are being sought here by this hearing. We join with other operators in urging that the requirement of the notification of the royalty owners and that offset operators be deleted. Thank you.

MR. PORTER: Mr. Anderson.

MR. ANDERSON: R. M. Anderson, Sinclair Oil & Gas Company. We believe that the proposed commingling Manual will be restrictive to an operator and unnecessarily so, but in the event that it is adopted, Sinclair would like to join with Texaco and



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some of the others in recommending that the subtraction method be retained in the Manual. We would like to concur with the recommendations made here today concerning not notifying royalty owners and other owners of an interest in a property, to get their approval, or to notify them of the matters pertaining to the commingling. We concur with that sentiment. We would also like to recommend that in the event that the Manual is adopted, that it delete any requirement for samplers whenever they are required, except if an operator elects to meter or measure the production prior to treating, and then at that time if the production exceeds two percent water, I believe then that samplers should be required, or at least should be left to the option of the operator. I have also a position I would like to make on behalf of Sinclair Crude Oil Company, who purchases crude in this State, and they would like to concur with the sentiments that were expressed with regard to getting the purchaser's approval prior to commingling in these installations. Possibly written requirements similar to the requirement in the LACT unit Rule, requiring a letter from the pipeline company approving the LACT unit, possibly a similar requirement should be put in the proposed Rule changes to require the applicant to get approval from the purchaser to commingle prior to making his application. Thank you.

MR. PORTER: Mr. Lyon.

MR. LYON: V. T. Lyon with Continental Oil Company.

Continental Oil Company would like to urge three points for con-



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ALBUQUERQUE, NEW MEXICO

sideration by the Commission on the matter under discussion. No. 1, we concur with the position of Shell Oil Company in regard to requiring consent of interested parties and notification of offset operators. No. 2, we fear that the adoption of the Manual may serve to force more expensive and complicated equipment that may be necessary for a particular application, and place an excessive burden of proof on any applicant at hearing wishing to deviate from any of the installations illustrated. No. 3, we observe several instances of a lack of clarity in the wording of the report, and rather than burden this record with a lengthy discussion, would like to submit a letter to the Commission for their consideration in drafting a final form of any formal directive or order.

MR. PORTER: Mr. Lyon, you will be permitted to submit any suggested wording that you would like, but we urge you to do that immediately, as soon as you possibly can.

MR. LYON: Yes, we will.

MR. PORTER: Anyone else?

MR. TUFFLY: A. J. Tuffly with Tidewater Oil Company. Tidewater wishes to concur in the adoption of installations and operation of commingling facilities and revisions of Rules 303 and 309 to provide for administrative procedures for obtaining permission to commingle crude oil in connection with the proposed Manual. Thank you.

MR. PORTER: Anyone else have a statement? Mr. Shoemaker.



MR. SHOEMAKER: Glenn Shoemaker, Indiana Oil Purchasing Company. We concur with Mr. Nyof and Sinclair's Crude Oil statements, that purchaser approval should be required for commingling.

MR. PORTER: Does anyone else have any statement to make? The Commission will take the case under advisement and take a short break.

DEARNLEY-MEIER REPORTING SERVICE, Inc.

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ALBUQUERQUE, NEW MEXICO



STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss

I, ADA DEARNLEY, Court Reporter, in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in machine shorthand and reduced to typewritten transcript under my personal supervision, and that the same is a true and correct record, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 30th day of August, 1961, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
NOTARY PUBLIC

My Commission expires:

June 19, 1963

DEARNLEY-MEIER REPORTING SERVICE, Inc.

PHONE CH 3-6691

ALBUQUERQUE, NEW MEXICO



First of all, on behalf of the Commission Staff, I would like to compliment and to thank the members of the Committee for the work they have done on this report. The Commission was fortunate in having men of their caliber to study this problem and to make such a thorough and comprehensive analysis of it. They have worked hard and done a good job, and certainly deserve much credit.

At the outset of my testimony, I wish to go on record as recommending adoption, by the Commission, of this report, with certain modifications, as a manual for the installation and operation of commingling facilities in the State of New Mexico.

I would like to make it clear, and I believe that the manual itself should make it clear, that these are minimum standards, compliance with which would be mandatory for administrative approval of commingling installations.

Further, I believe that these standards should serve as a guide for the design and operation of any facility for which approval is sought after notice and hearing. I believe that the Commission should give very serious consideration to the matter prior to approving any installation which does not conform in principle to these standards.

People have asked me whether these standards may not be excessive and may not impose too great an expense upon the operator who desires to save some money by commingling.

In reply to this, I would first point out that the rules strictly provide that the production from each lease and from each pool shall be measured, stored, and marketed separately. Commingling of production from one or more leases then, or from one or more pools, or from both, becomes an exception to the rules. And when any operator seeks an exception to the rules, he must be willing to go along with certain other rules governing the exception to the rules. This is for the benefit of all, and provides for more orderly development and depletion of our resources. As far as cost is concerned, the installations contained in the Committee's report will cost no more than some of the more elaborate installations heretofore put in. And the operators of those installations saved money on them. The record-keeping as required by the proposed standards probably is more detailed and probably will cost more money than the records heretofore kept, but certainly some minimum standards of book-keeping are indicated as required.

The Commission has, in the past, authorized many different types of commingling installations. Some were Model T arrangements. Some were Cadillac-type facilities. Almost all, regardless of the amount of money spent on them, left the door open for the pumper or the farm-boss, whether through innocent error, or because of over-eagerness to make the allowable, or whatever other reason, to cause oil from one lease or pool to be attributed to another. As most systems are presently designed, a pumper could in many cases accidentally divert oil from one

place to another and not be able to tell it himself the very next day.

We have reason to believe, as the result of our own investigations as well as those of the Federal Petroleum Board, that in quite a number of instances that we know about, and perhaps in other instances which we do not know about, that this accidental or purposeful transfer and mismeasurement of oil has occurred.

Several times I have heard the inquiry, "Well, then, why doesn't the Commission prosecute the violators rather than appoint a Committee to design such costly installations?"

In reply, I might point out that several investigations are being conducted, and have been for some time. Prosecution of several cases can be expected in the near future.

Certain of these investigations, as a matter of fact, helped point out the need for more adequate commingling design and record-keeping. As mentioned before, in some of these systems, which were formerly thought to be adequate, it is impossible to tell from one day to the next which zones or leases produced how much oil or when. In systems like these, it is extremely difficult, if not impossible, for a company itself, let alone the Commission, to detect purposeful mismeasurement of oil.

Without numerous additions to the Commission's field inspection staff, I believe that it will be impossible to

properly observe the operation of the existing commingling installations, not to mention the many new ones we can expect in the future.

For these reasons, the Commission, in appointing the Committee, requested it to design installations which would be as fool-proof as possible.

The Committee members accepted this charge, and devoted many hours of work to it. They have designed installations where mismeasurement of oil is possible but not easy. Deliberate tampering and falsification of records would probably be necessary to divert oil. In most cases, this tampering will result in mechanical alterations which we believe can be detected.

For the good of all concerned, and the overall protection of correlative rights, I believe that this report should be considered by the Commission as a criterion for the ideal installation.

I, therefore, urge its adoption, but would also recommend the following changes be made:

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

ir/

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.

Page -2-

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/

DOCKET: REGULAR HEARING - WEDNESDAY - AUGUST 16, 1961

OIL CONSERVATION COMMISSION - 9 A.M. - MORGAN HALL, STATE LAND OFFICE
BUILDING, SANTA FE, NEW MEXICO

- ALLOWABLE: (1) Consideration of the oil allowable for September, 1961.
- (2) Consideration of the allowable production of gas for September, 1961, from ten prorated pools in Lea and Eddy Counties, New Mexico, also consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba and Sandoval Counties, New Mexico, for September, 1961.

CONTINUED CASE

CASE 2215: In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the promulgation of an order prohibiting the flaring of casinghead gas from oil wells in the Cha Cha-Gallup and Totah-Gallup Oil Pools, San Juan County, New Mexico.

NEW CASES

CASE 2356: By call of the Oil Conservation Commission, on its motion, to hear the report of the Industry Study Committee on Commingling of Crude Oil, to consider the adoption of a Manual for the Installation and Operation of Commingling Facilities, and to consider the revision of Rules 303 and 309-B to provide for administrative procedures for obtaining permission to commingle crude oil in conformance with said manual.

CASE 2357: Southeastern New Mexico nomenclature case calling for an order creating new pools and extending existing pools in Lea, Eddy, and Roosevelt Counties, New Mexico.

- (a) Create a new pool designated as the East Pearl-Queen Pool, and described as:

TOWNSHIP 19 SOUTH, RANGE 36 EAST, NMPM
SECTION 20: SW/4

- (b) Create a new pool designated as the South Tonto-Yates Pool, and described as:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPM
SECTION 30: NE/4

CASE 2357: (Cont.)

- (c) Create a new pool designated as the Vacuum-Queen Pool, and described as:

TOWNSHIP 17 SOUTH, RANGE 33 EAST, NMPM
SECTION 36: SE/4

- (d) Abolish the East Allison-Pennsylvanian Pool described as:

TOWNSHIP 9 SOUTH, RANGE 37 EAST, NMPM
SECTION 8: NE/4

- (e) Extend the Allison-Pennsylvanian Pool to include:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM
SECTION 36: NE/4

TOWNSHIP 8 SOUTH, RANGE 37 EAST, NMPM
SECTION 18: SE/4

TOWNSHIP 9 SOUTH, RANGE 37 EAST, NMPM
SECTION 5: W/2
SECTION 6: NE/4
SECTION 8: N/2

- (f) Extend the Artesia Pool to include:

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM
SECTION 26: SW/4

- (g) Extend the East Benson-Yates Pool to include:

TOWNSHIP 19 SOUTH, RANGE 30 EAST, NMPM
SECTION 13: NE/4

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
SECTION 18: W/2 NW/4

- (h) Extend the Blinebry Pool to include:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
SECTION 35: NE/4

- (i) Extend the Culwin-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM

SECTION 5: SW/4

SECTION 6: SE/4

- (j) Extend the Southwest Gladiola-Devonian Pool to include:

TOWNSHIP 12 SOUTH, RANGE 37 EAST, NMPM

SECTION 35: S/2 NW/4

- (k) Extend the Grayburg-Jackson Pool to include:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

SECTION 28: SE/4

SECTION 32: N/2 NW/4

- (l) Extend the Justis-Montoya Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM

SECTION 24: SW/4

- (m) Extend the Justis-Paddock Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM

SECTION 23: NE/4

SECTION 24: N/2 and SW/4

- (n) Extend the Lea-Devonian Pool to include:

TOWNSHIP 20 SOUTH, RANGE 34 EAST, NMPM

SECTION 12: SE/4

- (o) Extend the Loco Hills Pool to include:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM

SECTION 20: SW/4

- (p) Extend the East Millman-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM

SECTION 15: E/2 SW/4

CASE 2357: (Cont.)

- (q) Extend the Moore-Wolfcamp Pool to include:

TOWNSHIP 11 SOUTH, RANGE 32 EAST, NMPM
SECTION 25: W/2

- (r) Extend the Paduca-Delaware Pool to include:

TOWNSHIP 25 SOUTH, RANGE 32 EAST, NMPM
SECTION 22: SW/4

CASE 2358:

Northwestern New Mexico nomenclature case calling for an order extending existing pools in Rio Arriba, San Juan, and Sandoval Counties, New Mexico.

- (a) Extend the Aztec-Pictured Cliffs Pool to include:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
SECTION 32: SE/4

- (b) Extend the Ballard-Pictured Cliffs Pool to include:

TOWNSHIP 24 NORTH, RANGE 6 WEST, NMPM
SECTION 7: SE/4
SECTION 8: SW/4

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
SECTION 13: SW/4

- (c) Extend the Tapacito-Pictured Cliffs Pool to include:

TOWNSHIP 27 NORTH, RANGE 5 WEST, NMPM
SECTION 4: SW/4
SECTION 5: S/2
SECTION 8: E/2
SECTION 9: W/2
SECTION 20: W/2

- (d) Extend the Blanco-Mesaverde Pool to include:

TOWNSHIP 31 NORTH, RANGE 13 WEST, NMPM
SECTION 10: E/2

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
SECTION 34: S/2

- (e) Extend the Bisti-Lower Gallup Oil Pool to include:

TOWNSHIP 24 NORTH, RANGE 10 WEST, NMPM
SECTION 5: N/2 NE/4

- (f) Extend the Cha Cha-Gallup Oil Pool to include:

TOWNSHIP 28 NORTH, RANGE 13 WEST, NMPM
SECTION 7: W/2 (Partial)
SECTION 9: E/2 (Partial)

TOWNSHIP 29 NORTH, RANGE 14 WEST, NMPM
SECTION 16: N/2 SW/4
SECTION 35: NW/4 & SE/4

- (g) Extend the Devils Fork-Gallup Pool to include:

TOWNSHIP 24 NORTH, RANGE 6 WEST, NMPM
SECTION 7: W/2 SE/4

- (h) Extend the Escrito-Gallup Oil Pool to include:

TOWNSHIP 24 NORTH, RANGE 7 WEST, NMPM
SECTION 22: W/2 NE/4
SECTION 28: N/2 NE/4

- (i) Extend the Horseshoe-Gallup Oil Pool to include:

TOWNSHIP 30 NORTH, RANGE 16 WEST, NMPM
SECTION 2: E/2 SW/4 & SE/4

- (j) Extend the Totah-Gallup Oil Pool to include:

TOWNSHIP 29 NORTH, RANGE 13 WEST, NMPM
SECTION 18: S/2
SECTION 19: SW/4
SECTION 35: E/2 SW/4

TOWNSHIP 29 NORTH, RANGE 14 WEST, NMPM
SECTION 13: S/2
SECTION 14: E/2 SE/4
SECTION 24: W/2 NE/4 & E/2 NW/4

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.

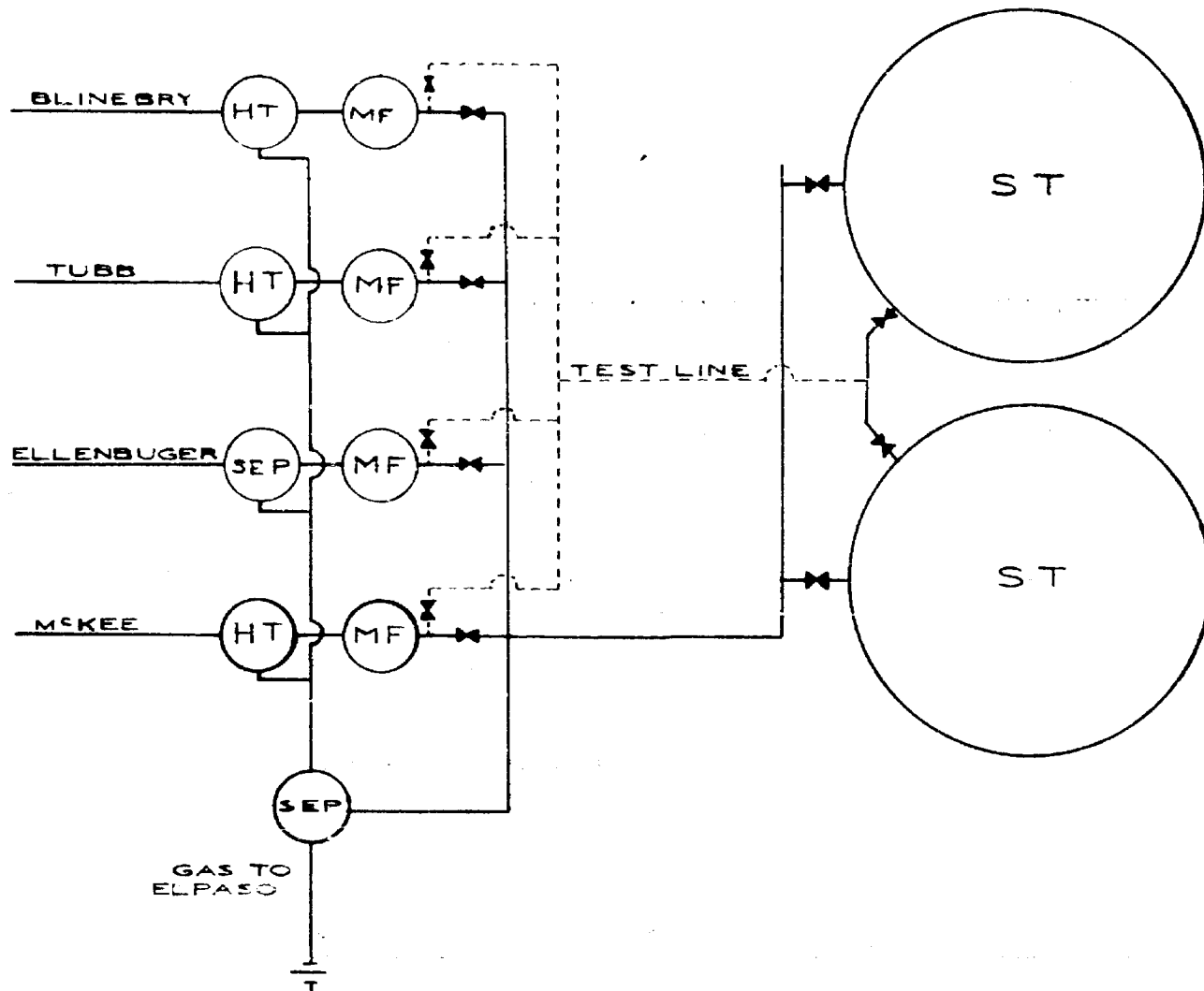
We feel that this system, as outlined, is as accurate and foolproof as any outlined in the Committee's report. A separator on the gas line provides a fail safe feature on the system in that it prevents oil being lost to the gas pipeline by a malfunction of the dump meters. Although this will allow unmetered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

SKELLY OIL COMPANY
HOBBS "A" LEASE



1/10000

BLOCK VALVE
GAS METER
HEATER TREATER
STOCK TANK
SEPARATOR
METERING FACILITIES

D.A.H.



CONTINENTAL OIL COMPANY

P. O. BOX 1377
ROSWELL NEW MEXICO

September 14, 1961

WM. A. MEAD
DIVISION SUPERINTENDENT
OF PRODUCTION
NEW MEXICO DIVISION

825 PETROLEUM BUILDING
TELEPHONE: MAIN 2-4202

New Mexico Oil Conservation Commission
Box 871
Santa Fe, New Mexico

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

Re: SUGGESTED CHANGES TO
PROPOSED COMMINGLING
MANUAL

*Note -
these proposals
were received
5 days
after the manual
had been
adopted
(Order
no
R-2060)*

At the conclusion of Case No. 2356 on August 16, 1961, Continental Oil Company requested permission to advise by letter of any changes which they considered to be desirable in the commingling manual. Mr. Porter requested that these suggestions be submitted without delay. Listed below are the suggestions offered by Continental Oil Company.

1. Section I, Paragraph B-3 (A) is not clear and should be clarified. It was the Committee's intent that no correction of meter reading should be permitted other than for meter factor unless a sampler was utilized. However, Continental Oil Company does not believe this to be practical, since the differences between (1) production as determined by pipeline runs adjusted by opening and closing inventory and (2) the summation of meter readings must be re-apportioned on a prorata basis to account for BS&W content determined by the pipeline gauger or representative. Attached is Continental Oil Company's suggested re-wording of this paragraph.
2. Continental Oil Company suggests that Section II, Paragraph A be amended to clarify the definition of the word "lease". The suggested change would require the treating of zones which have been farmed out or where difference in ownership of working interest or royalty interests are not identical as separate leases. Attached is Continental Oil Company's suggested re-wording of this paragraph.

New Mexico Oil Conservation Commission
Page -2-

3. Drawing A-7. This drawing is somewhat confusing in that the bad oil return line is shown to have a by-pass around the heater treater. The purpose of the by-pass is not indicated on the drawing. A notation as to the purpose of the by-pass should be included on the drawing.

It is believed that the manual should be clarified for those instances where several zones containing no top allowable wells are to be commingled with one or more zones containing top allowable wells. It is Continental Oil Company's recommendation that any zone which does not contain a top allowable well should not be required to be metered prior to commingling.

Your consideration of these suggested changes is respectfully requested.

Yours very truly,

W. C. Mead

WAM-sm
Attachment

I. ZONE COMMINGLING (Common Royalty)

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

3. Zone Production Allocation

- a. A sampler installation will be required on zones producing fluid containing two percent or more BS&W at the point of commingling. Wherever a sampler is utilized, the net zone production shall be determined by correcting the gross meter reading for BS&W content and meter factor. Wherever a sampler is not utilized, the net zone production shall be determined by correcting the gross meter reading by the meter factor and reapportioning the summation of zone meter readings on a prorata basis to agree with net pipeline runs adjusted by opening and closing inventory.

II. LEASE OR ZONE COMMINGLING (Royalty no common)

A. GENERAL REQUIREMENTS

The word "lease" used hereinafter shall mean any lease or part thereof throughout which all interests are 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.

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

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

August 11, 1961

P. O. Drawer 1938
Roswell, New Mexico

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

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

Re: Case No. 2356 Scheduled for Consideration
at the Statewide Hearing to be Held in
Santa Fe on August 16, 1961

Gentlemen:

The following are Gulf's comments in regard to the above referenced case.

The Industry Study Committee on Commingling of Crude Oil has done an excellent job in setting up standards to minimize the possibilities of failure and accidental or purposeful mismeasurements of commingled crude oil. However, it is our opinion that the standards which were set up to comply with the Commission's directive add to the cost of installations at a time when producers are attempting to reduce costs by commingling. The standards do tend to minimize the possibilities of purposeful mismeasurements; however, prudence on the part of the producer has been and still will be a prime factor.

Gulf desires the opportunity to commingle crudes from multi-pay leases having common royalty on top allowable zones as well as on marginal zones without prior metering, with allocation of production being made to the respective pays based on well tests. Based on increasing cost trends an operator must continually exploit all means of reducing or minimizing costs. By the elimination of individual measurement a great saving can be realized in investment, operating and maintenance costs and also a substantial reduction in reporting and keeping of records would result in further savings. It is our opinion that this approach is a practical one.

It is recommended that the new rules, if adopted, not require seals on metering facilities because of the burden of resealing that would be placed on the Commission and the operator.

It is further recommended that provided the new rules apply to installations already installed as approved by the Commission that the need for any modifications be determined after individual consideration.



August 11, 1961

Reference is made to the portion of the proposed revision to Rule 309-B which reads, "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". We feel that the obtaining of approval from offset operators of the adjoining leases is not necessary and only serves to add a paperwork burden upon the producer.

Yours very truly,

GULF OIL CORPORATION

A handwritten signature in cursive script, reading "W. A. Shellshear".

W. A. Shellshear

JHH:bc

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-00)

SYMBOLS

DL = Day Letter

NL = Night Letter

LT = International Letter Telegram

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination

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1961 AUG 16 AM 7

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NEW MEXICO OIL CONSERVATION COMMISSION=

ATTN A L PORTER JR SANTA FE NMEX=

RE CASE 2356, AUGUST 16 HEARING. THE OHIO OIL COMPANY CONCURS IN THE PROPOSAL TO AUTHORIZE ADMINISTRATIVE APPROVAL OF APPLICATIONS TO COMMINGLE CRUDE OIL PROVIDED THE SAFEGUARDS AND MINIMUM STANDARDS RECOMMENDED BY THE JUNE 21 REPORT OF THE INDUSTRY COMMITTEE ARE COMPLIED WITH. WE AGREE THAT CONSENT OF ROYALTY OWNERS SHOULD NOT BE REQUIRED AND THAT NOTICE TO ROYALTY OWNERS AND OFFSET OPERATORS MAY BE DISPENSED WITH IF THOSE SAFEGUARDS AND MINIMUM STANDARDS ARE ADOPTED=

JD WHEELER DIVN MGR THE OHIO OIL CO HOUSTON DIVN.

SERVICE
fast message
unit deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination.

COMPANY'S POSITION REGARDING NOTIFICATION OF ROYALTY OWNERS AND OFFSET OPERATORS. WE FEEL THAT THE NOTIFICATION REQUIREMENTS ARE UNNECESSARY AND A BURDEN THAT SHOULD NOT BE PLACED ON THE INDUSTRY. WHERE MINIMUM REQUIREMENTS ARE NOT TO BE FOLLOWED, THE COMMISSION, AFTER PROPER PUBLIC NOTICE, SHOULD REQUIRE A HEARING PRIOR TO APPROVAL=

R D HANLEY VICE PRESIDENT MOBIL OIL CO.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

SYMBOLS
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NL = Night Letter
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D MDA154 PD=MIDLAND TEX 15 338P CST=
NEW MEXICO OIL CONSERVATION COMMISSION=
SANTA FE NMEX=

SOCONY MOBIL'S STATEMENT ON COMMINGLING AT AUGUST 16, 1961 NMOCC HEARING.

SOCONY MOBIL OIL COMPANY, INC. RECOMMENDS ADOPTION OF THE PROPOSED COMMINGLING STANDARDS. WE ALSO URGE THAT THE COMMISSION NOT REQUIRE THE NOTIFICATION OF ROYALTY OWNERS AND OFFSET OPERATORS FOR ADMINISTRATIVE APPROVAL OF COMMINGLING REQUESTS. WE SUPPORT SHELL OIL

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

WESTERN UNION TELEGRAM

W. P. MARSHALL, President

1220
R-4-60

SYMBOLS	
DL	Day Letter
NL	Night Letter
LT	International Letter Telegram

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LA185 SSK446

1961 AUG 15 PM 3 40

HBA088 LONG PD=HOBBS NMEX 15 337P MST=
NEW MEXICO OIL CONSERVATION COMMISSION=
BOX 871 SANTA FE NMEX=

ATTN A L PORTER JR: CITIES SERVICE PETROLEUM CO
RECOMMENDS THE REVISION OF RULES 303 AND 309-B TO
PROVIDE FOR ADMINISTRATIVE PROCEDURE FOR OBTAINING
PERMISSION TO COMINGLE CRUDE OIL UNDER THE MINIMUM
STANDARDS AS PROPOSED BY THE COMMITTEE ON COMINGLING OF
CRUDE OIL JUNE 21, 1961. CITIES SERVICE PETROLEUM CO
FURTHER RECOMMENDS THAT THE COMMISSION CONSIDER REVISION
OF THAT PORTION OF THESE RULES WHERE BY IT IS NECESSARY
TO OBTAIN CONSENT IN WRITING FROM ROYALTY OWNERS AND
OWNERS OF ADJOINING OIL AND GAS LEASES TO COMINGLE
PRODUCTION FROM SEPARATE LEASES OR SEPARATE PRODUCING
ZONES. SINCERELY=

R W ELY ASST DIVN SUPT=

=303 309-B 21 1961

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE



SHELL OIL COMPANY

PETROLEUM BUILDING

P. O. BOX 1509

MIDLAND, TEXAS

August 1, 1961

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

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

Gentlemen:

It is noted that the final report by the Industry Study Committee on Minimum Standards for Commingling Crude Oil and Hydrocarbons in New Mexico has been submitted to the Oil Conservation Commission and that at the regular hearing on August 16, 1961 the Commission probably will consider incorporating such standards as part of Rules 303 and 309-B.

There is no doubt that the adoption of the Committee's study would be a big help to the Commission and to the operators in establishing uniform procedures. However, in cases where the interest ownership is diversified the commingling of crude oil from wells, zones, or leases presents a problem to the purchaser of the production insofar as proper allocation for payment is concerned. Due to difference in price the commingling of high gravity condensate with crude also presents another problem. It is our feeling that the purchaser has the right to refuse to purchase any commingled production if means or facilities are not available to properly determine quality and ownership at the time and place of receipt. In other words, the purchaser, in taking the commingled production, will not rely upon breakdown data compiled and furnished by the operator.

It is therefore recommended that even though the Commission may grant permission to commingle it should be with the understanding that the operator should not start commingling operations until he has first consulted and made satisfactory arrangements with the purchaser of the production.

In the case of diversified ownership one possible solution is for the purchaser to require that the operator assume the full responsibility of disbursing payments to all interest owners. For protection and indemnity to the purchaser this would require that the operator, in some cases, obtain approval from each interest owner whereby such interest owner would agree to look to


New Mexico Oil Conservation Commission

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the operator for payment. This could possibly be done at the time the operator obtains consent to commingle as is now provided in Rule 309-B.

We respectfully call this to your attention so that our recommendation may be given proper consideration when the matter comes up for hearing on August 16, 1961.

Yours very truly,



C. A. Nyhof
Crude Oil Department - Midland

BGC:JG

DOCKET: REGULAR HEARING - WEDNESDAY - AUGUST 16, 1961

OIL CONSERVATION COMMISSION - 9 A.M. - MORGAN HALL, STATE LAND OFFICE
BUILDING, SANTA FE, NEW MEXICO

- ALLOWABLE:
- (1) Consideration of the oil allowable for September, 1961.
 - (2) Consideration of the allowable production of gas for September, 1961, from ten prorated pools in Lea and Eddy Counties, New Mexico, also consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba and Sandoval Counties, New Mexico, for September, 1961.

CONTINUED CASE

CASE 2215: In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the promulgation of an order prohibiting the flaring of casinghead gas from oil wells in the Cha Cha-Gallup and Totah-Gallup Oil Pools, San Juan County, New Mexico.

NEW CASES

CASE 2356: By call of the Oil Conservation Commission, on its motion, to hear the report of the Industry Study Committee on Commingling of Crude Oil, to consider the adoption of a Manual for the Installation and Operation of Commingling Facilities, and to consider the revision of Rules 303 and 309-B to provide for administrative procedures for obtaining permission to commingle crude oil in conformance with said manual.

CASE 2357: Southeastern New Mexico nomenclature case calling for an order creating new pools and extending existing pools in Lea, Eddy, and Roosevelt Counties, New Mexico.

- (a) Create a new pool designated as the East Pearl-Queen Pool, and described as:

TOWNSHIP 19 SOUTH, RANGE 36 EAST, NMPM
SECTION 20: SW/4

- (b) Create a new pool designated as the South Tonto-Yates Pool, and described as:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPM
SECTION 30: NE/4

CASE 2357: (Cont.)

- (c) Create a new pool designated as the Vacuum-Queen Pool, and described as:

TOWNSHIP 17 SOUTH, RANGE 33 EAST, NMPM
SECTION 36: SE/4

- (d) Abolish the East Allison-Pennsylvanian Pool described as:

TOWNSHIP 9 SOUTH, RANGE 37 EAST, NMPM
SECTION 8: NE/4

- (e) Extend the Allison-Pennsylvanian Pool to include:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM
SECTION 36: NE/4

TOWNSHIP 8 SOUTH, RANGE 37 EAST, NMPM
SECTION 18: SE/4

TOWNSHIP 9 SOUTH, RANGE 37 EAST, NMPM
SECTION 5: W/2
SECTION 6: NE/4
SECTION 8: N/2

- (f) Extend the Artesia Pool to include:

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM
SECTION 26: SW/4

- (g) Extend the East Benson-Yates Pool to include:

TOWNSHIP 19 SOUTH, RANGE 30 EAST, NMPM
SECTION 13: NE/4

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
SECTION 18: W/2 NW/4

- (h) Extend the Blinebry Pool to include:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
SECTION 35: NE/4

- (i) Extend the Culwin-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
SECTION 5: SW/4
SECTION 6: SE/4

- (j) Extend the Southwest Gladiola-Devonian Pool to include:

TOWNSHIP 12 SOUTH, RANGE 37 EAST, NMPM
SECTION 35: S/2 NW/4

- (k) Extend the Grayburg-Jackson Pool to include:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM
SECTION 28: SE/4
SECTION 32: N/2 NW/4

- (l) Extend the Justis-Montoya Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 24: SW/4

- (m) Extend the Justis-Paddock Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 23: NE/4
SECTION 24: N/2 and SW/4

- (n) Extend the Lea-Devonian Pool to include:

TOWNSHIP 20 SOUTH, RANGE 34 EAST, NMPM
SECTION 12: SE/4

- (o) Extend the Loco Hills Pool to include:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM
SECTION 20: SW/4

- (p) Extend the East Millman-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
SECTION 15: E/2 SW/4

CASE 2357: (Cont.)

- (q) Extend the Moore-Wolfcamp Pool to include:

TOWNSHIP 11 SOUTH, RANGE 32 EAST, NMPM
SECTION 25: W/2

- (r) Extend the Paduca-Delaware Pool to include:

TOWNSHIP 25 SOUTH, RANGE 32 EAST, NMPM
SECTION 22: SW/4

CASE 2358:

Northwestern New Mexico nomenclature case calling for an order extending existing pools in Rio Arriba, San Juan, and Sandoval Counties, New Mexico.

- (a) Extend the Aztec-Pictured Cliffs Pool to include:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
SECTION 32: SE/4

- (b) Extend the Ballard-Pictured Cliffs Pool to include:

TOWNSHIP 24 NORTH, RANGE 6 WEST, NMPM
SECTION 7: SE/4
SECTION 8: SW/4

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
SECTION 13: SW/4

- (c) Extend the Tapacito-Pictured Cliffs Pool to include:

TOWNSHIP 27 NORTH, RANGE 5 WEST, NMPM
SECTION 4: SW/4
SECTION 5: S/2
SECTION 8: E/2
SECTION 9: W/2
SECTION 20: W/2

- (d) Extend the Blanco-Mesaverde Pool to include:

TOWNSHIP 31 NORTH, RANGE 13 WEST, NMPM
SECTION 10: E/2

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
SECTION 34: S/2

- (i) Extend the Culwin-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
SECTION 5: SW/4
SECTION 6: SE/4

- (j) Extend the Southwest Gladiola-Devonian Pool to include:

TOWNSHIP 12 SOUTH, RANGE 37 EAST, NMPM
SECTION 35: S/2 NW/4

- (k) Extend the Grayburg-Jackson Pool to include:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM
SECTION 28: SE/4
SECTION 32: N/2 NW/4

- (l) Extend the Justis-Montoya Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 24: SW/4

- (m) Extend the Justis-Paddock Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM
SECTION 23: NE/4
SECTION 24: N/2 and SW/4

- (n) Extend the Lea-Devonian Pool to include:

TOWNSHIP 20 SOUTH, RANGE 34 EAST, NMPM
SECTION 12: SE/4

- (o) Extend the Loco Hills Pool to include:

TOWNSHIP 18 SOUTH, RANGE 29 EAST, NMPM
SECTION 20: SW/4

- (p) Extend the East Millman-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
SECTION 15: E/2 SW/4

CASE 2357: (Cont.)

- (q) Extend the Moore-Wolfcamp Pool to include:

TOWNSHIP 11 SOUTH, RANGE 32 EAST, NMPM
SECTION 25: W/2

- (r) Extend the Paduca-Delaware Pool to include:

TOWNSHIP 25 SOUTH, RANGE 32 EAST, NMPM
SECTION 22: SW/4

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- (b) Extend the Ballard-Pictured Cliffs Pool to include:

TOWNSHIP 24 NORTH, RANGE 6 WEST, NMPM
SECTION 7: SE/4
SECTION 8: SW/4

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
SECTION 13: SW/4

- (c) Extend the Tapacito-Pictured Cliffs Pool to include:

TOWNSHIP 27 NORTH, RANGE 5 WEST, NMPM
SECTION 4: SW/4
SECTION 5: S/2
SECTION 8: E/2
SECTION 9: W/2
SECTION 20: W/2

- (d) Extend the Blanco-Mesaverde Pool to include:

TOWNSHIP 31 NORTH, RANGE 13 WEST, NMPM
SECTION 10: E/2

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
SECTION 34: S/2

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-E).

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

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

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.

$\sum Z's$ = 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:

Then:

Z_1 = 9,100 barrels

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

Z_2 = 6,330 barrels

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

Z_3 = 4,562 barrels

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

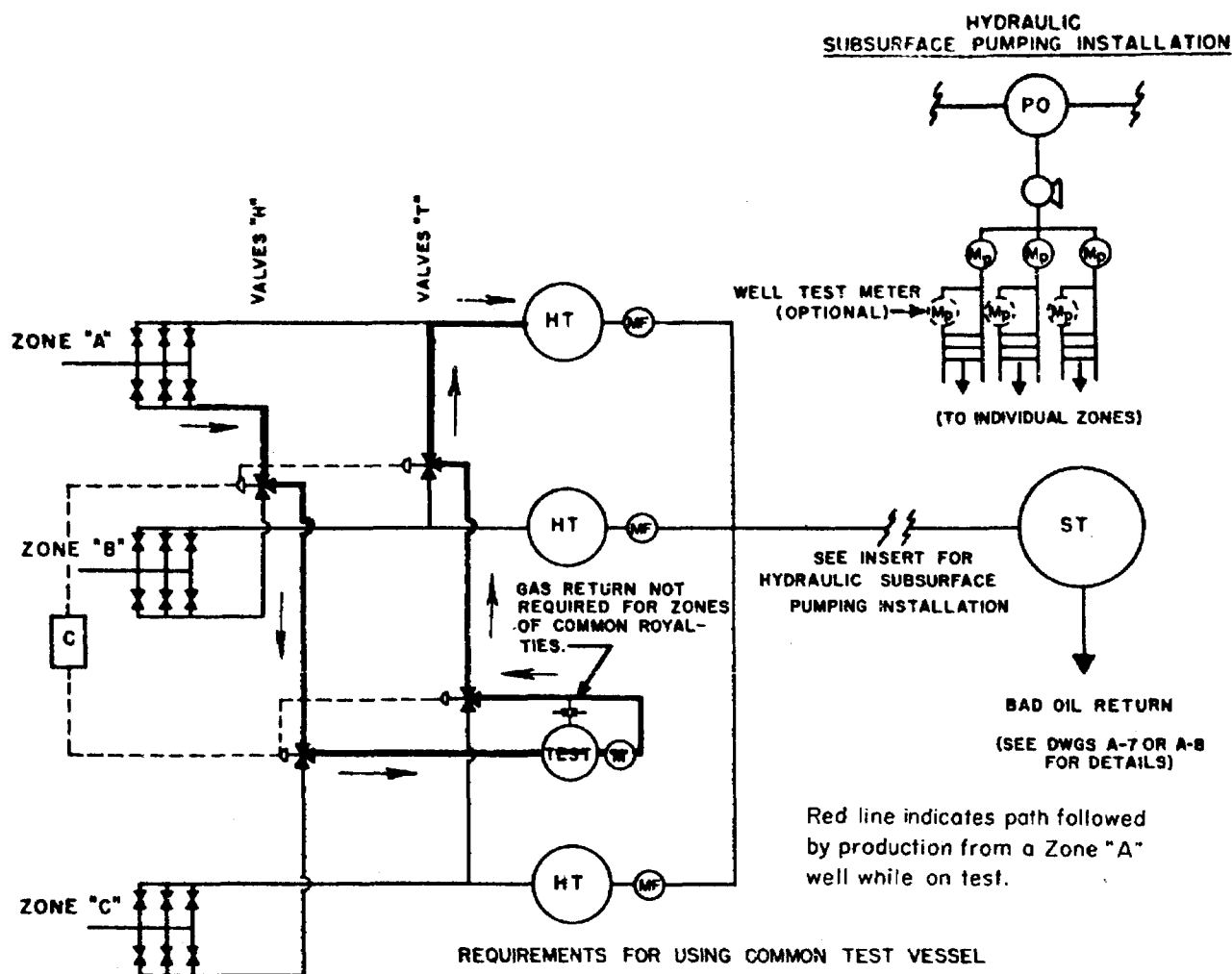
$\sum Z's$ = 19,992 barrels

A = 20,021 barrels

- 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

- Drawing A-1 Individual treaters used in commingling common or separate royalties.
- Drawing A-2 Common treater used in commingling common or separate royalties.
- Drawing A-3 Individual treaters used in commingling common or separate royalties when normally closed, two-way valves are installed.
- Drawing A-4 Common treaters used in commingling common or separate royalties when normally closed, two-way valves are installed.
- Drawing A-5 Individual treaters used in commingling common royalties by "Subtraction Method".
- Drawing A-6 Common treater used in commingling common royalties by "Subtraction Method".
- Drawing A-7 Bad oil return (Alternate No. 1).
- Drawing A-8 Bad oil return (Alternate No. 2) when test treater is installed.
- Drawing A-9 Positive displacement meter system.



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.

SYMBOLS

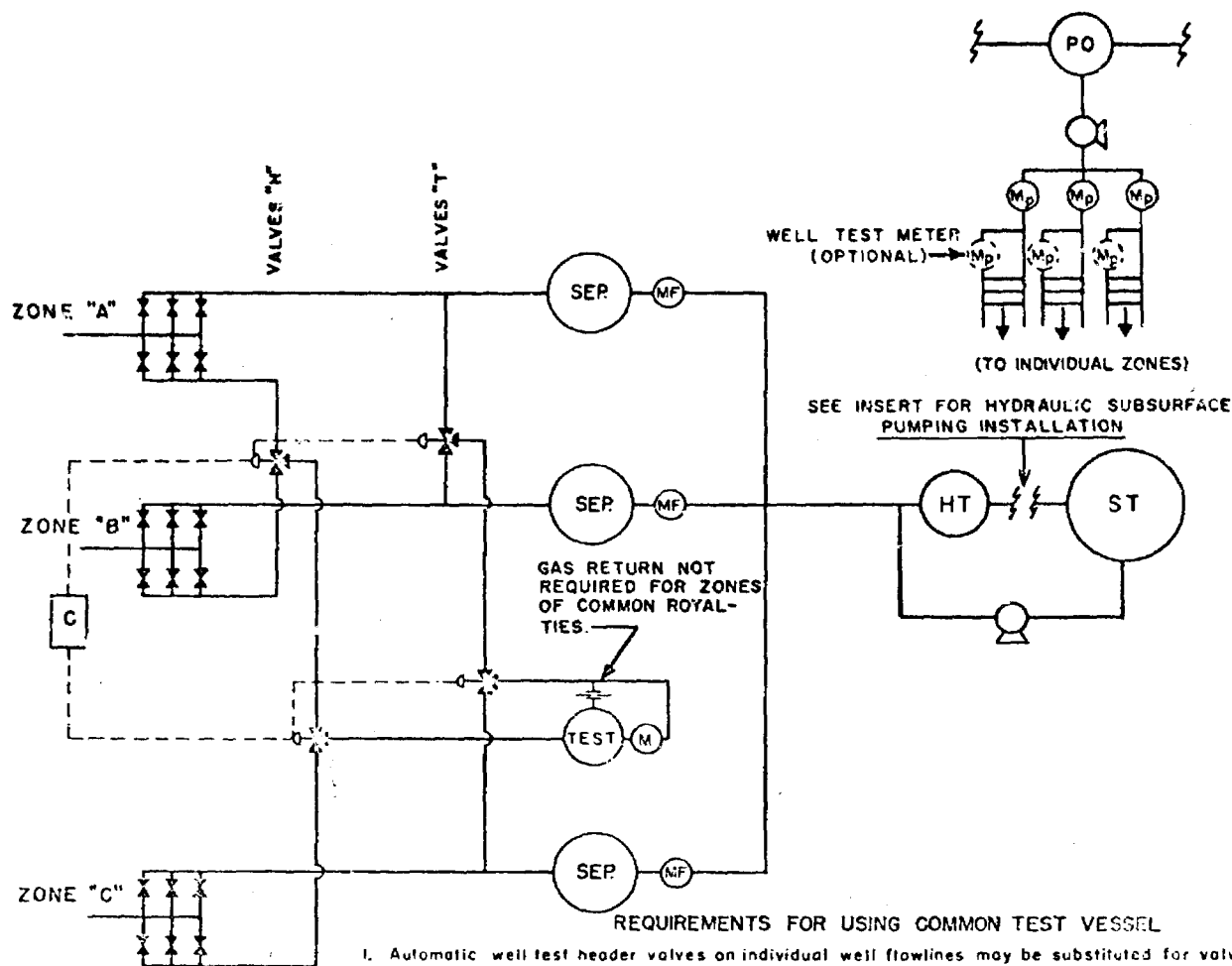
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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



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.

SYMBOLS

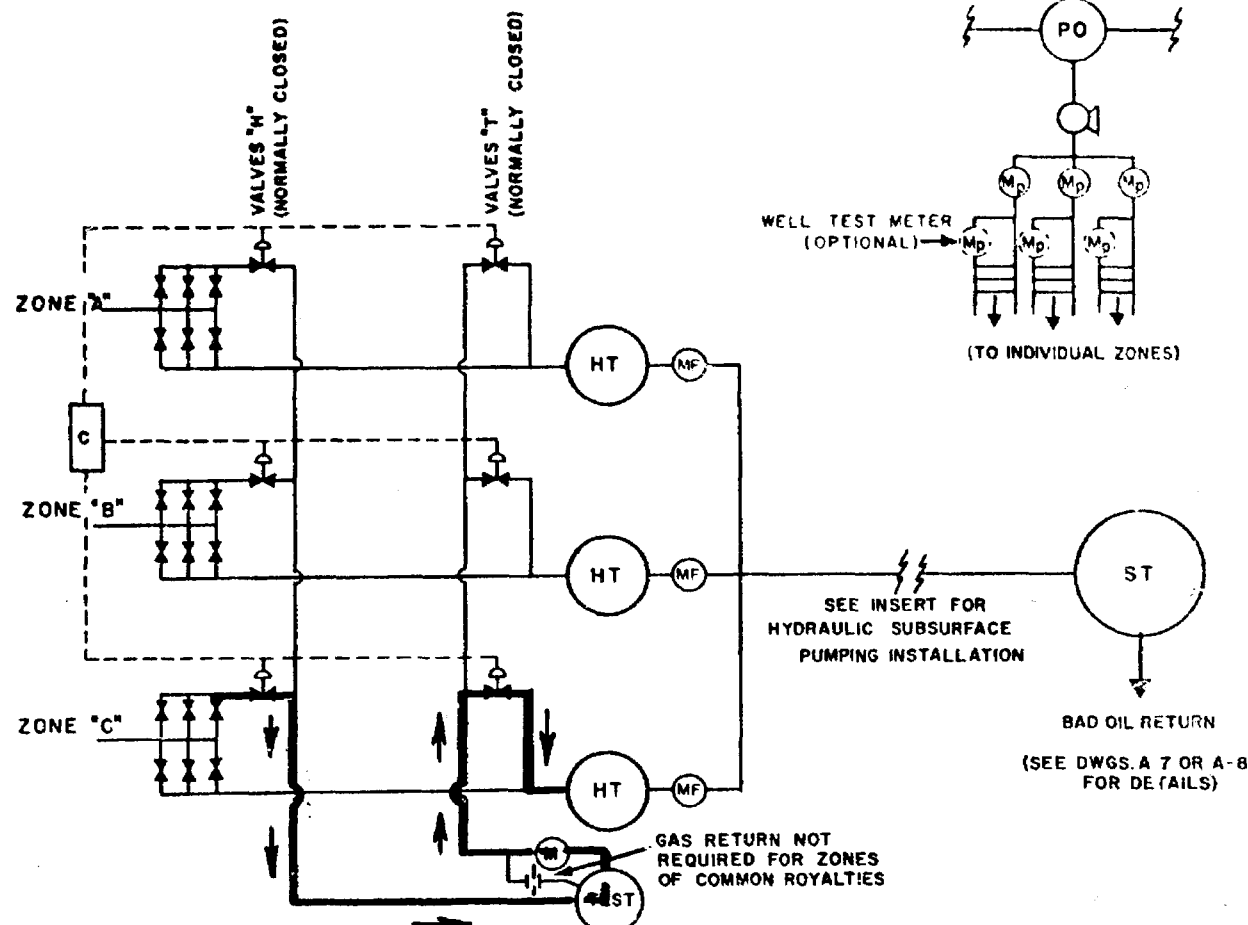
Z	CHECK VALVE.
⌵	BLOCK VALVE.
⌵	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
⌵	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
[C]	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
⌵	GAS METER
(M)	TEST METER
(M _p)	METER FOR POWER OIL
(TEST)	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
(HT)	HEATER TREATER
(PO)	POWER OIL TANK
(ST)	STOCK TANK
(P)	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



Red line indicates path followed by production from a Zone "C" well while on test.

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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

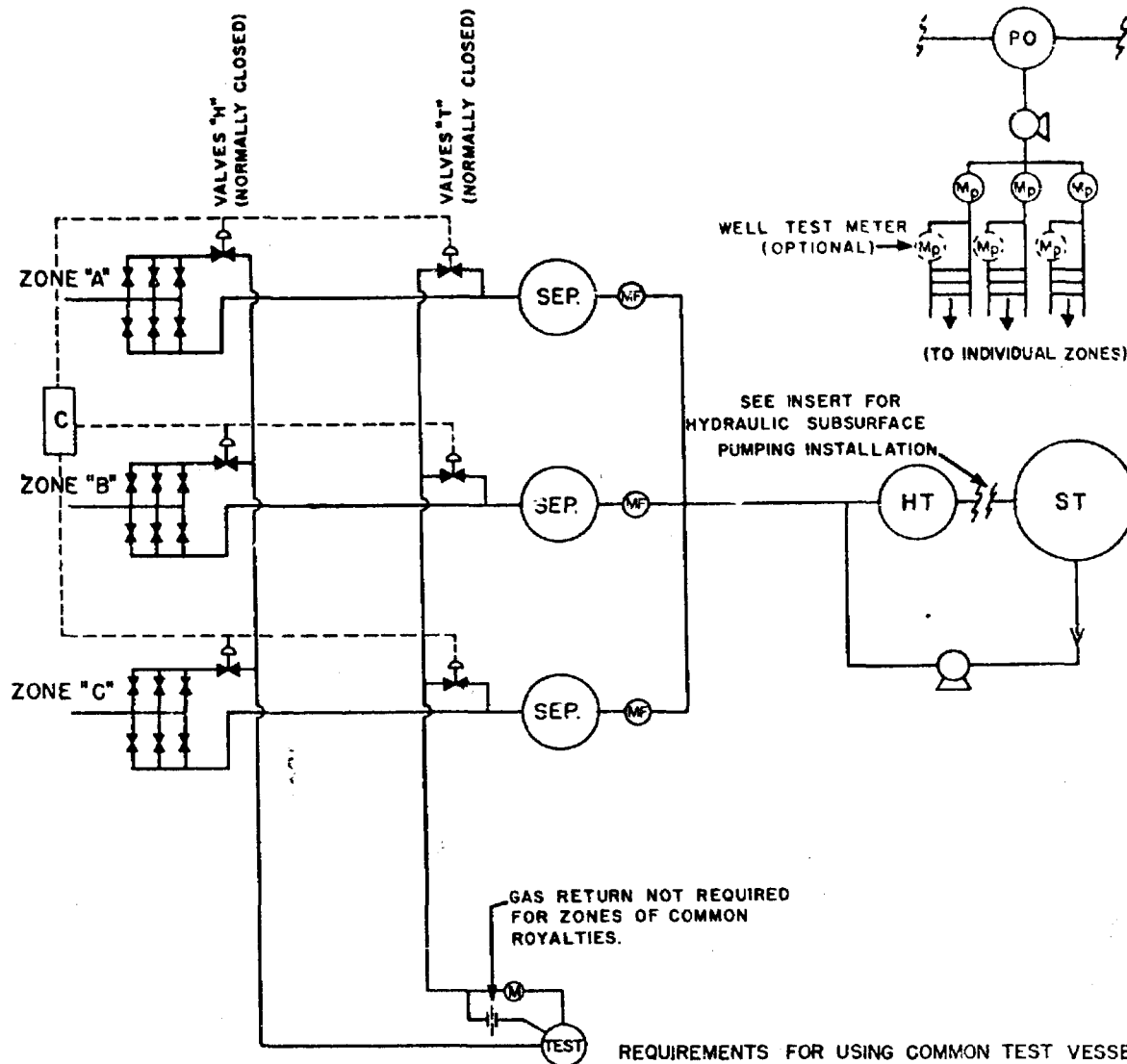
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	METERING FACILITY (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

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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

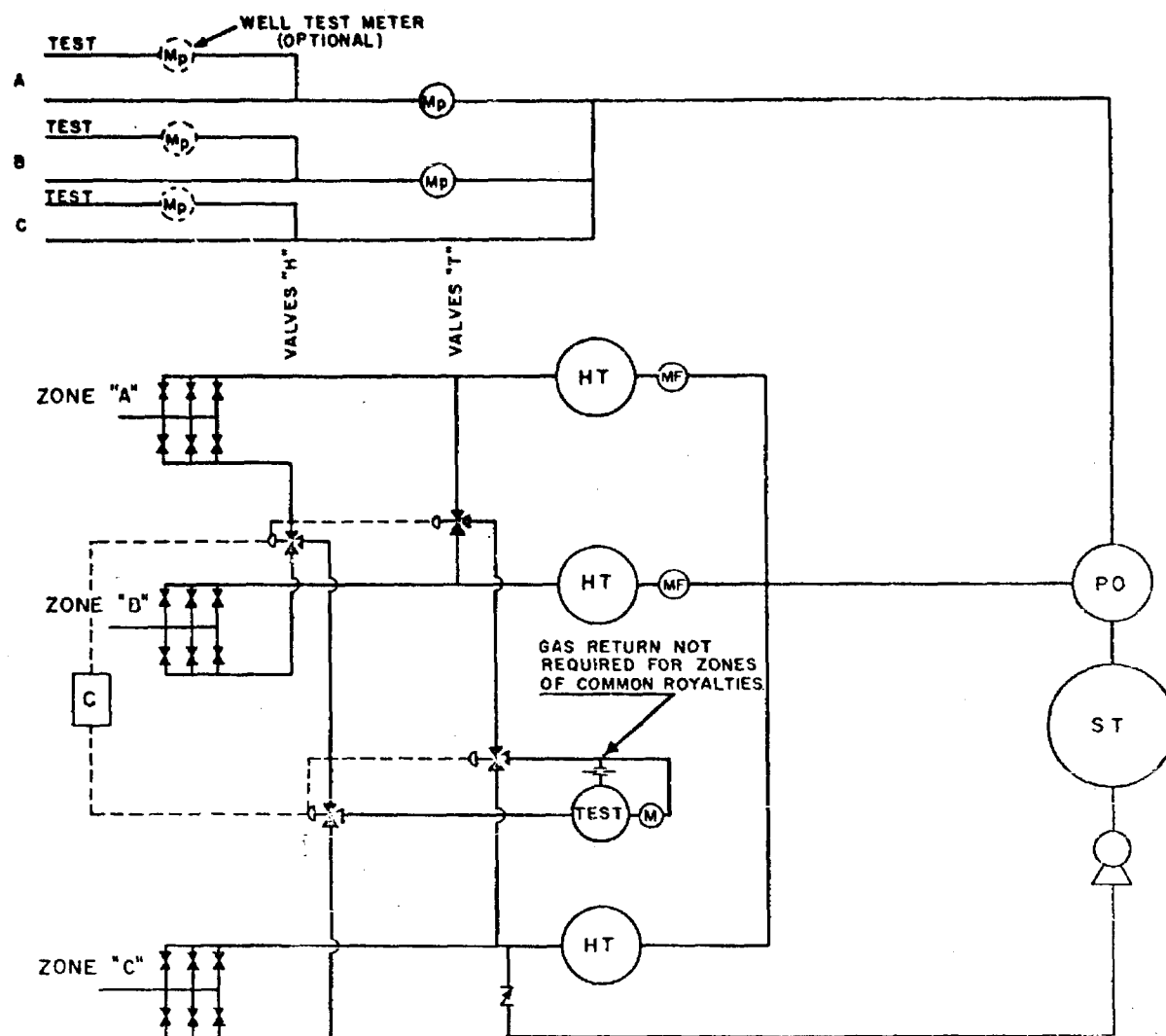
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
	GAS METER.
	TEST METER.
	METER FOR POWER OIL.
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
	HEATER TREATER.
	POWER OIL TANK.
	STOCK TANK.
	PUMP.
	SEPARATOR.
	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.

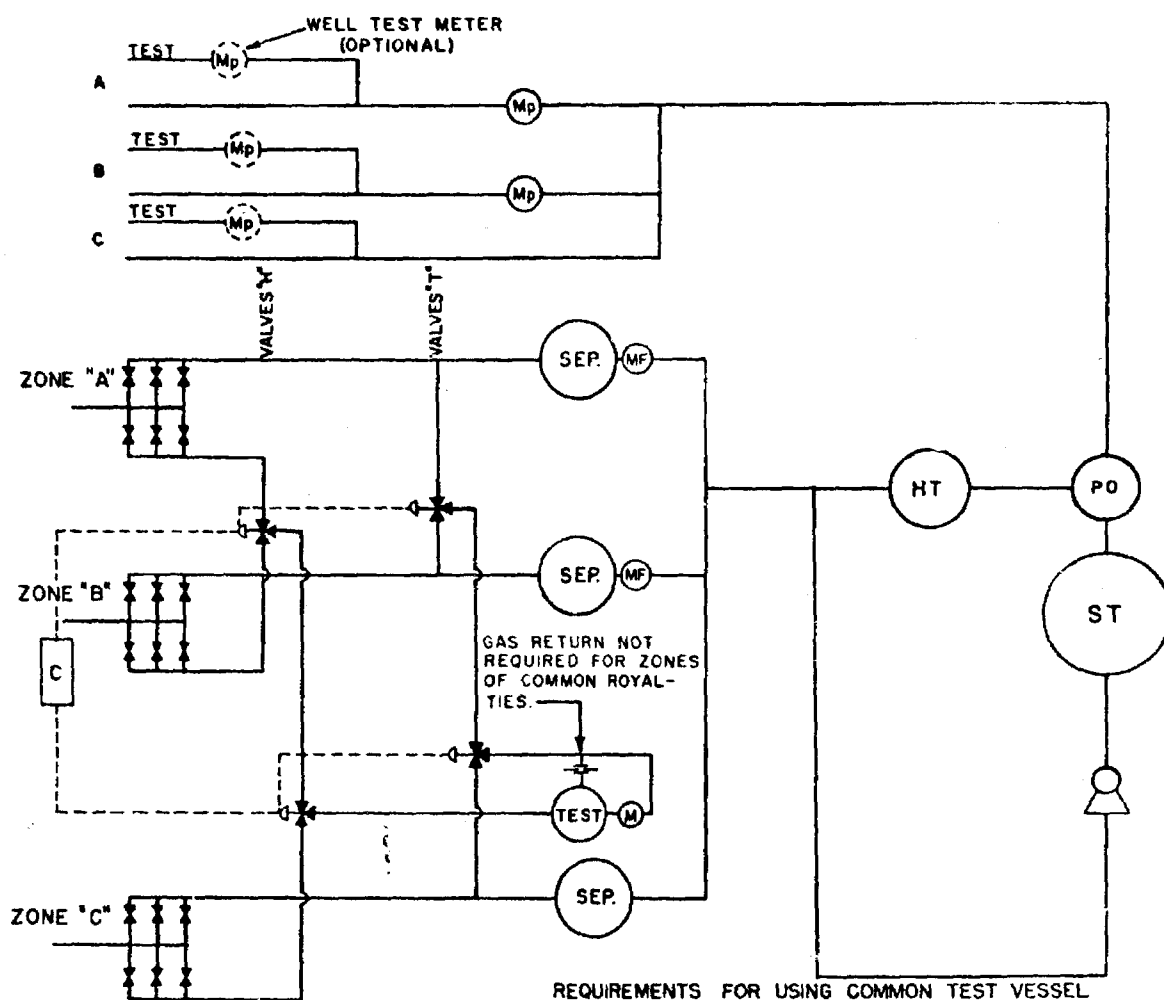
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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



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 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).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	METERING FACILITIES (METER AND SAMPLER, IF APPLICABLE)
	SEPARATOR

COMMON TREATER USED IN COMMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

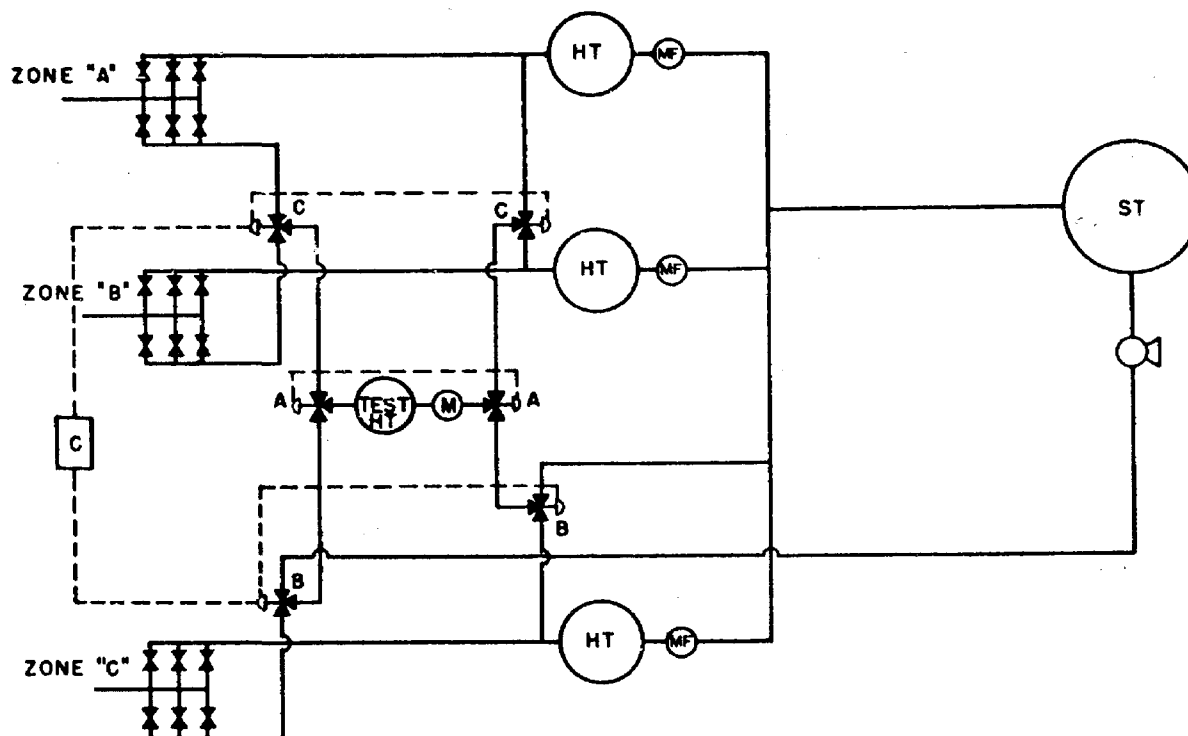
DRAWING A-6



- BAD OIL RETURN (ALTERNATE NO. 1)

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMMINGLING

DRAWING A-7



SYMBOLS

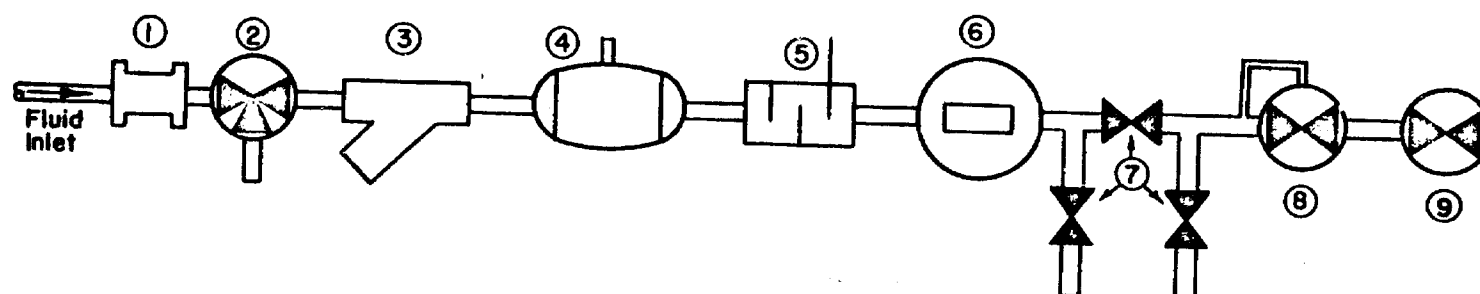
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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

PROPOSED REVISIONS - RULE 303 AND RULE 309-B

RULE 303 SEGREGATION OF PRODUCTION FROM POOLS

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
OCC Staff EXHIBIT NO. 1
CASE 2356

(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/

TEXACO Inc.

STATE OF NEW MEXICO "G" LEASE

MONUMENT POOL

WEATHERING TESTS

<u>Hours</u>	<u>Gauge</u>	<u>Temperature</u>	<u>Observed Gravity</u>	<u>Tank Chart Volume (Bbls)</u>	<u>Gravity @ 60°F</u>	<u>Volume @ 60°F (Bbls)</u>	<u>% Change in Initial Volume @ 60°F</u>
- 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

CHART NO. 1
 7-1-16
 2356
 CASE

TEXACO Inc.

STATE OF NEW MEXICO "L" & "M" LEASES

VACUUM POOL

WEATHERING TEST

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

TEXACO
2356

TEYACO Inc.

C. E. PENNY NCT-4 LEASE

JUSTIS ELLENBURGER & JUSTIS MCKEE POOLS

WEATHERING TEST

<u>Date & Time</u>	<u>Hours</u>	<u>Gauge</u>	<u>Temperature</u>	<u>Observed Gravity</u>	<u>Tank Chart Volume (Bbls.)</u>	<u>Gravity @ 60°F.</u>	<u>Volume @ 60°F (Bbls)</u>	<u>% Change in Initial Volume @ 60°F.</u>
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

Tepeco 2356 3

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

-4-

CASE No. 2356
Order No. R-2060

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



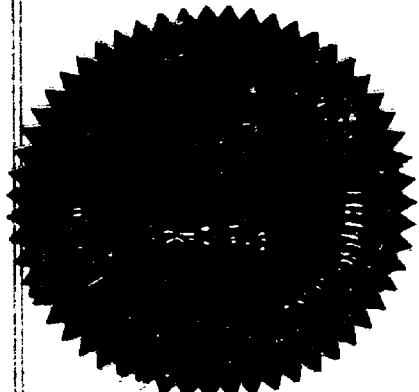
EDWIN L. MECHEM, Chairman



E. S. WALKER, Member



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



ear/

Texas Pacific	John Yurontka, Midland
Texaco	Ed Robinson, Midland
B-M-G	Al Greer or S. J. Stanley
Phillips	R. D. Schropp, B'ville
Pan Am	H. J. Inderrieden, Lubbock
Continental	V. T. Lyon Eunice
Humble	W. M. O'Reilly Midland
Carper	Clark Storm, Artesia
Shell	Randy L. Elkins, Roswell
Gulf	C. M. Bumpass, Hobbs

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

March 30, 1961

COPY
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

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

March 17, 1961

C
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P
Y

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

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

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OIL CONSERVATION COMMISSION

P. O. BOX 871
SANTA FE, NEW MEXICO

March 17, 1961

Benson-Montin-Greer Drilling Corporation
405 1/2 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

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OIL CONSERVATION COMMISSION

P. O. BOX 871
SANTA FE, NEW MEXICO

March 17, 1961

**Phillips Petroleum Company
Phillips Building
Bartlesville, Oklahoma**

Attention: Mr. Jack Turner, 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/lr

Enclosure

Phillips Petroleum Company

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

March 17, 1961

C
O
P
Y

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

Attention: Mr. W. 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

March 17, 1961

C
Continental Oil Company
Fair Building
Fort Worth, Texas

O
Attention: Mr. R. G. Parker
Gentlemen:

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

Y
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/ix

Enclosure

OIL CONSERVATION COMMISSION

P. O. BOX 871
SANTA FE, NEW MEXICO

C
O
P
Y

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
P. O. Box 1600

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

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

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OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

March 17, 1961

**Shell Oil Company
Box 1589
Midland, Texas**

Attention: Mr. Eychoten

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-Martin-Cover Drilling Corporation, Pan American, Phillips, Humble, Tesoro, 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. FORNER, Jr.
Secretary-Director**

ALF/lr

cc: To all member companies

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/



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

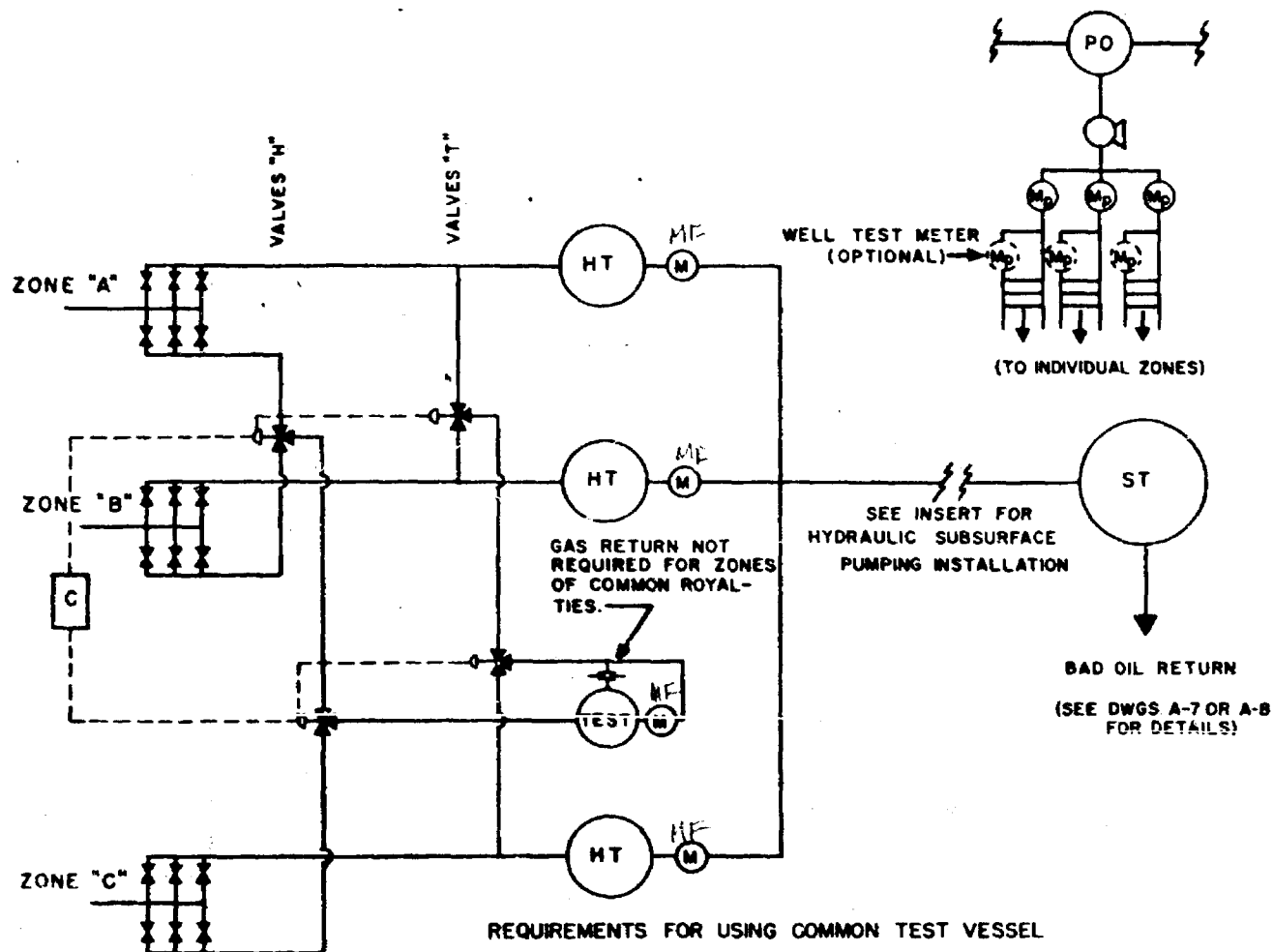
Enclosures

ATTACHMENT NO. 1

PART I

Drawings A-1 through A-8

HYDRAULIC SUBSURFACE PUMPING INSTALLATION



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.

SYMBOLS

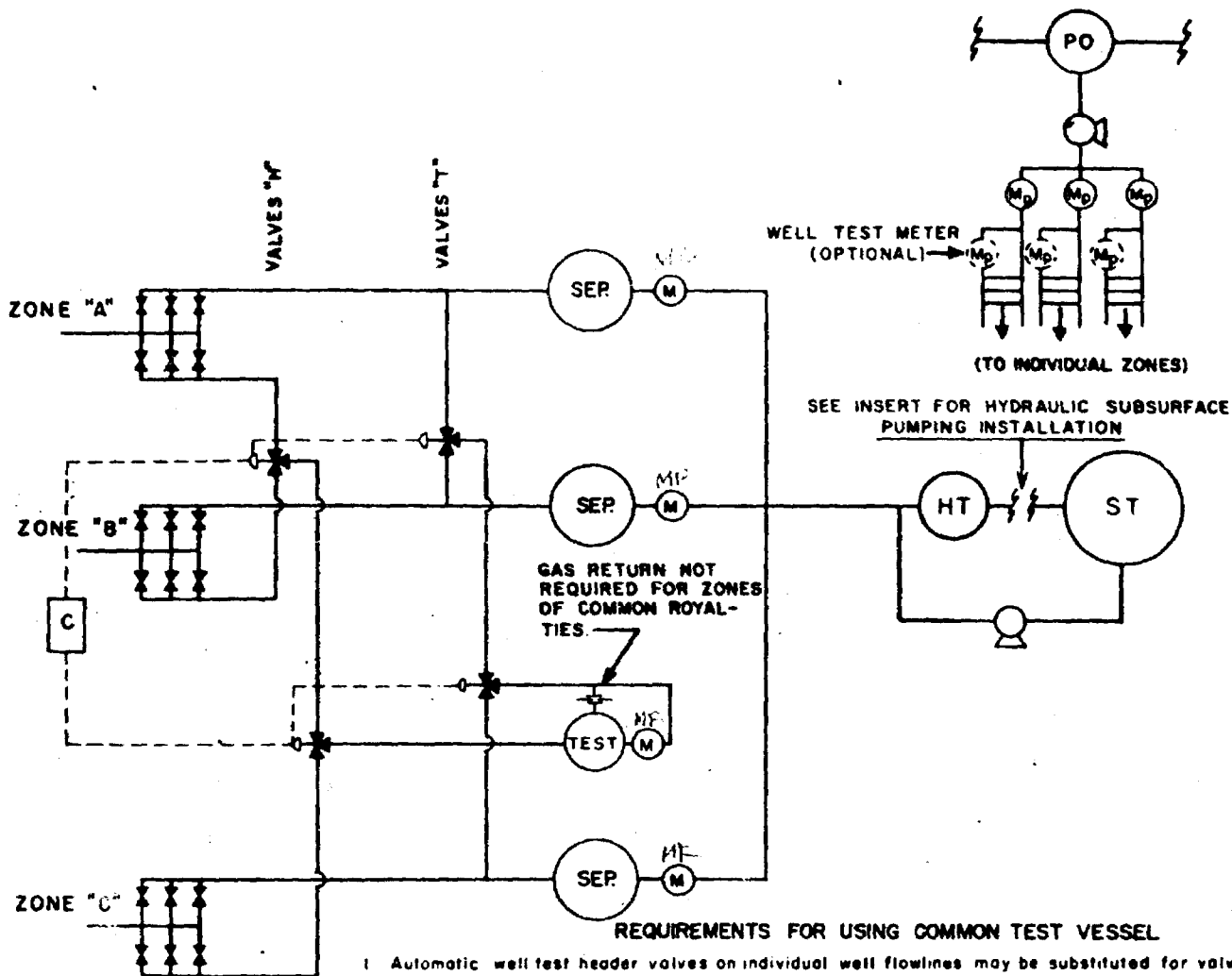
- CHECK VALVE.
 BLOCK VALVE.
 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
 CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
 GAS METER.
 LIQUIDS MEASURING FACILITIES (SHALL INCLUDE SAMPLER WHERE APPLICABLE).
 METER FOR POWER OIL.
 TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
 HEATER TREATER.
 POWER OIL TANK.
 STOCK TANK.
 PUMP.
 SEPARATOR.

INDIVIDUAL TREATERS USED IN COMINGLING ZONES
OF COMMON OR SEPARATE ROYALTIES















NEW MEXICO OIL CONSERVATION COMMISSION
(COMMITTEE ON COMINGLING)

DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-1
REVISED		
APPROVED		

HYDRAULIC SUBSURFACE PUMPING INSTALLATION

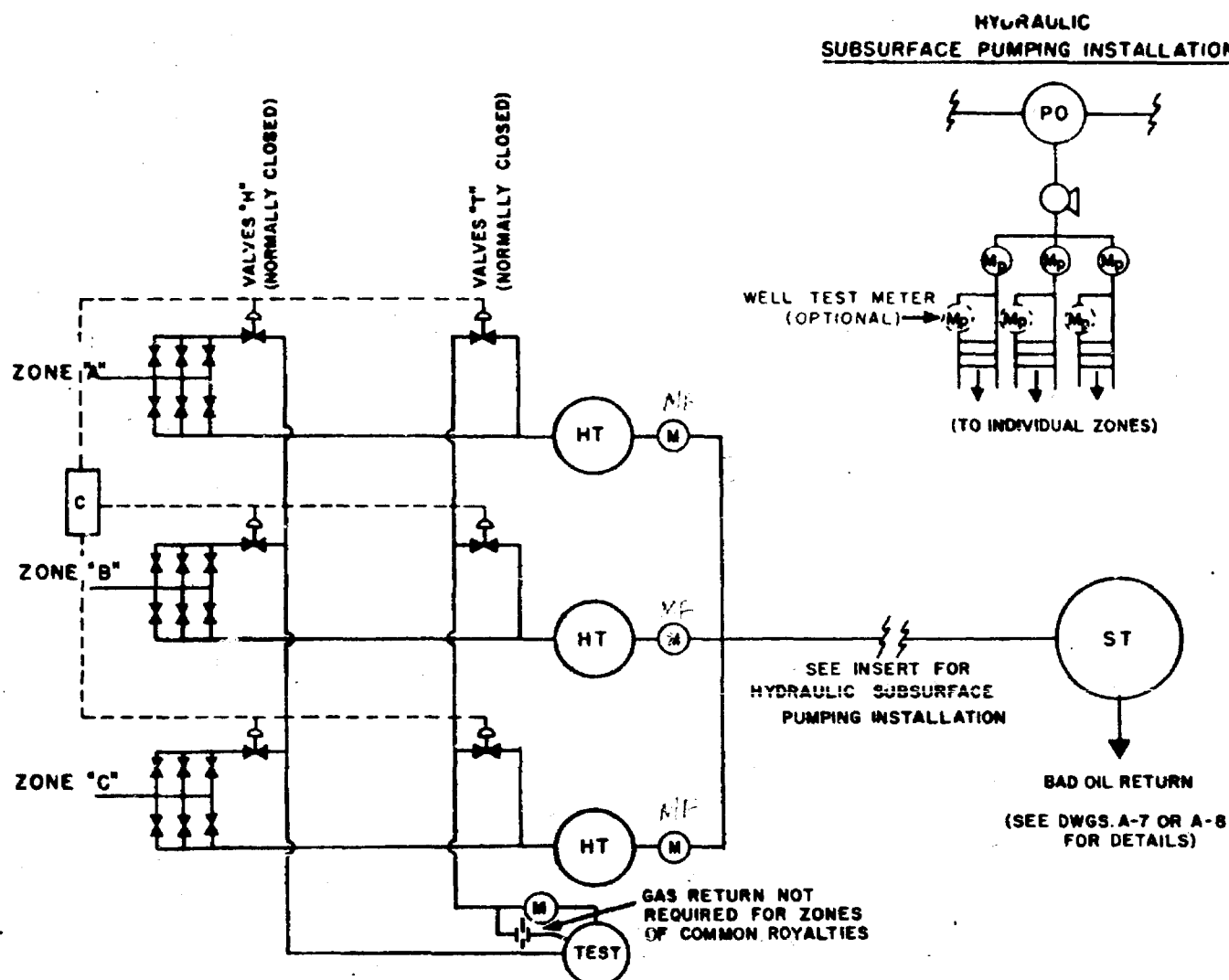


SYMBOLS

- production line only.
- | | |
|---|--|
|  | CHECK VALVE. |
|  | BLOCK VALVE. |
|  | 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED). |
|  | 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED) |
|  | CONTROL PANEL (PNEUMATIC OR ELECTRICAL) |
|  | GAS METER |
|  | LIQUIDS MEASURING FACILITIES |
|  | METER FOR POWER OIL |
|  | TESTING VESSEL (HEATER-TREATER OR SEPARATOR) |
|  | HEATER TREATER |
|  | POWER OIL TANK |
|  | STOCK TANK |
|  | PUMP |
|  | SEPARATOR |

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.

COMMON TREATER USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: <u>H. M. S.</u>	DATE: <u>5-4-61</u>	DWG. NO. A-2
APPROVED _____	_____	
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. Control panel designed to permit opening of only one pair of valves "H" and "T" at any time.
3. Manual overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

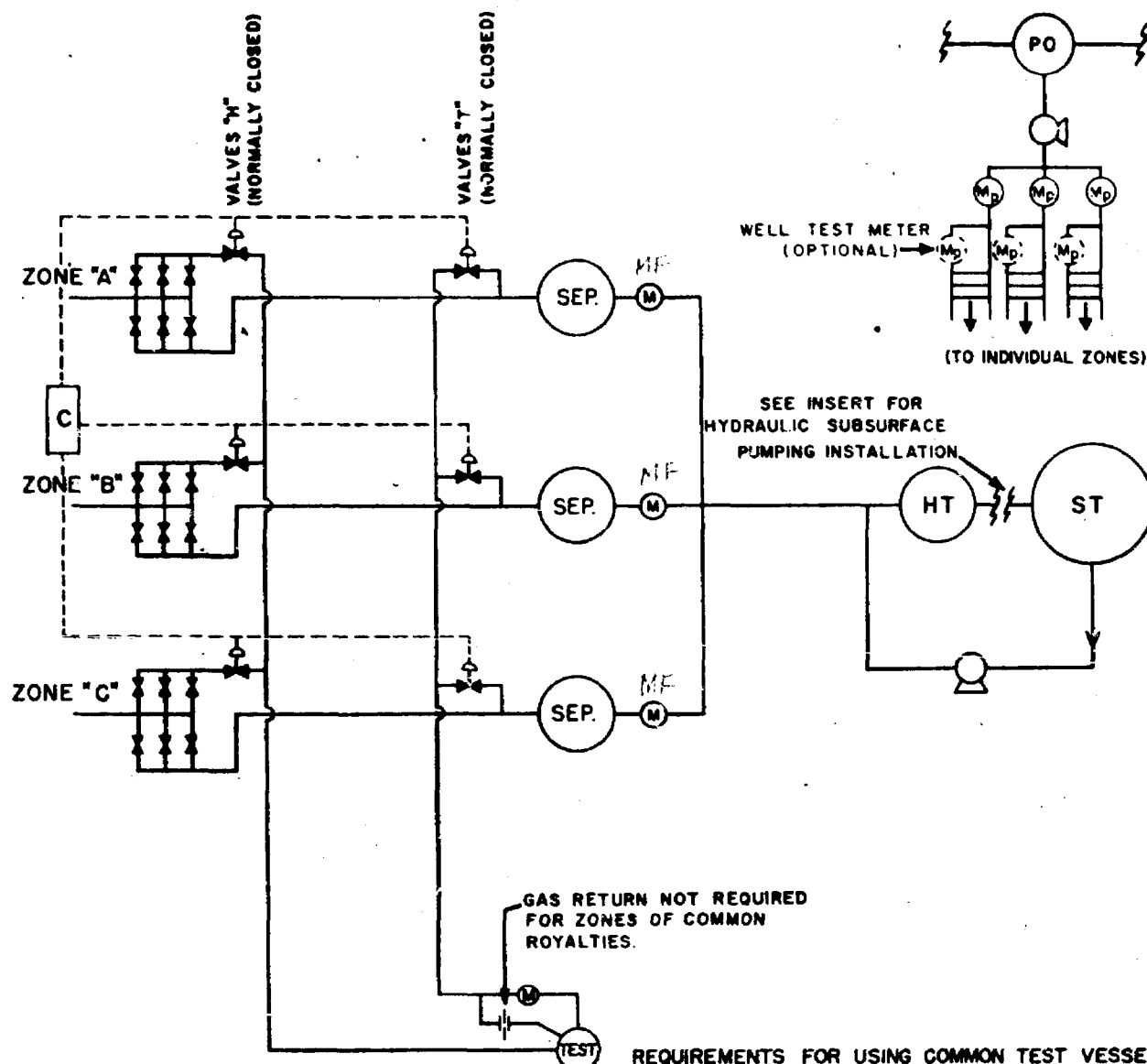
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	LIQUIDS MEASURING FACILITIES
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATOR OR SEPARATOR)
	HEATER TREATOR
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR

when normally closed two way valves are used

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES WHEN MANUAL VALVES ARE NOT INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO.
APPROVED:		A-3
REVISD:		
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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

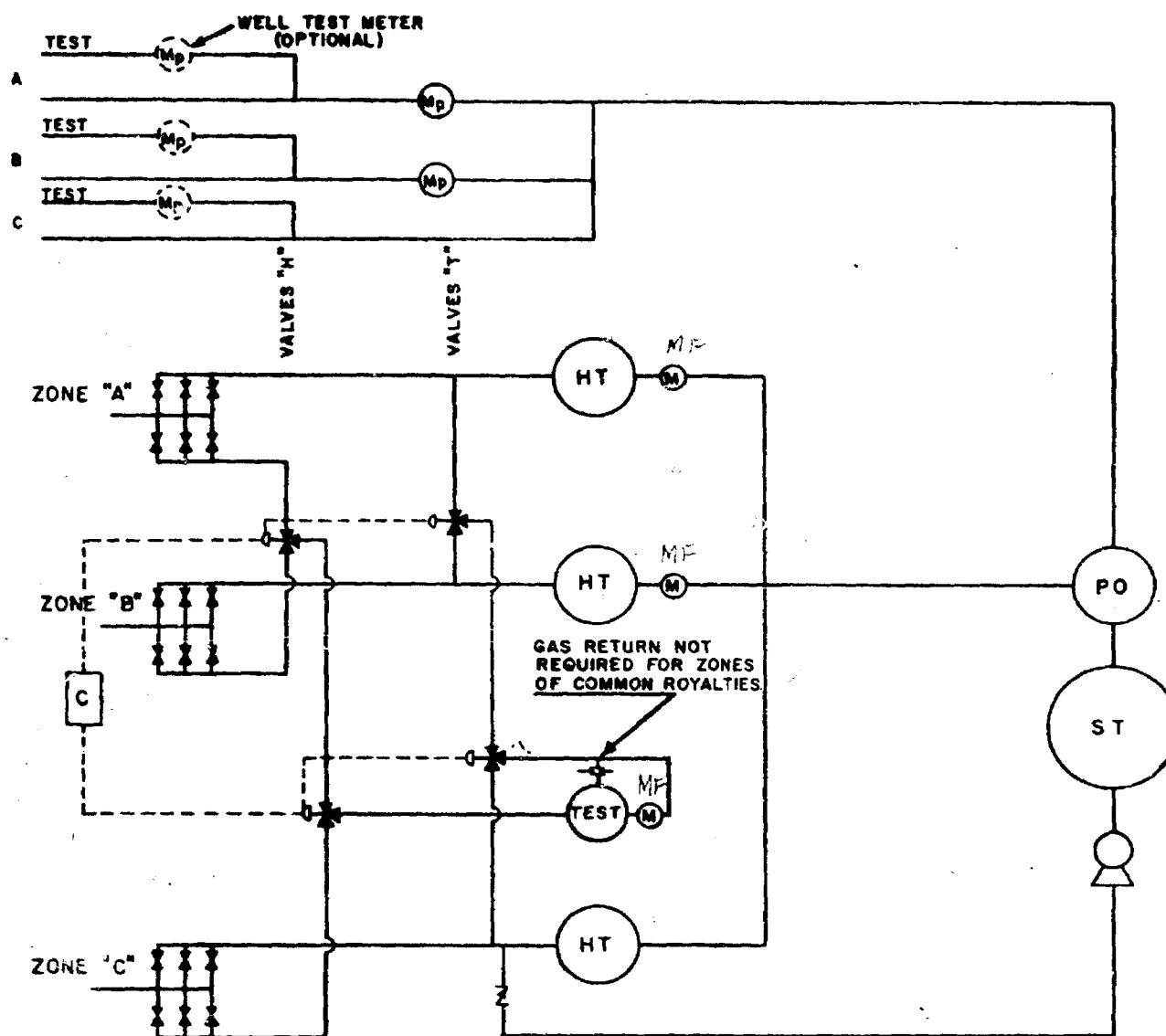
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
	GAS METER.
	LIQUIDS MEASURING FACILITIES.
	METER FOR POWER OIL.
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
	HEATER TREATER.
	POWER OIL TANK.
	STOCK TANK.
	PUMP.
	SEPARATOR.

COMMON TREATER USED IN COMINGLING ZONES OF
COMMON OR SEPARATE ROYALTIES
WHEN ~~MANUAL VALVES ARE NOT INSTALLED~~

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED:		A-4
REVISED:		
APPROVED:		

*normally closed two-way valves
are installed.*



REQUIREMENTS FOR USING COMMON TEST VESSEL

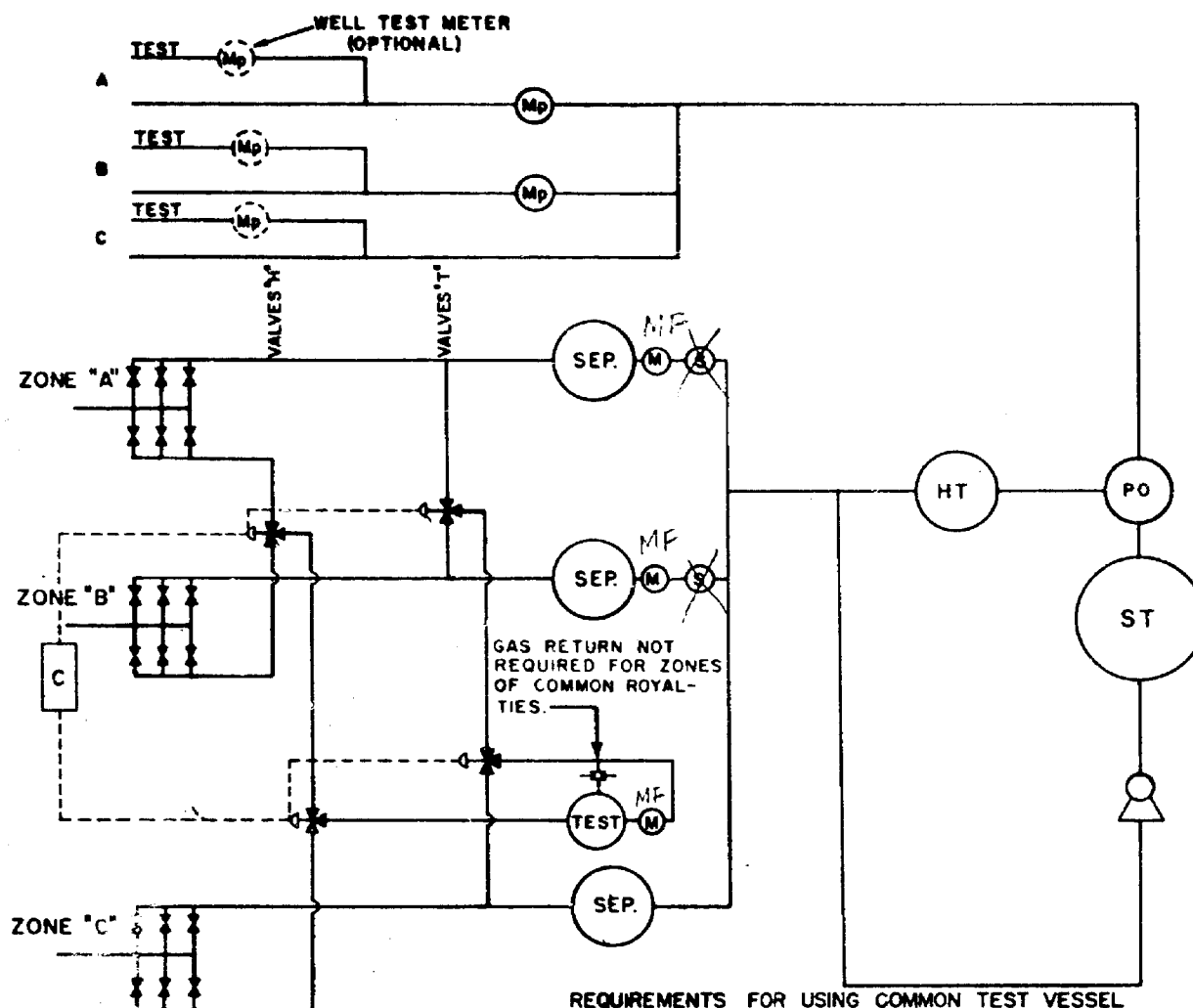
1. Automatic well test header valves on individual well flowlines may be substituted for valve "H". Interlocking control as shown would then be required between each valve on the manifold and the respective valve "T".
2. Manual, pneumatic, or electrical interlocks must be provided between the appropriate 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.

SYMBOLS

- Z
 CHECK VALVE.
 BLOCK VALVE.
 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
 CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
 GAS METER.
 LIQUIDS MEASURING FACILITIES.
 METER FOR POWER OIL.
 TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
 HEATER TREATER.
 POWER OIL TANK.
 STOCK TANK.
 PUMP.
 SEPARATOR.

4. Refer to Drawing H-4 if normally closed two-way valves are to be used.

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: H.N.S.	DATE: 5-4-61	DWG. NO. A-5
APPROVED		
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 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.

SYMBOLS

Z	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

Refer to Drawing A-4 if normally closed two-way valves are to be used.

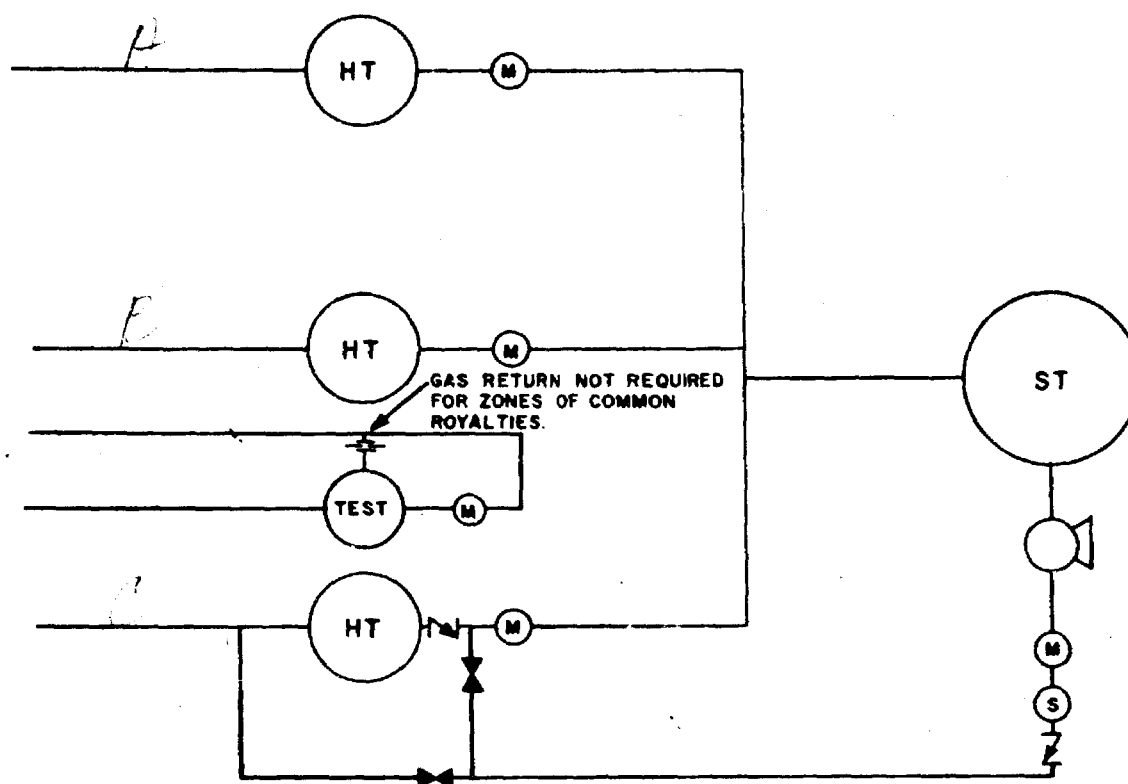
COMMON TREATER USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMINGLING

DRAWN: H. M. S.
APPROVED: _____
REVISED: _____
APPROVED: _____

DATE: 5-4-61

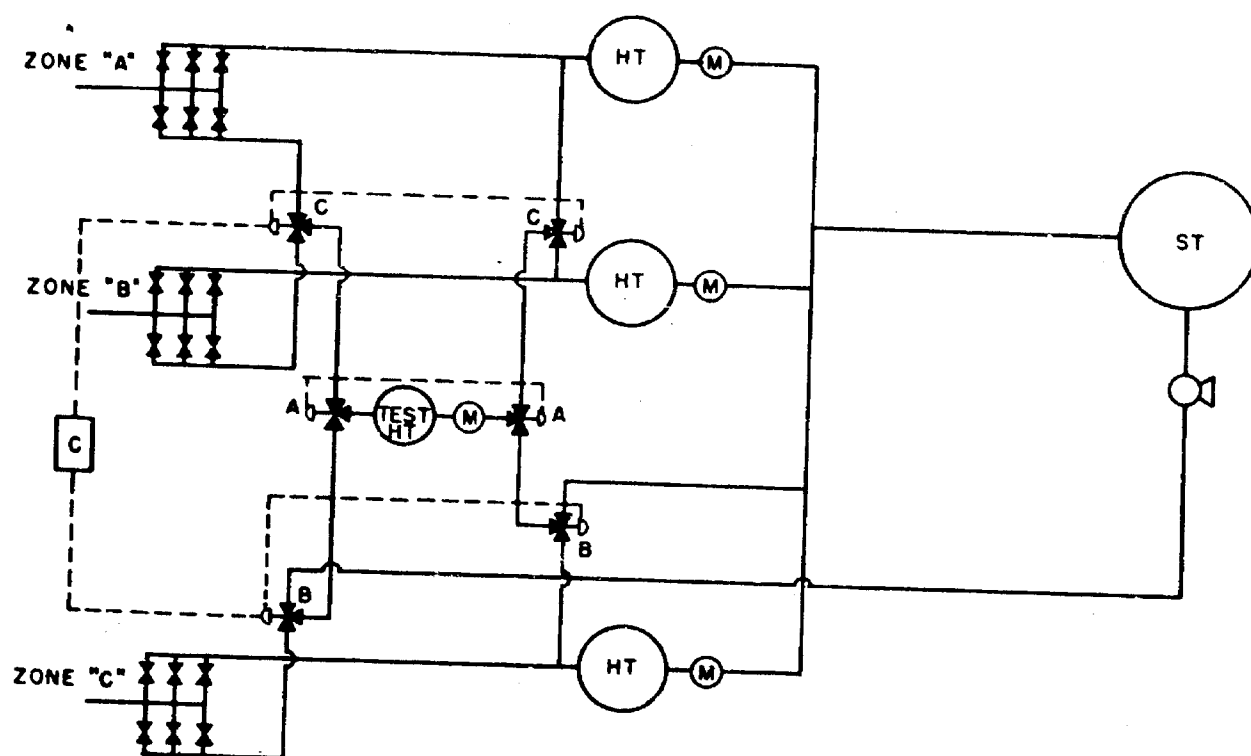
DWG. NO.
A-6

















SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	LIQUIDS MEASURING FACILITIES
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SAMPLER
	SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 1)		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: H.M.S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-7
REVISED		
APPROVED		



SYMBOLS

-  CHECK VALVE.
-  BLOCK VALVE.
-  2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
-  3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
-  CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
-  GAS METER
-  LIQUIDS MEASURING FACILITIES
-  METER FOR POWER OIL
-  TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
-  HEATER TREATER
-  POWER OIL TANK
-  STOCK TANK
-  PUMP
-  SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 2) WHEN TEST TREATER IS INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO.
APPROVED		A-8
REVISED		
APPROVED		

ATTACHMENT NO. 2

PART II

Liquid Measuring Facilities

I COMMINGLING
ZONE METERING (Common Royalty)

A. MARGINAL ZONES

B. WITH ALL ZONES METERED

ZONES WITH TOP ALLOWABLE WELLS

(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 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.

a/ 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.

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

lesser time as the Commission may approve.

- included in zone metering*
- 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

normally
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.

*such device has no
the Commission
May 4/19/2000*
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.

- used in zone accounting*
- 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~~ *COMMITTING* (Royalty not common)

- A. GENERAL REQUIREMENTS *The word lease used hereafter shall mean any lease or zone where the*
- 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. *royalty is not common.*

111 Meter Equipment *or otherwise approved*

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 ~~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 ~~counter~~ 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.
- 9/ 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.

§22 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.

§23 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 shall 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).

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

net pipeline runs with beginning and ending stock adjustments

approved by the Commission

4.1 Meter Provers and Procedures of Calibration

- used in lease accounting*
- 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 ~~minimum~~ duration of 24 hours.
 - Calibrated*
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

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 metering ~~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

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

Where:

Z'_1 = *Adjusted* Net zone ^{or lease} production chargeable to the zone allowable.

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

$\sum Z's$ = 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

$$Z_1 = 500 \text{ bbls.}$$

$$Z_2 = 500 \text{ bbls.}$$

$$Z_3 = 500 \text{ bbls.}$$

$$\Sigma Z's = 1500 \text{ bbls.}$$

$$A = 1530 \text{ bbls.}$$

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 air ^{net} 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 commissioning application does not conform to 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 in Drawings A-1 through A-8 or lines around meters shall be permitted.

Don
Midland, Texas
May 5, 1961

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

Mr. J. E. Robinson, Jr.
Texaco, Inc.
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Midland, Texas

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.

WMO'R/cr

Yours very truly,

W. M. O'Reilly
W. M. O'Reilly

Chairman of Special Work Group

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} ~~was~~ 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. Natter, New Mexico Oil Conservation Commission
W. M. O'Reilly, Humble Oil & Refining Company
J. D. Ramey, New Mexico Oil Conservation Commission
J. E. Robinson, Texas Co.
R. D. Schrapp, 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

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

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CASE No. 2356
Order No. R-2060

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

-4-
CASE No. 2356
Order No. R-2060

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 herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

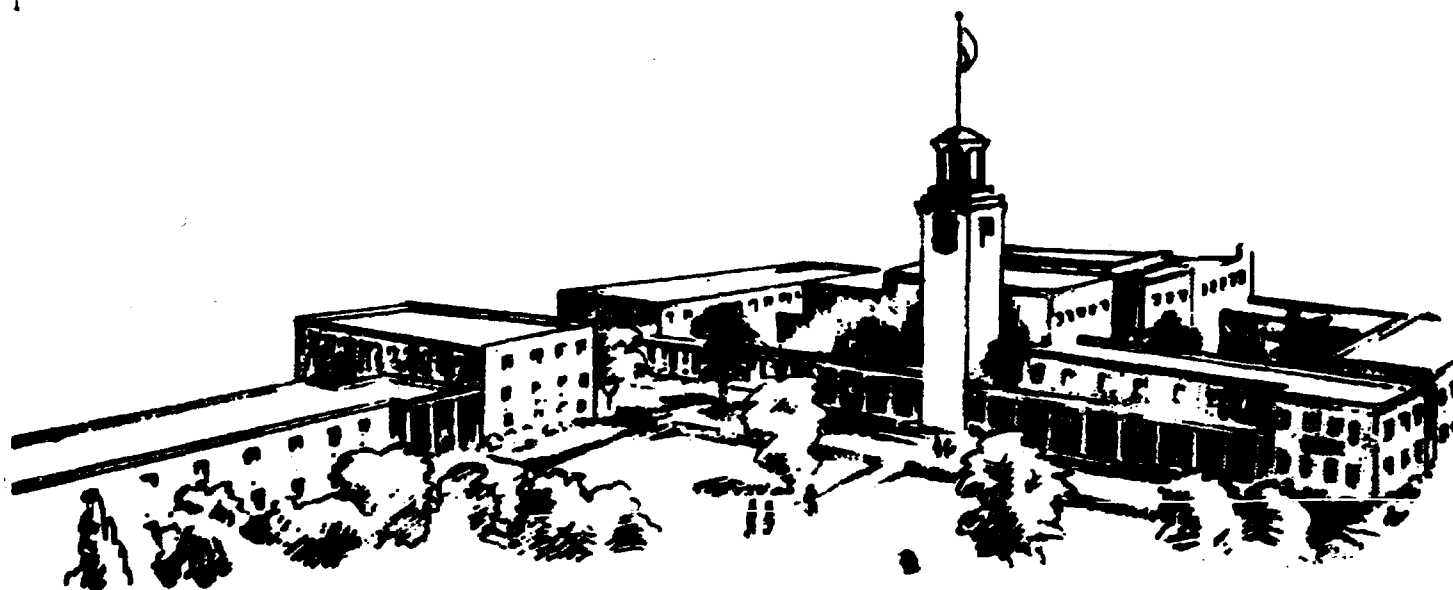
E. S. WALKER, Member

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
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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:

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

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.)
- $\sum Z's$ = 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:

Then:

Z_1 = 9,100 barrels	$Z_1' = \frac{9,100 \times 20,021}{19,992} = 9,113$
Z_2 = 6,330 barrels	$Z_2' = \frac{6,330 \times 20,021}{19,992} = 6,339$
Z_3 = 4,562 barrels	$Z_3' = \frac{4,562 \times 20,021}{19,992} = 4,569$
$\sum Z's$ = 19,992 barrels	
A = 20,021 barrels	

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°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°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%

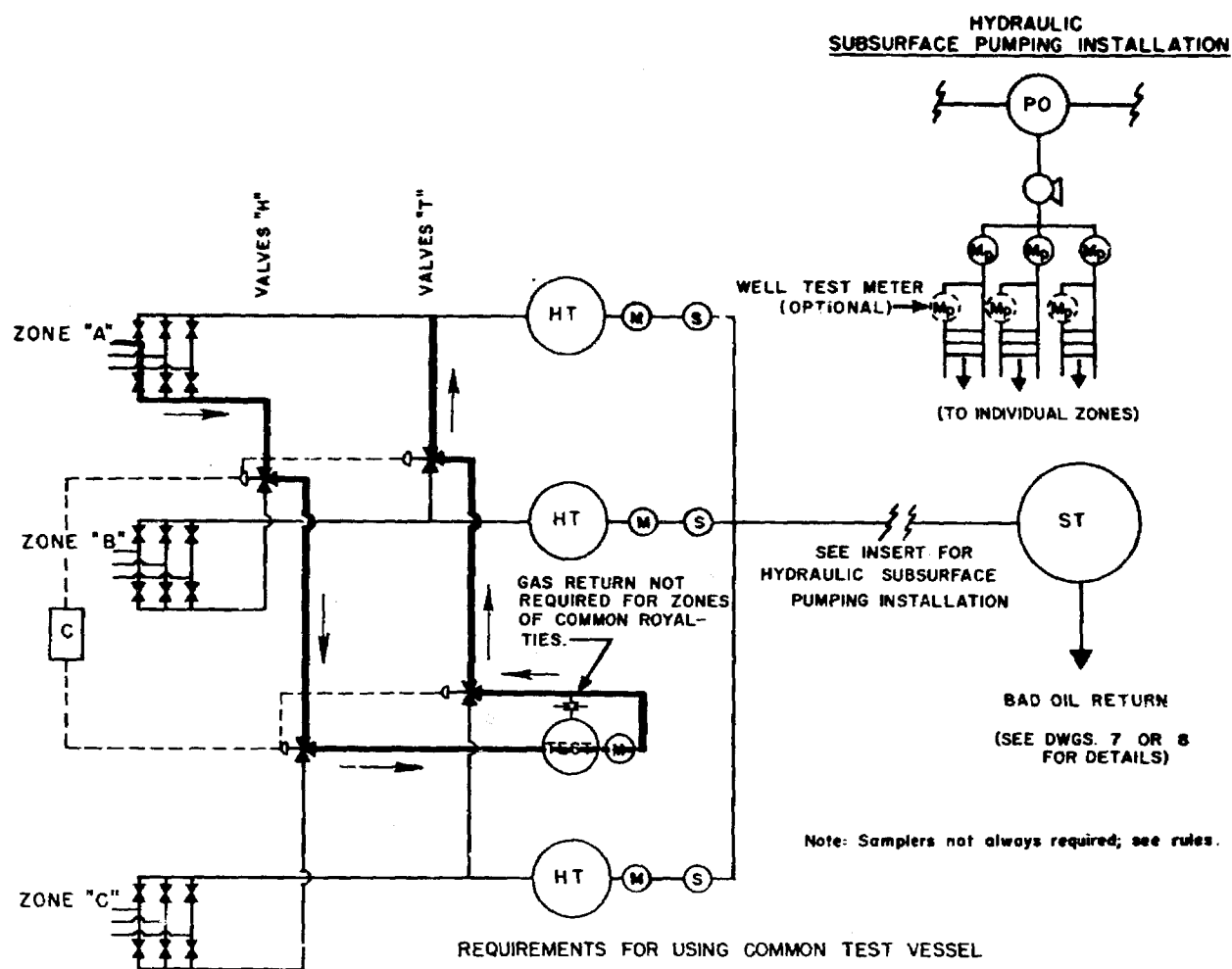
Any proving device described in API Standard 1101, Sections II and III can be used; however, all requirements of Sections II and III regarding provers and their calibration and prover procedures shall be met.

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° 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.

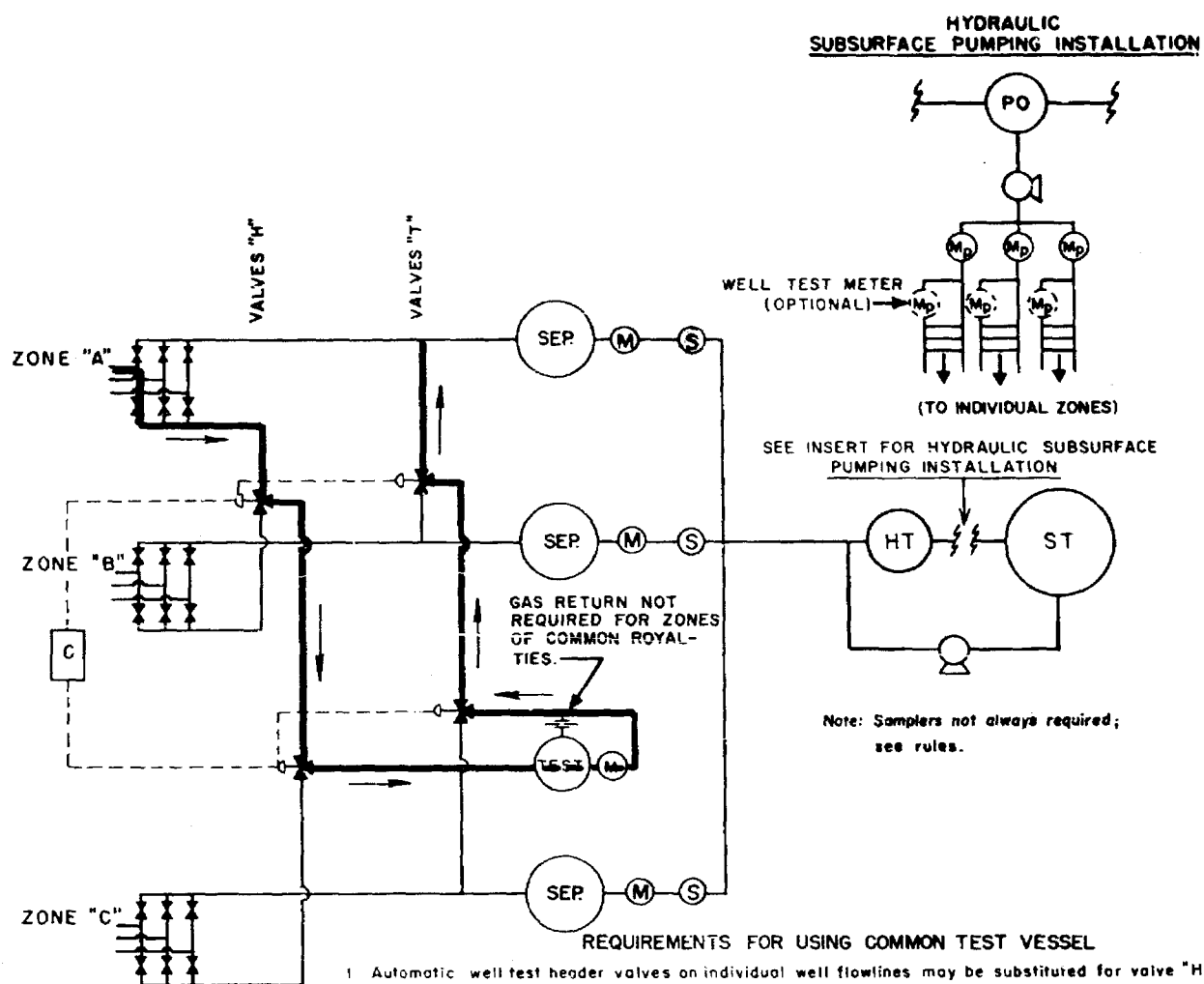


SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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



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.

SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	SAMPLER

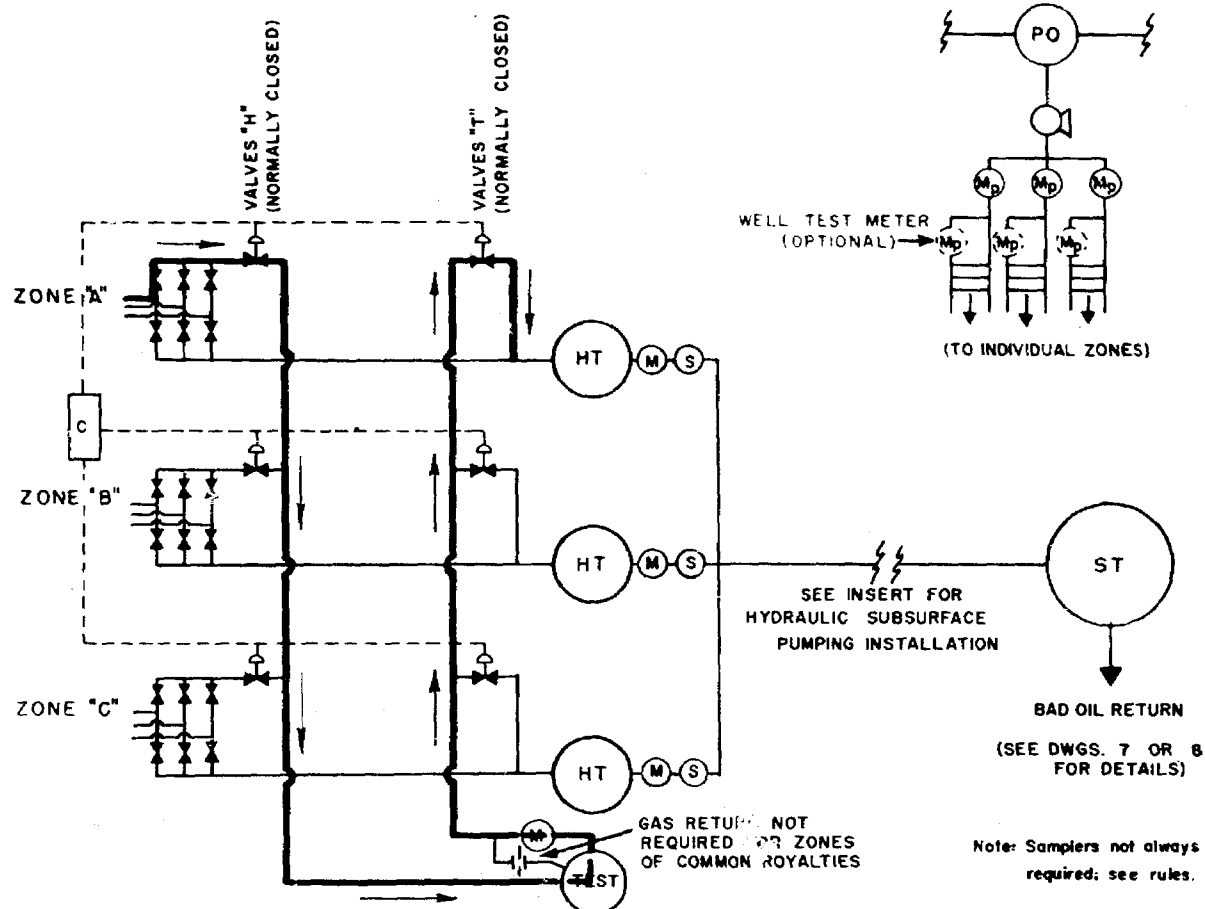
Red line indicates path followed by production from a Zone "A" well while on test.

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 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)
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	SAMPLER

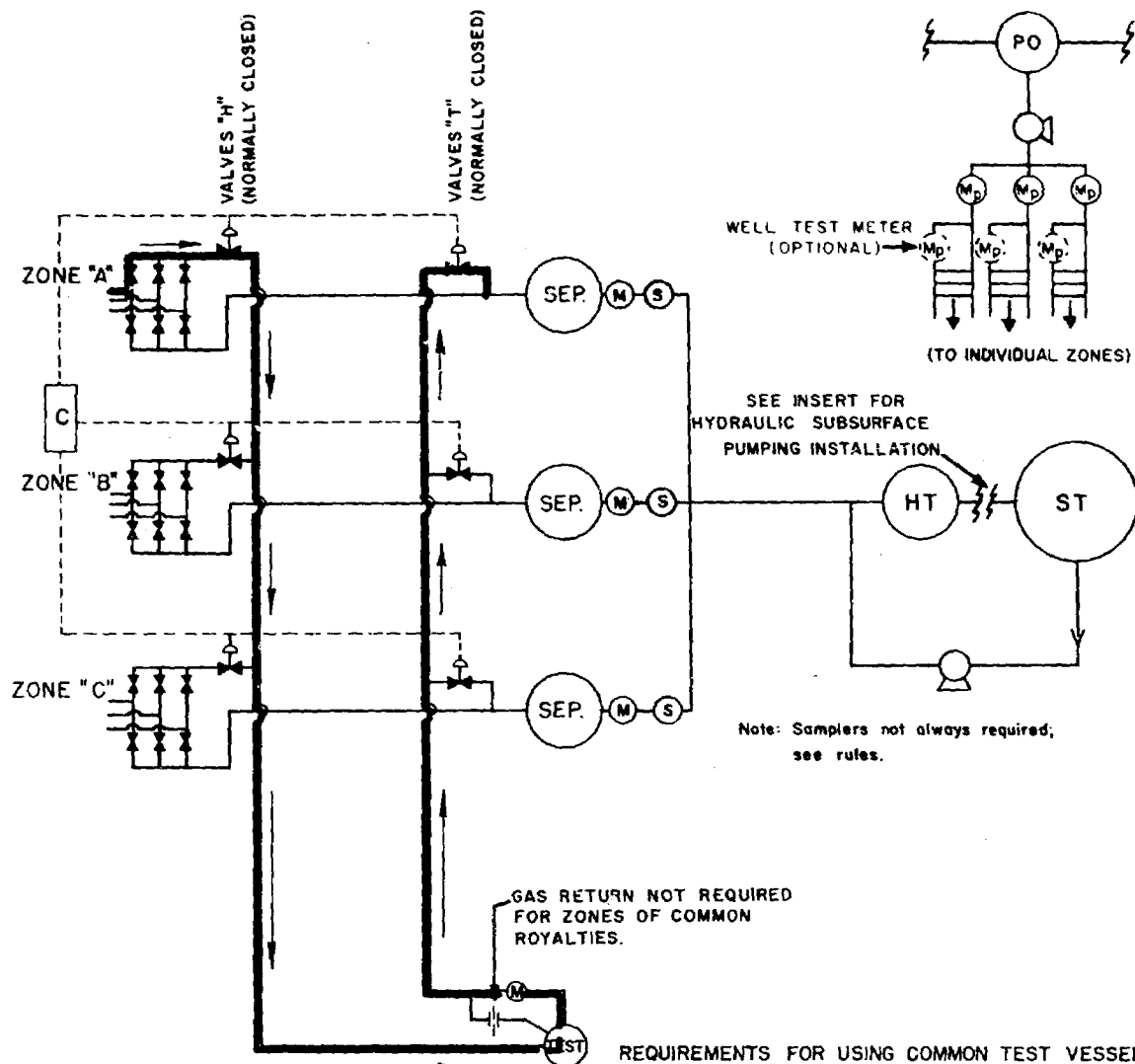
Red line indicates path followed by production from a Zone "A" well while on test.

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

HYDRAULIC SUBSURFACE PUMPING INSTALLATION



SYMBOLS

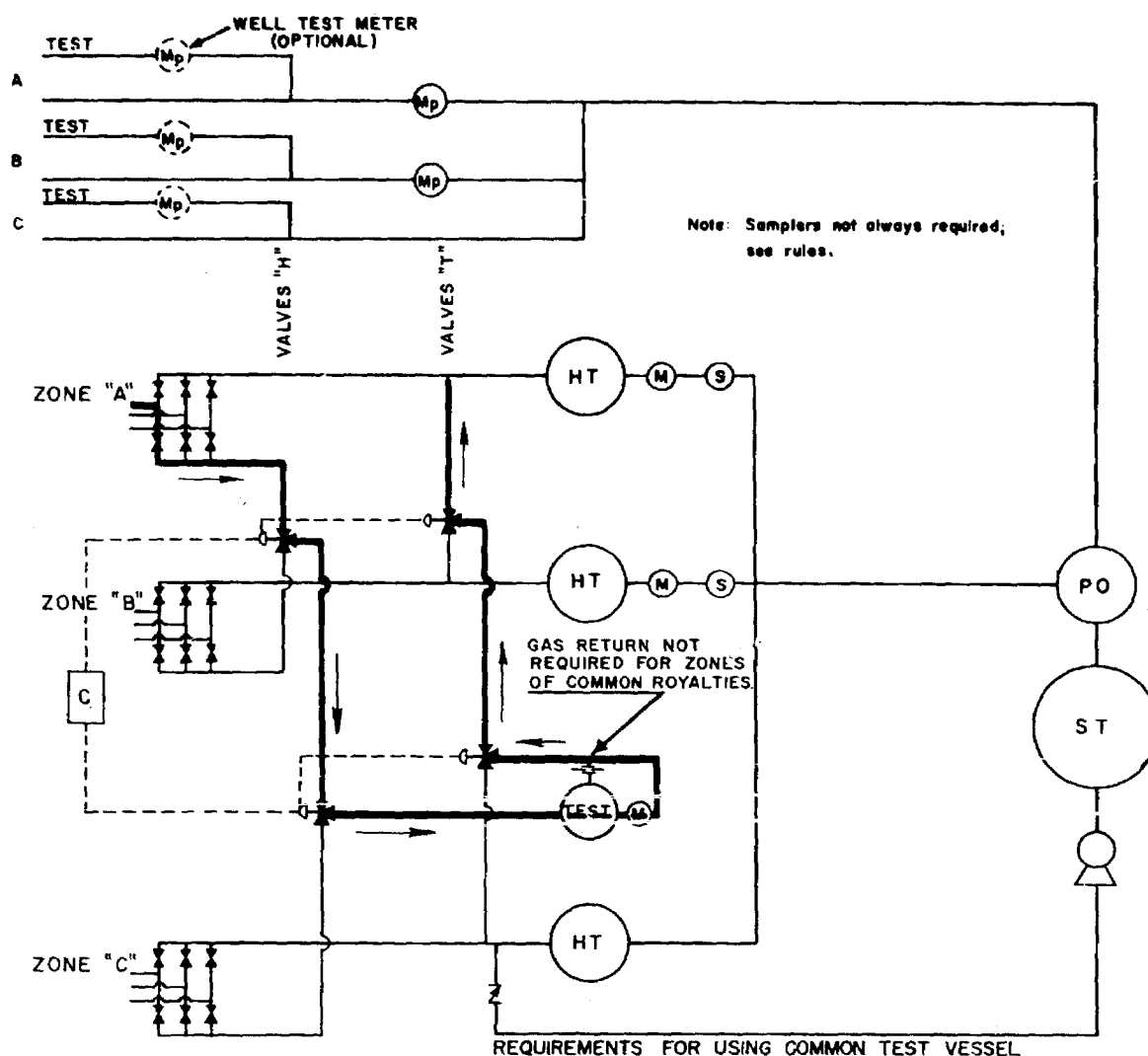
- CHECK VALVE
- BLOCK VALVE
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED)
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
- CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- METER
- METER FOR POWER OIL
- TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HEATER TREATER
- POWER OIL TANK
- STOCK TANK
- PUMP
- SEPARATOR
- SAMPLER

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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

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 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

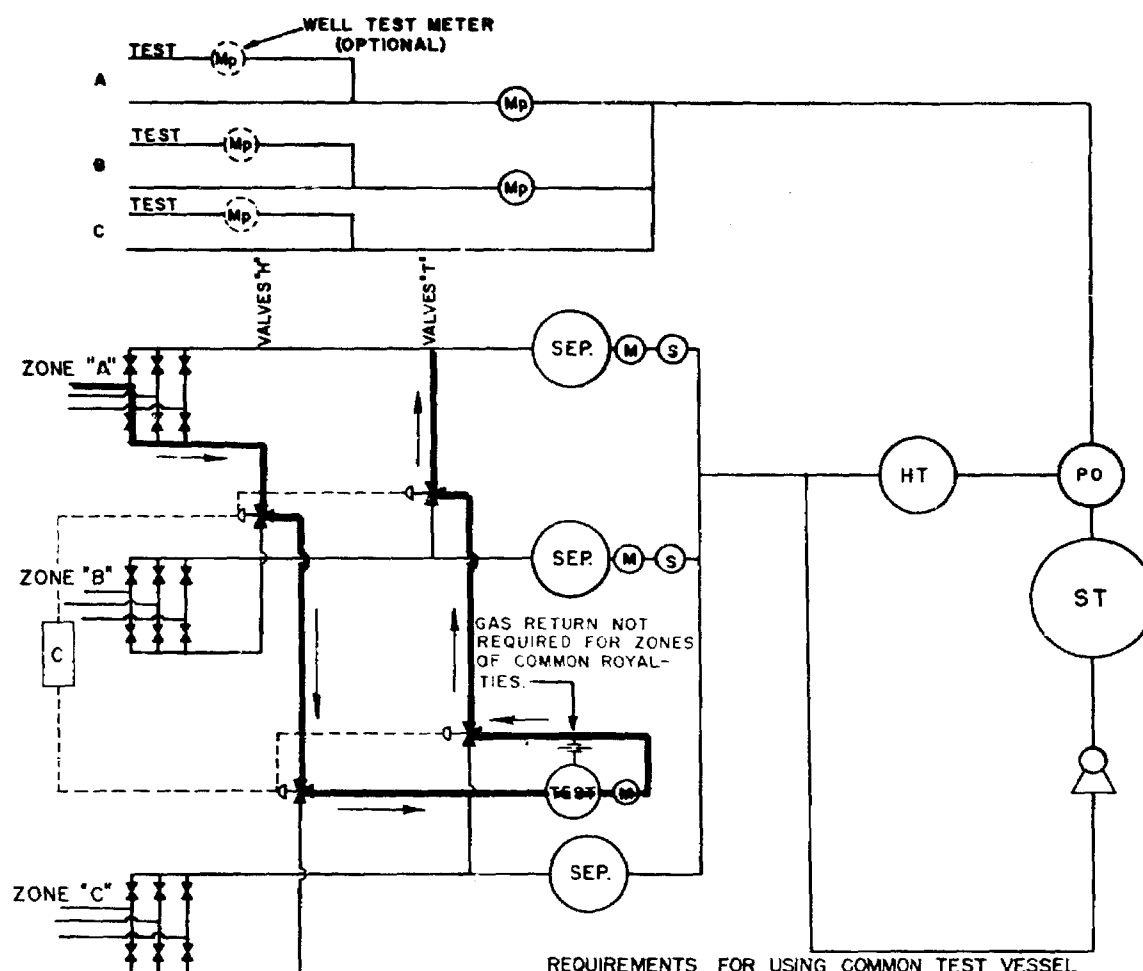
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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 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 used, refer to drawing A-1.

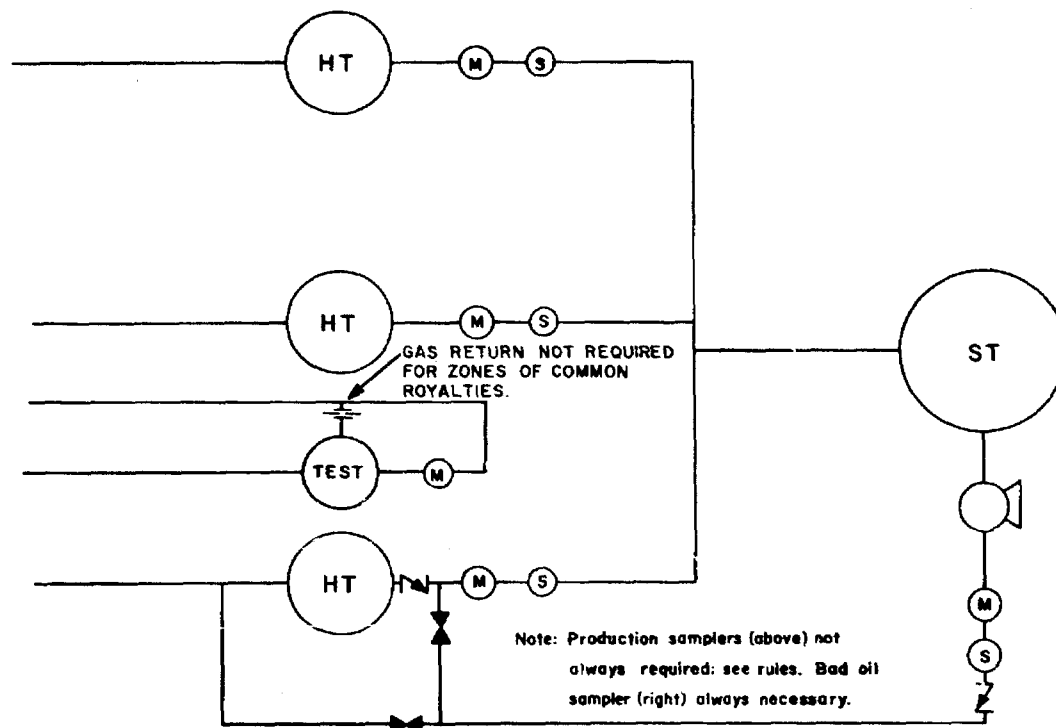
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SAMPLER
	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).
-  CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
-  GAS METER
-  METER
-  METER FOR POWER OIL
-  TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
-  HEATER TREATER
-  POWER OIL TANK
-  STOCK TANK
-  PUMP
-  SAMPLER
-  SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 1)

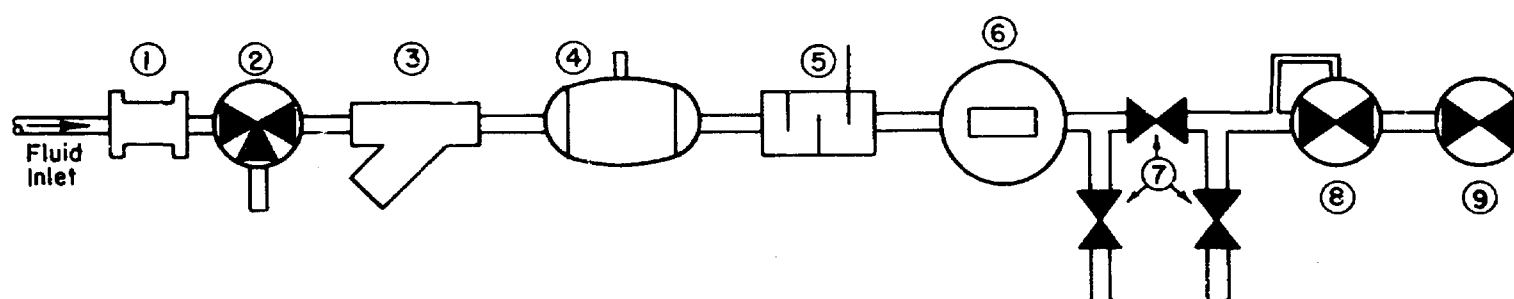
NEW MEXICO OIL CONSERVATION COMMISSION
MANUAL FOR COMMINGLING

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.

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

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 CON-
SERVATION 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 Con-
servation 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 ad-
vised 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 produc-
tion 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.

-3-

Case No. 1850
Order No. R-1597

DONE at Santa Fe, New Mexico, on the day and year herein-
above 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/

SINGLAI OIL & GAS COMPANY

SINGLAI 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
Horace N. Burton

HNB/id

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/

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

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

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

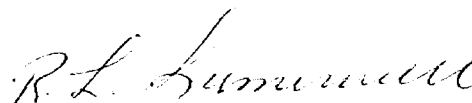
SUBJECT INDUSTRY STUDY COMMITTEE
COMMINGLING OF CRUDE OIL

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. Hutter 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

RLS/dhw

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

cc: Mr. D. S. Hutter  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

102 only in

15-116

MEASURING METHODS COMMITTEE

I. ZONE METERING

1. Meter Equipment

May use any meter, ~~equipped~~ 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.~~

- will be corrected for all zones measuring 2% or more BS+W. as BS+W is less than 2%.*
- 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, and BS+W is 2% or more, 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 water 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 ^{net} meter reading bears to the sum of all such ^{net} 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~~ as an attachment to the monthly report. *Following for a period to be specified by the Committee.*
- Report cumulative reading of non-reset counter End ☒ Start ☒

Zone Meter Factor _____

Percent BS&W from Sampler ☒ _____

Load Oil Volume ☒ _____

Remarks _____

*3. C-115 form
monthly
as attachment
to report
following for a
period to be
specified by
the Committee*

1. ZONE METERS (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, *does not apply* ~~should be omitted.~~

OIL CONSERVATION COMMISSION

P. O. BOX 671

SANTA FE, NEW MEXICO

June 28, 1961

C
O
P
Y

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 Sumnerwell did an excellent job of filling in for you. We have been wondering how an old boy from the wide open spaces is faring 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

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

June 23, 1961

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

Dear Mr. Sumarwell:

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

ALB/ix

OIL CONSERVATION COMMISSION

P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

C
O
P
Y

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

Dear Mr. Yaronka:

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

C
O
P
Y

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

Dear Mr. Storn:

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

C
O
P
Y

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

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.

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. V. T. Lyon
Continental Oil Company
P. O. Box 68
Hunice, 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

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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

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

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

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

C
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P
Y

OIL CONSERVATION COMMISSION

P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1961

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

MAILING LIST

Industry Study Committee
Commingle 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

MAILING LIST

Industry Study Committee
Commingle of Crude Oil

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

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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



SHELL OIL COMPANY

P O. Box 1858
Roswell, New Mexico

file

May 12, 1961

Subject: Third Meeting
Industry Study Committee
Commingleing 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

MAILING LIST

Industry Study Committee
Commingleling 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.
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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. R. T. From



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. D. S. Nutter	New Mexico Oil Conservation Commission
Mr. J. D. Ramay	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. 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. L. Sumarwell	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 temperature.
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. Sumnerwell
	V. T. Lyon
	Clark Storm

Industry Study Committee Members

-3-

5-2-61

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.

Industry Study Committee Members

-2-

5-22-61

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. Elkins

for R. L. Elkins
Committee Chairman

MAILING LIST

Industry Study Committee
Commingle 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
Commingleing of Crude Oil

COMMITTEE MEMBERS

Gentlemen:

The fourth and final meeting of the Industry Study Committee on Commingleing 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 commingleing 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.

-2-

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. Sumnerwell

R. L. Sumnerwell
Committee Chairman

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

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

[illegible]

MASTER TEST METER MAKE OR STOCK TANK NO.	SIZE	MODEL	SERIAL NO.	DATE LAST CALIBRATION	FACTOR
---	------	-------	---------------	--------------------------	--------

[illegible][illegible]

☒ I hereby certify that the information is true

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

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

Signed _____

Title _____

Address _____

Company _____

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

The New Mexico Oil Conservation Commission has appointed the subject committee for the purpose of preparing designs of comingling 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 comingling systems, with a listing of problems encountered in each type, are outlined below:

- I. Comingling 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 comingling 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)? *% of meter and sampler*
 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.



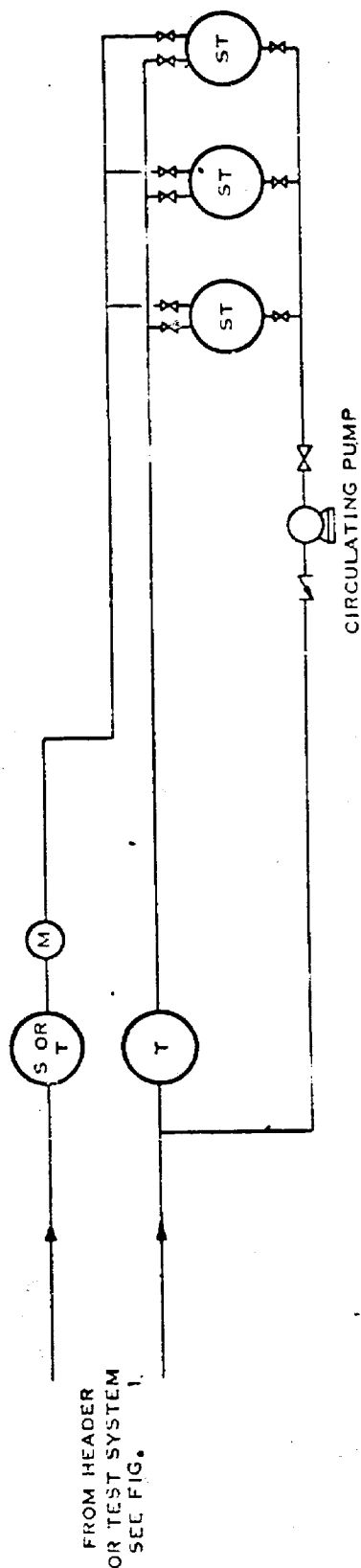
III. Commingling of production from two or more zones and from two or more leases with different royalty owners.

PROBLEMS - 1. See 1 thru 11 above.

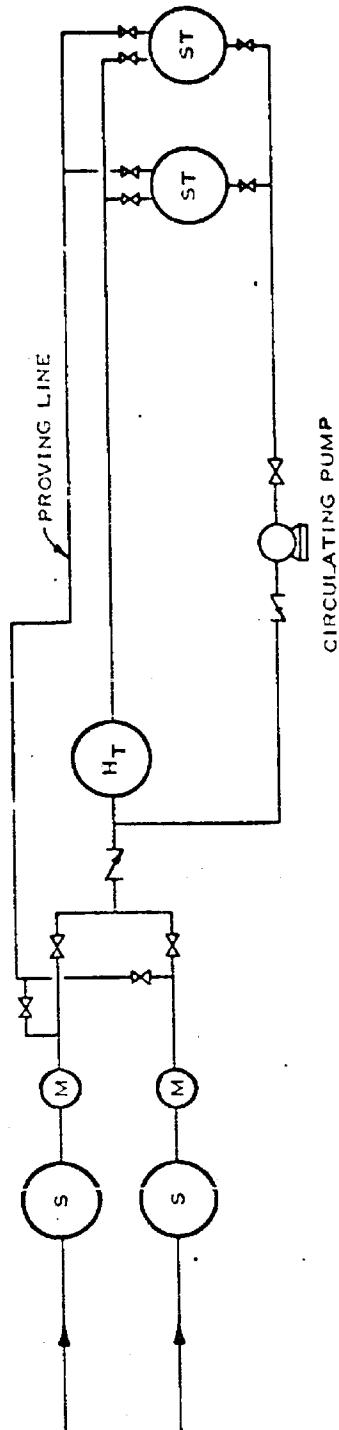


2. When commingling several leases and two or more zones there might be a problem of crude gravity determination by leases.

CIRCULATING BOTTOMS OR BAD OIL IF ONLY ONE METER USED
(COMMON ROYALTY)



CIRCULATING BOTTOMS OR BAD OIL IF METERING FROM SEPARATOR
(COMMON ROYALTY)



CIRCULATING BOTTOMS OR BAD OIL IF METERING FROM TREATER
(COMMON ROYALTY)

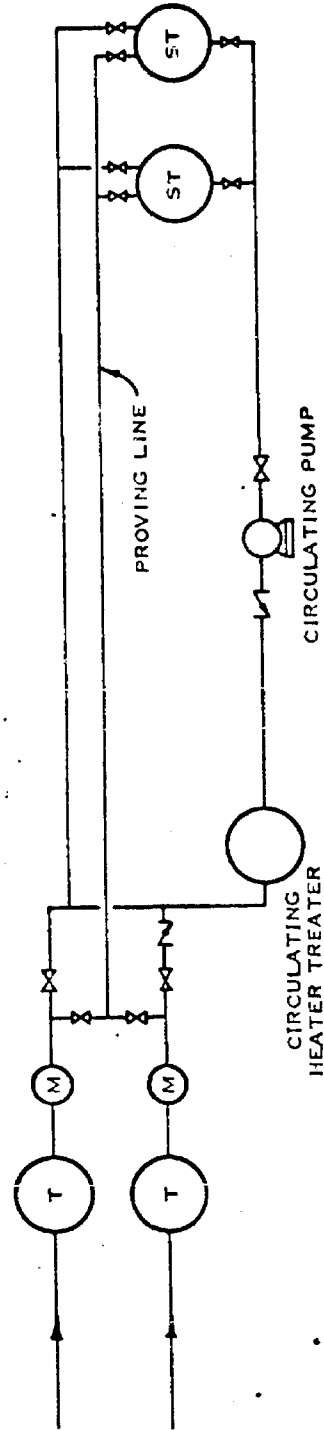
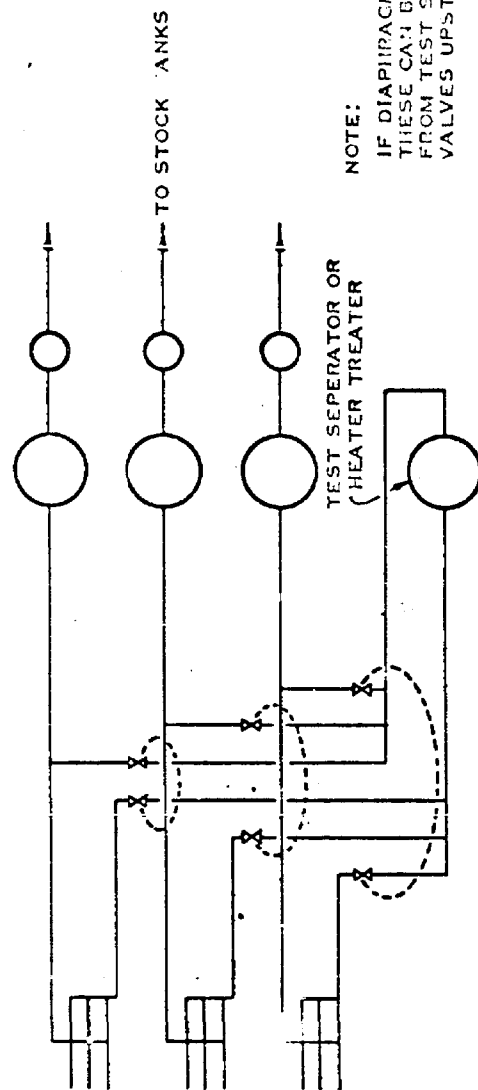
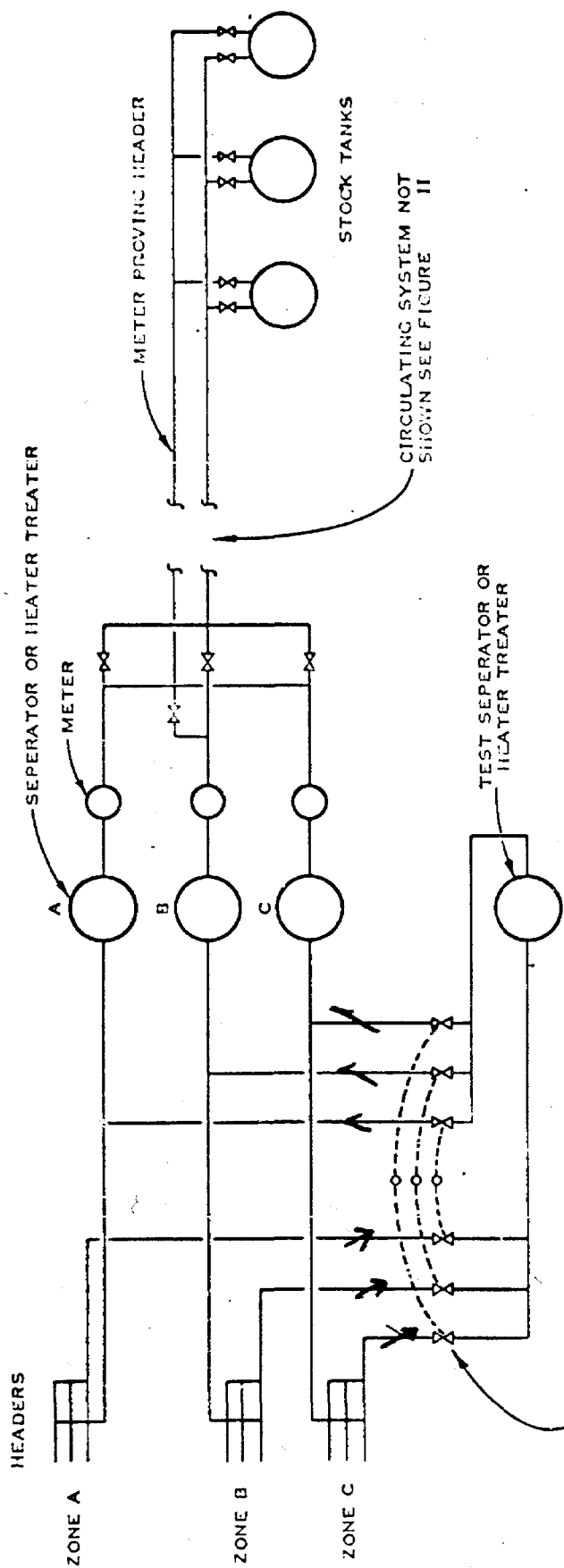


FIGURE II

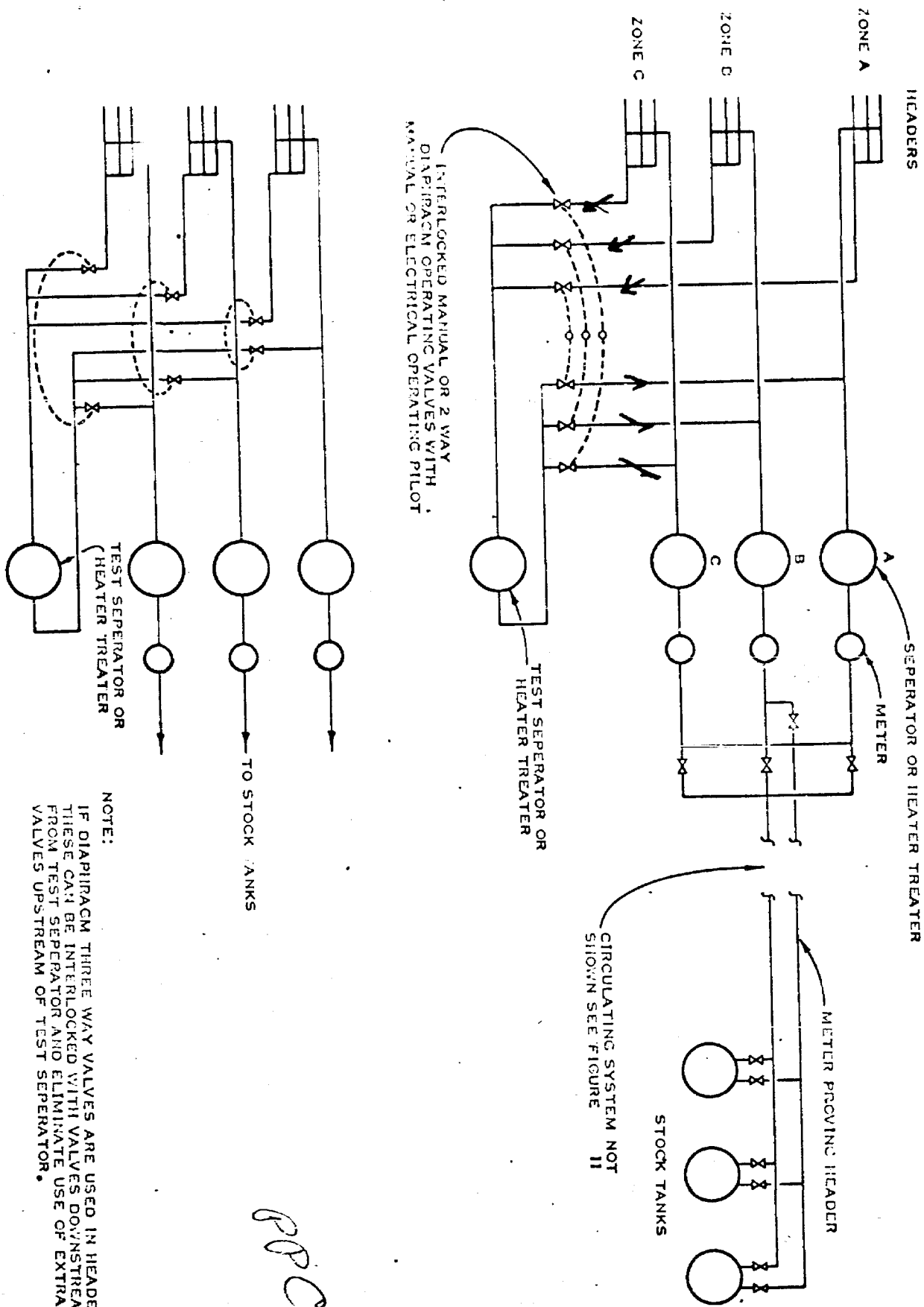
WELL TEST INSTALLATION FOR COMMINGLING MULTIPLE ZONE LEASES (COMMON ROYALTY)



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 SEPARATOR AND ELIMINATE USE OF EXTRA VALVES UPSTREAM OF TEST SEPARATOR.

WELL TEST INSTALLATION FOR COMMINGLING MULTIPLE ZONE LEASES (COMMON ROYALTY)



ALTERNATE POSITION OF VALVES
MANUAL OR DIAPHRAGM OPERATED
INTERLOCKED VALVES

FIGURE I

MAILING LIST

Industry Study Committee
Commingle 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. E. 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.

4-12-61

- 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.

Industry Study Committee Members

-4-

4-12-61

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
<hr/>				
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:

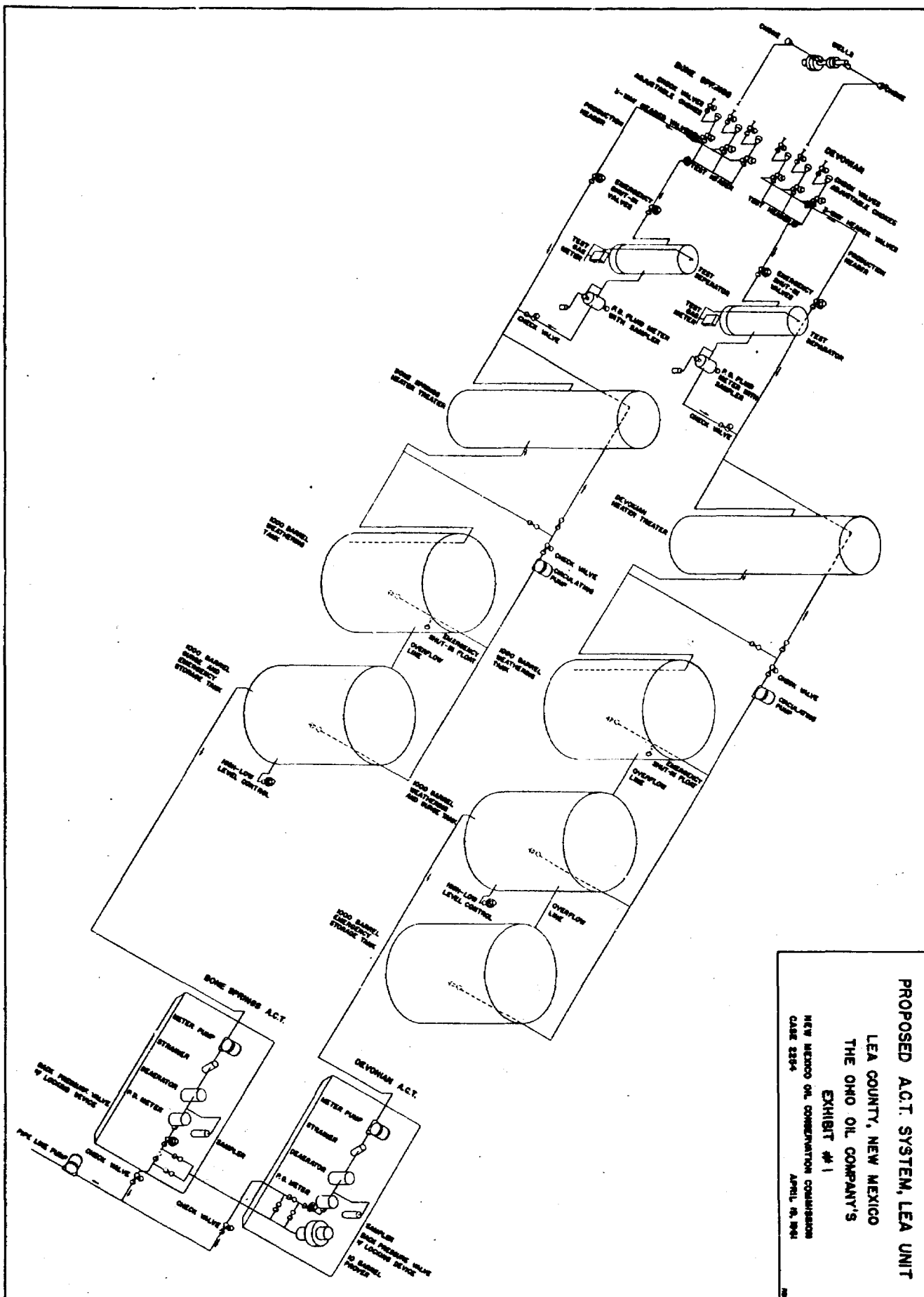
Although we as a purchaser are extremely interested in the study being conducted by the committee on commingling problems, we did not attend the meetings held April 20 and 21 inasmuch as it is my understanding those meetings would be devoted to standard drawings of automatic transfer installations.

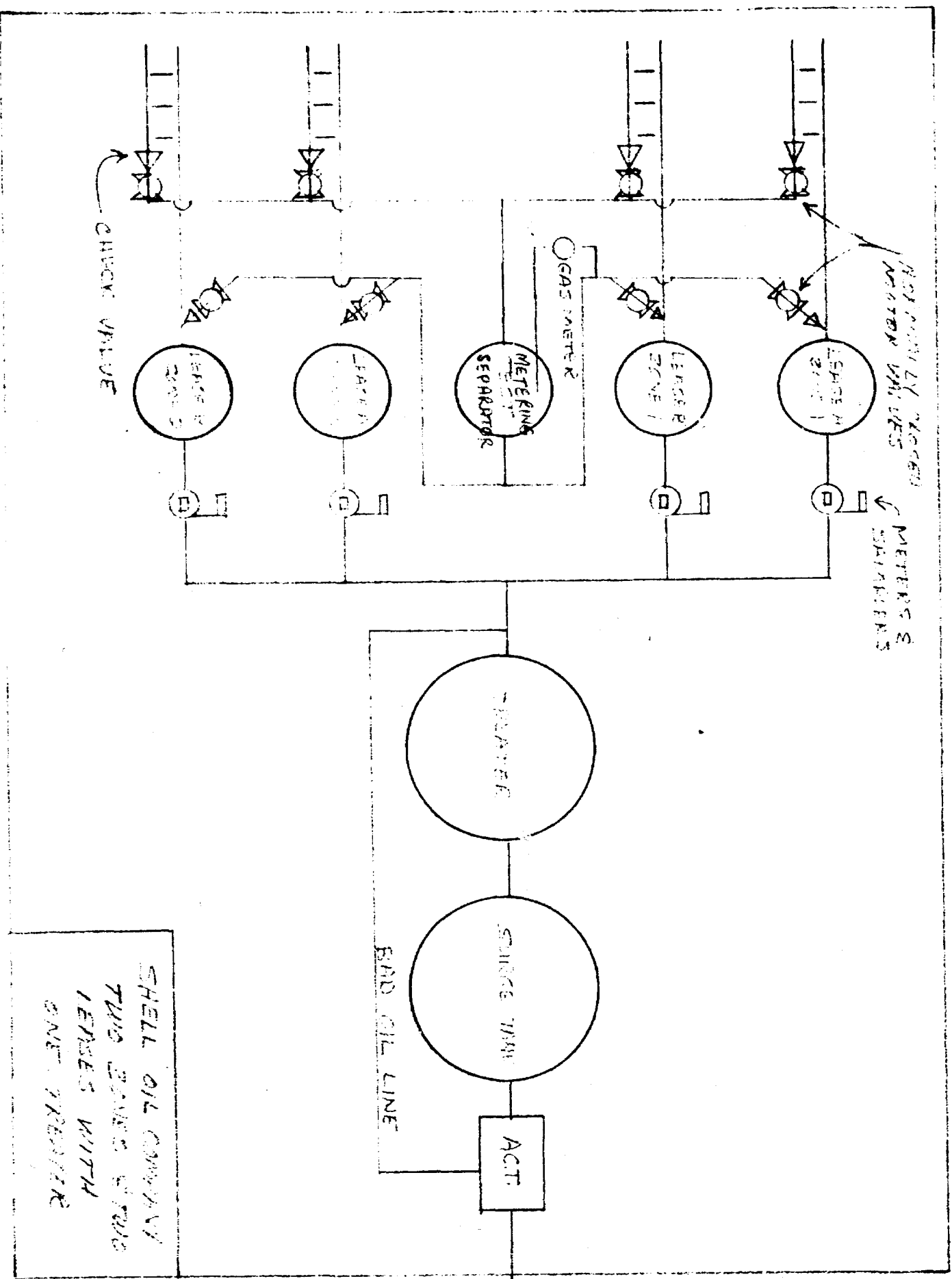
We are, of course, highly interested in the problems under Items 2 and 3 of the discussion notes of April 7, 1961, and I would appreciate receiving word from you when these problems come up for further discussion.

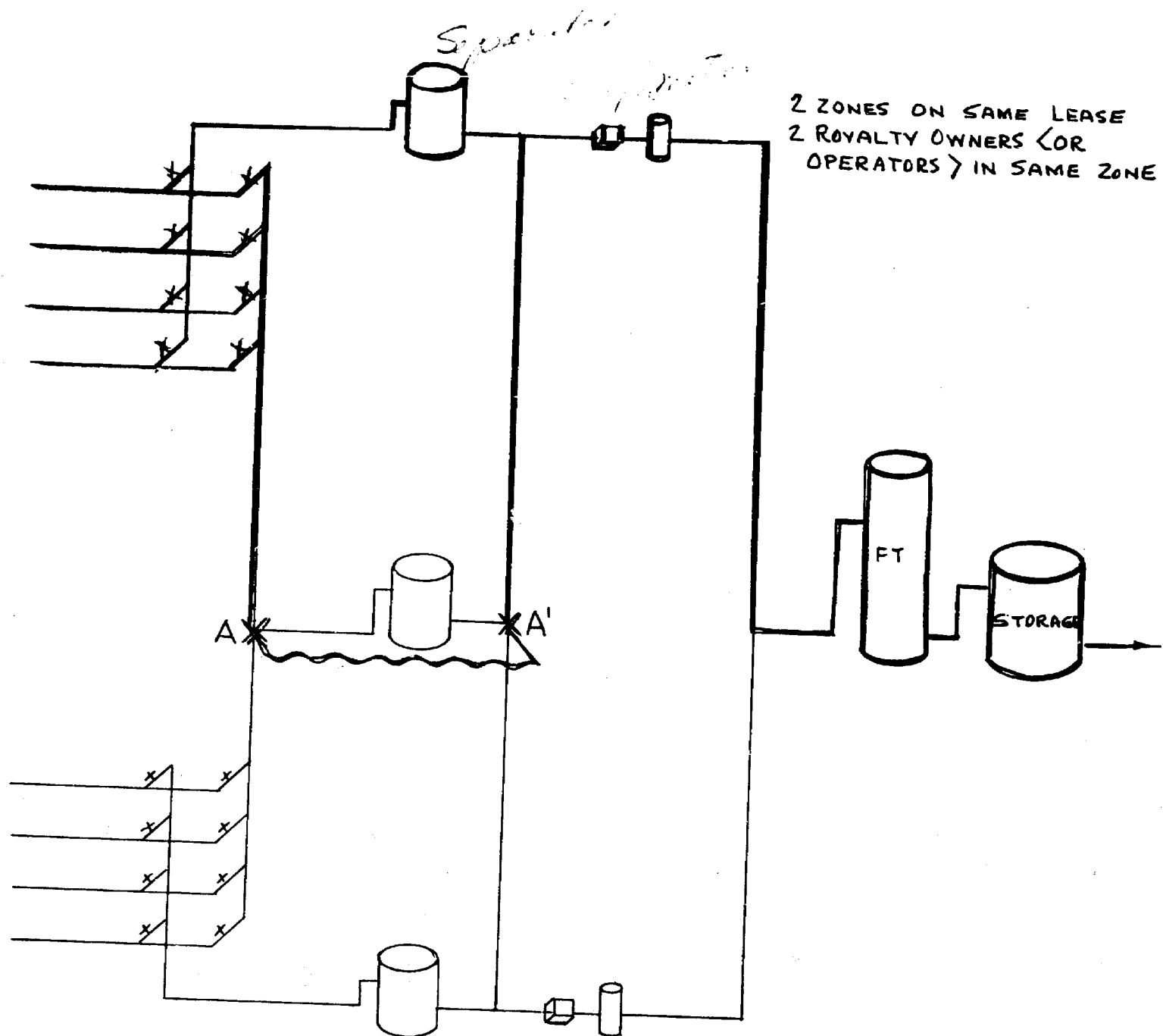
Yours very truly,

P. W. Perryman

PWP:ib



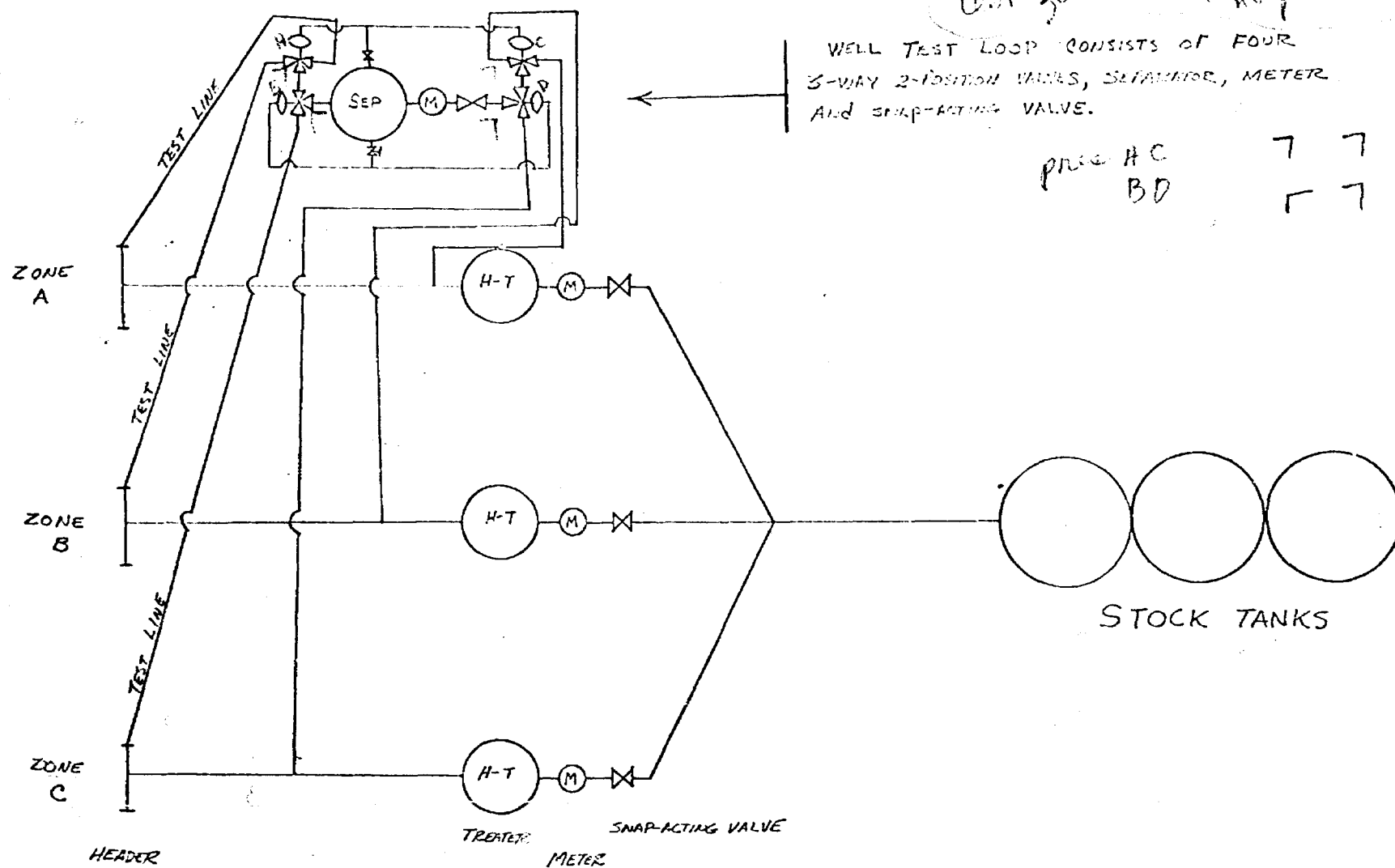




VALVES A & A' TO BE 3WAY 3 POSITION VALVES
INTERLOCKED (MECHANICALLY OR ELECTRICALLY)
TO RELATIVE POSITIONS FOR DIRECTING FLOW.

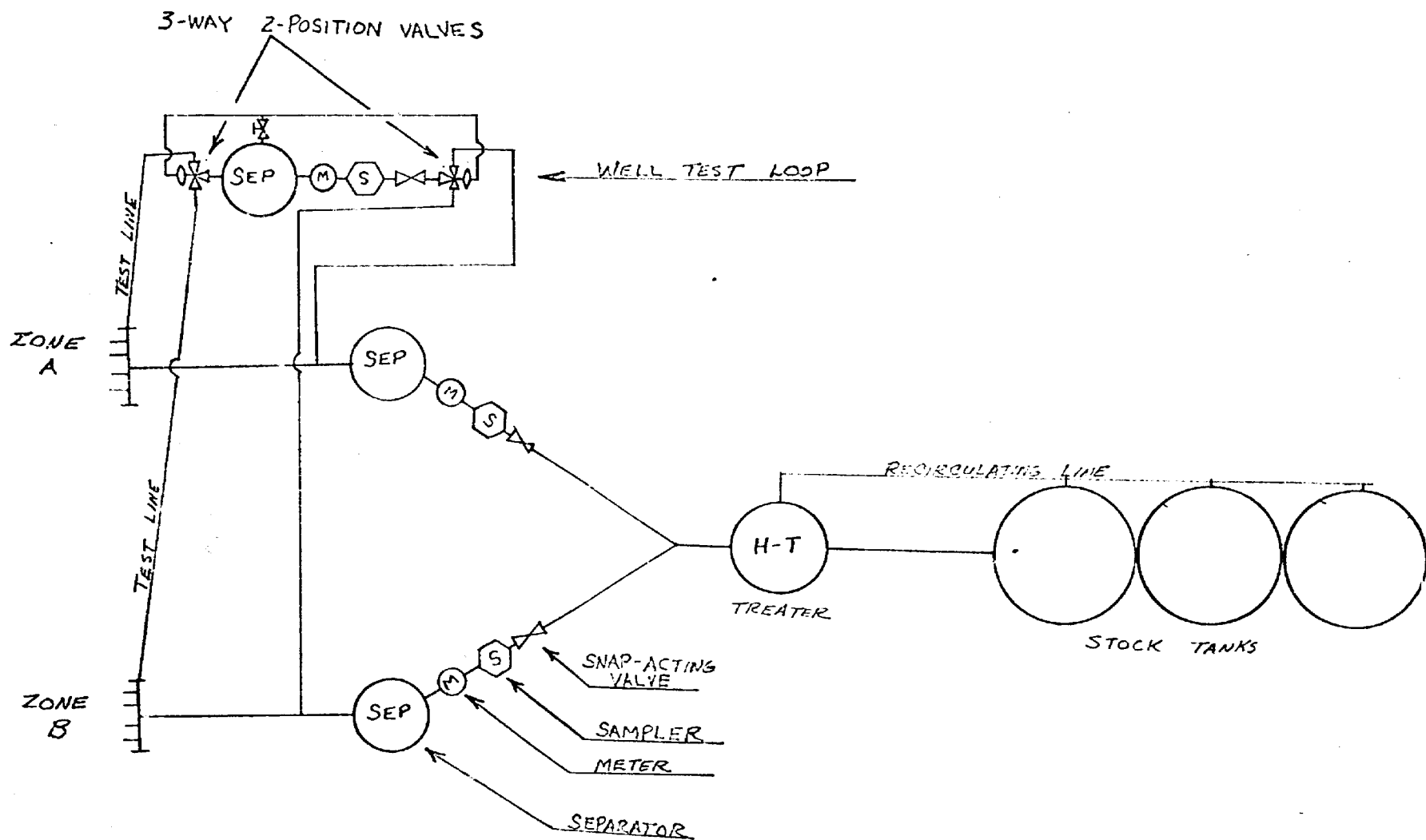
STANDARD HOOK-UP FOR COMMINGLING THREE ZONES

test zone A AC or BD
 test zone B AC or BD
 test zone C AC or BD



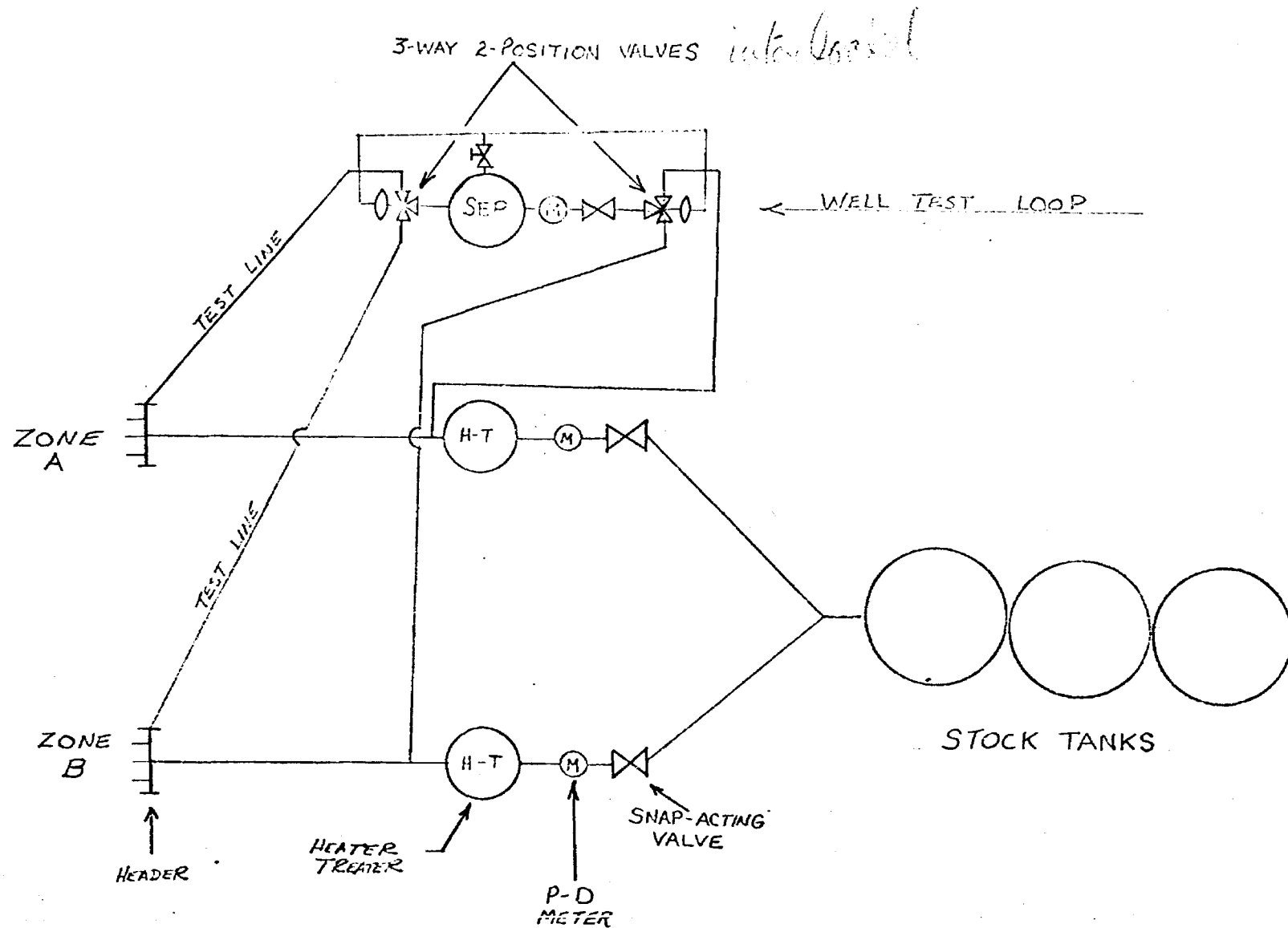
TEXACO Inc.

STANDARD HOOK-UP FOR COMMINGLING TWO ZONES PRIOR TO TREATMENT

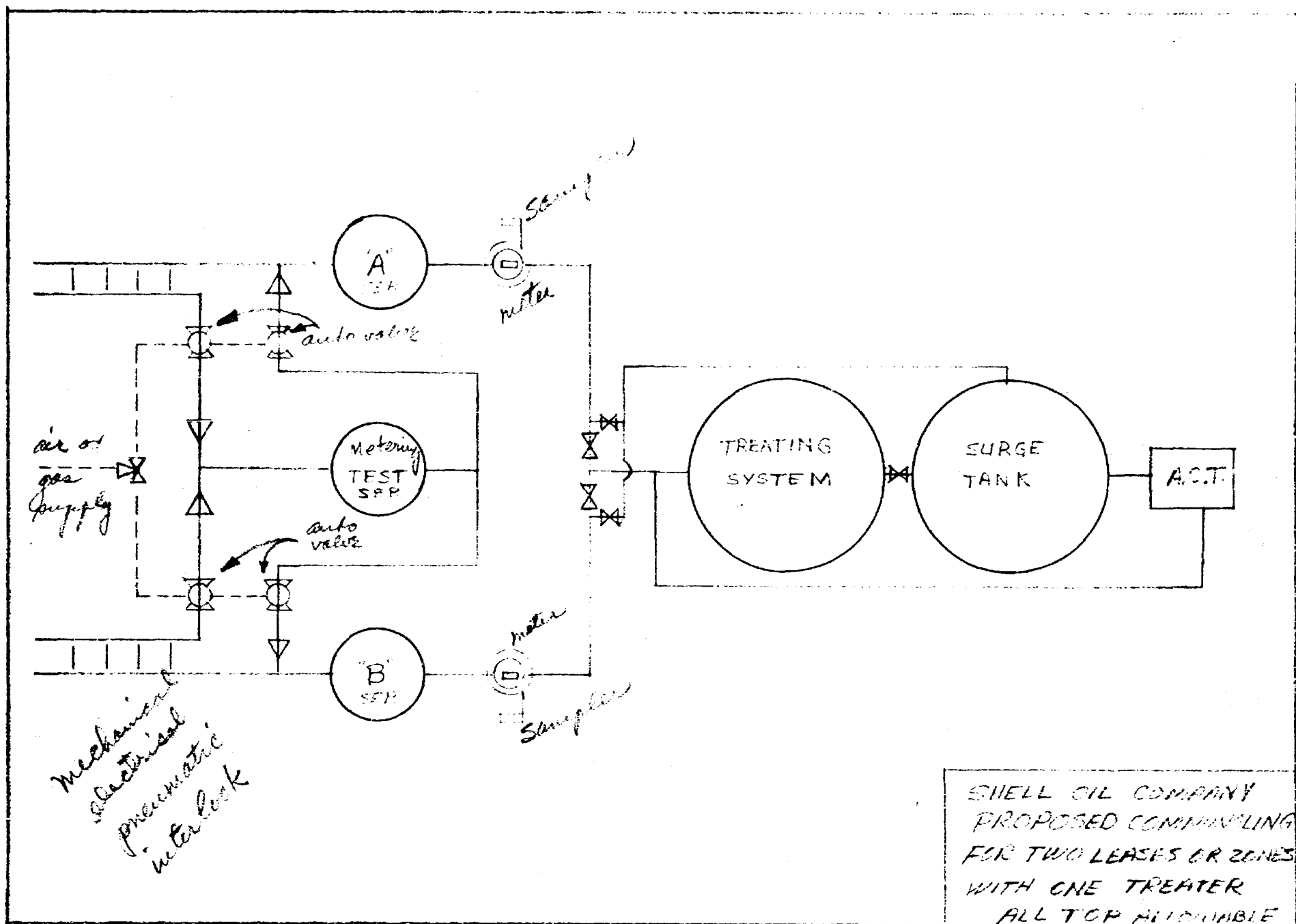


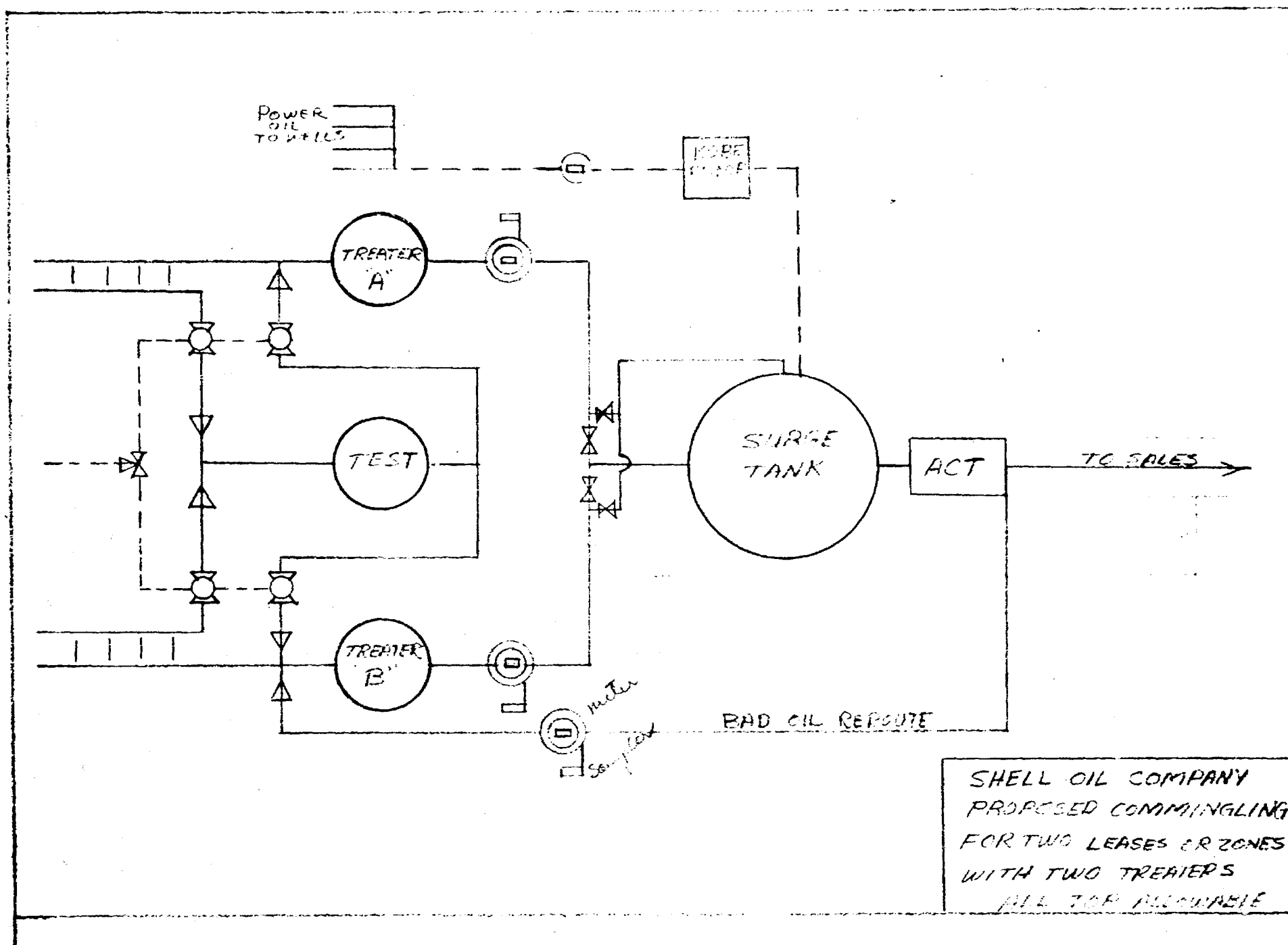
TEXACO Inc.

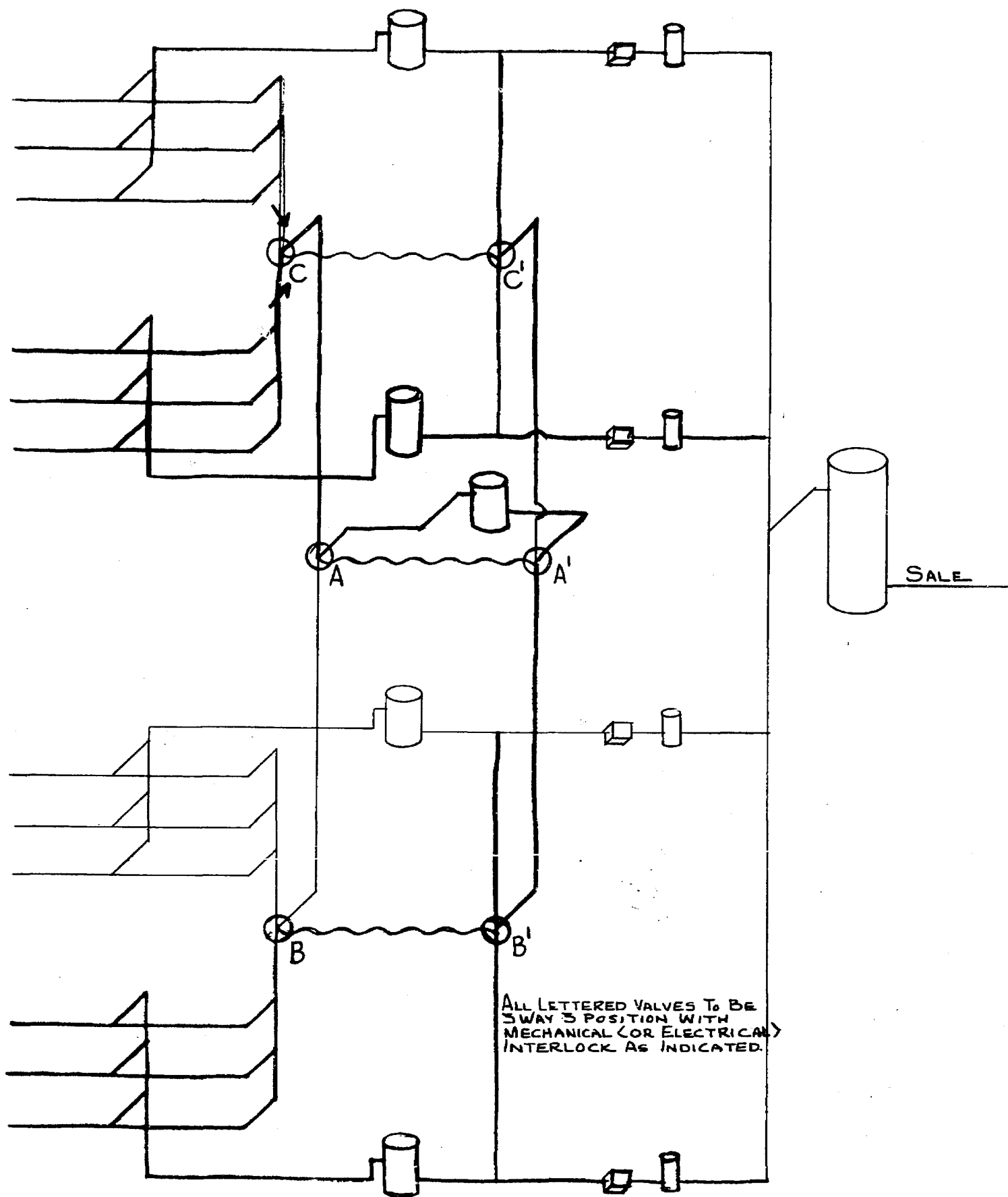
STANDARD HOOK-UP FOR COMMINGLING TWO ZONES



TEXACO Inc.









SHELL OIL COMPANY

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
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

April 3, 1961

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

P. O. Drawer 1938
Roswell, New Mexico

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

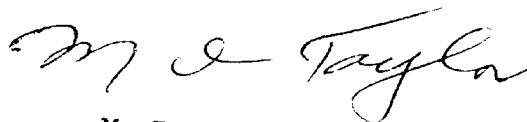
Attention: Mr. A. L. Porter, Jr.
Secretary-Director

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

Committee Chairman

MAILING LIST

Industry Study Committee
Commingle 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**

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**

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

**Benson-Kontin-Greer Drlg.
Mr. Al Greer
4054 West Broadway
Farmington, New Mexico**

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

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

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

C
O
P
Y

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

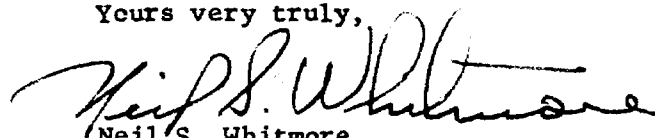
Attention: Mr. A. L. Porter, Jr.

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

March 20, 1961

R. W. HINES
VICE PRESIDENT, PRODUCTION

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:

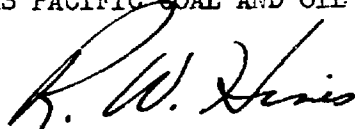
We have your letter of March 17, 1961 concerning the appointment of an industry committee to study commingling and we wish to advise you of our acceptance of the appointment to serve on this committee.

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
Vice President, Production

RWH:B



CONTINENTAL OIL COMPANY

FAIR BUILDING
FT. WORTH 2, TEXAS

March 20, 1961

R. G. PARKER
REGIONAL MANAGER OF PRODUCTION
SOUTHWESTERN REGION

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,

A handwritten signature in cursive script, appearing to read "R. G. Parker".

RGP-DM

PRODUCTION DEPARTMENT
WESTERN AREA

R. R. MCCARTY
MANAGER
J. S. BOLDRICK
OPERATIONS SUPERINTENDENT
M. 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 Turner 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.

O I L P R O D U C T I O N A N D D R I L L I N G

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.

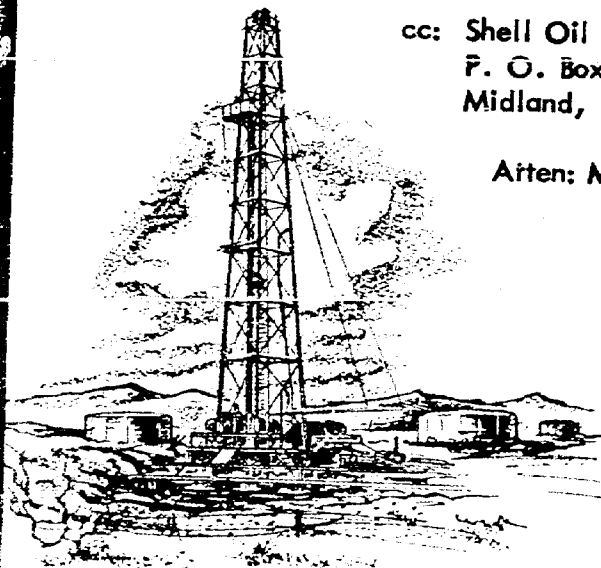
Marshall Rowley

MR:cc

Marshall Rowley

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

Attn: Mr. Hughston



Thursday 20th next mtg.
Attendance April 7:

R. L. Elkin	Shell
D. S. Miller	OCC
A. L. Porter	OCC
E. A. Utz	OCC
Eric Engbrecht	OCC
Joe Raley	OCC
Vic Ryan	Conth
C. M. Bumpass	Self
John Myronka	TP
W. M. O'Reilly	Humble
Ed Robinson	Texas
F. C. Morgan	PPCo
R. D. Schapp	PPCo
R. L. Summerwell	Shell
P. W. Perryman	Indiana
Clark Starn	Carper
Bud Inderriden	Pan Am
J. E. York	Pan Am
Ken Shaemaker	Indiana

MAILING LIST

Industry Study Committee
Commingle 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. 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.

6-2-61

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

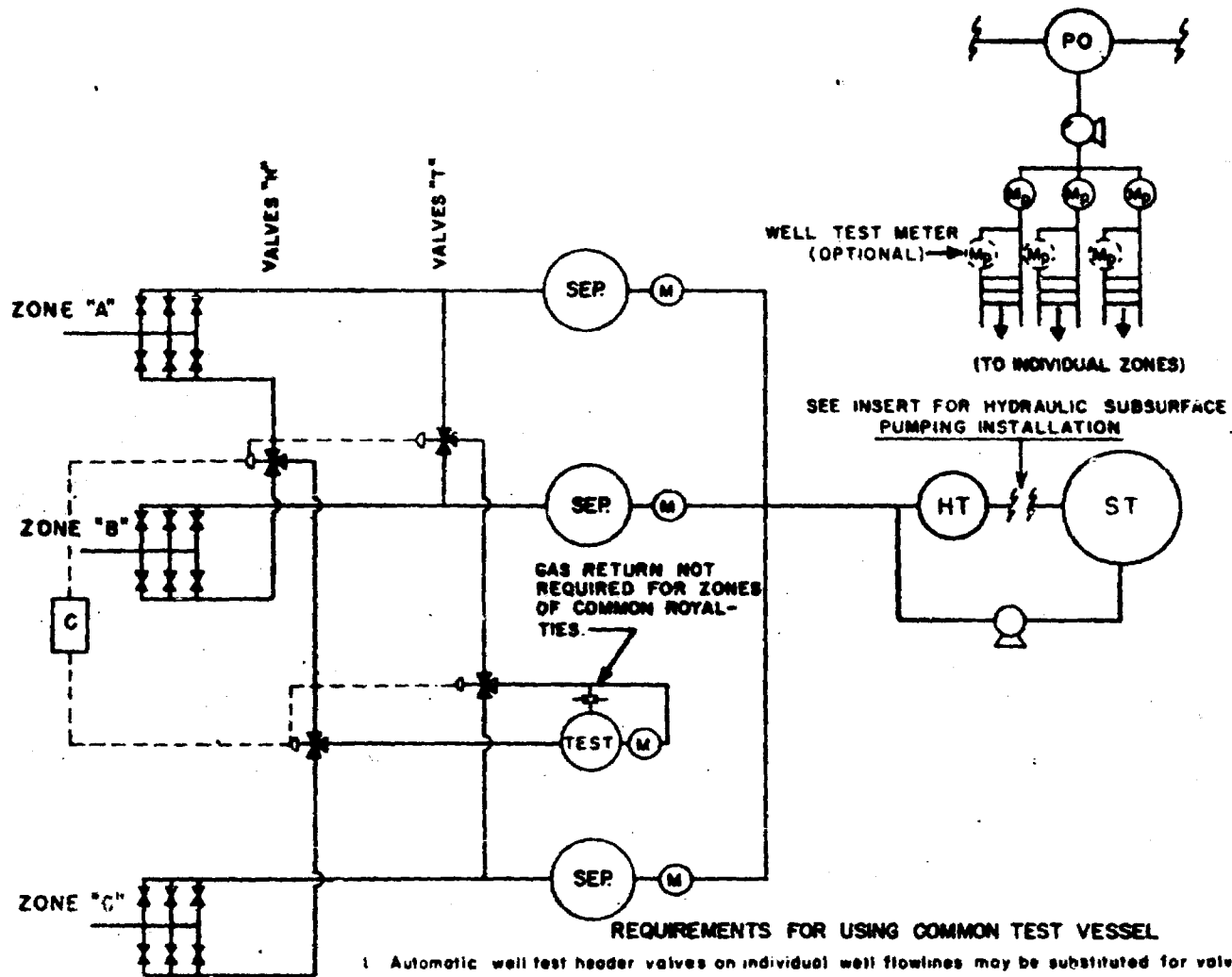


- SYMBOLS**

SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON OR SEPARATE ROYALTIES		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: <u>H. M. S.</u>	DATE: <u>5-4-61</u>	DWG. NO. <u>A-1</u>
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 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.

SYMBOLS

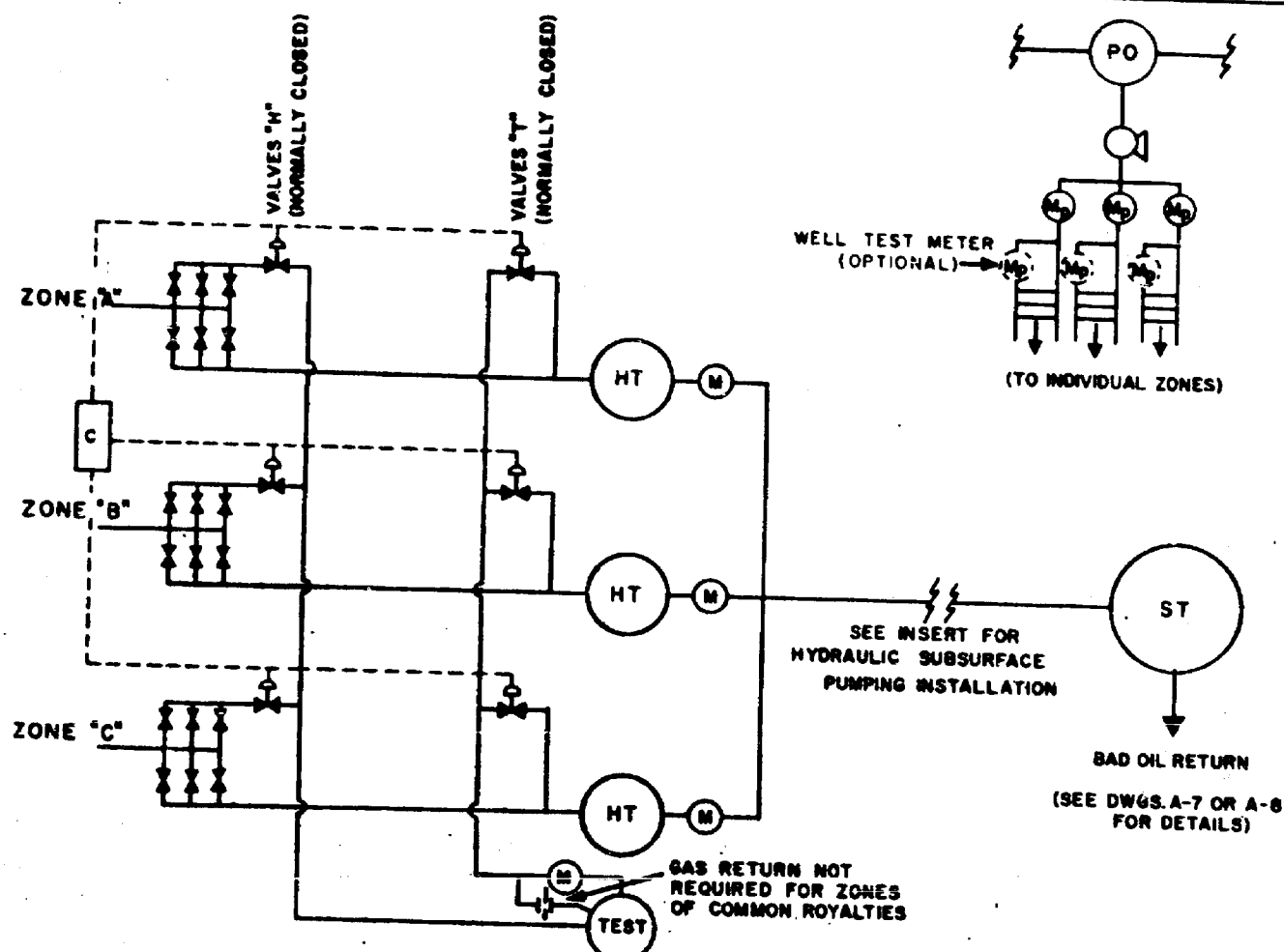
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED)
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	LIQUIDS MEASURING FACILITIES
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR

COMMON TREATER USED IN COMINGLING ZONES OF
COMMON OR SEPARATE ROYALTIES

NEW MEXICO OIL CONSERVATION COMMISSION
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 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).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	LIQUIDS MEASURING FACILITIES
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR

INDIVIDUAL TREATERS USED IN COMINGLING ZONES
OF COMMON OR SEPARATE ROYALTIES
WHEN MANUAL VALVES ARE NOT INSTALLED

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMINGLING

DRAWN: H. M. S.

DATE: 5-4-61

DWG. NO.

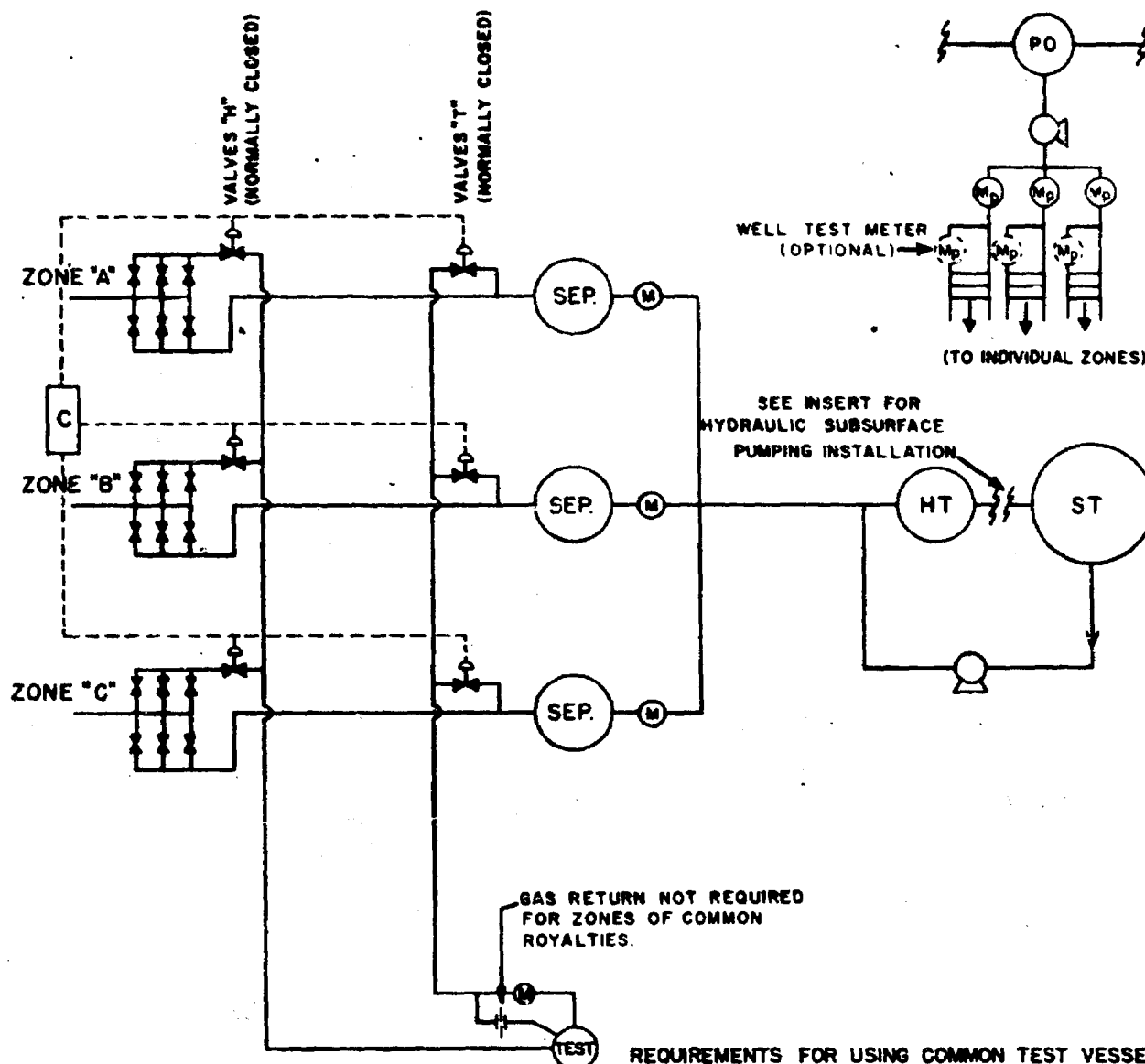
APPROVED:

REVISED:

APPROVED:

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 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).
 CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
 GAS METER.
 LIQUIDS MEASURING FACILITIES.
 METER FOR POWER OIL.
 TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
 HEATER TREATER.
 POWER OIL TANK.
 STOCK TANK.
 PUMP.
 SEPARATOR.

COMMON TREATER USED IN COMINGLING ZONES OF
COMMON OR SEPARATE ROYALTIES
WHEN MANUAL VALVES ARE NOT INSTALLED

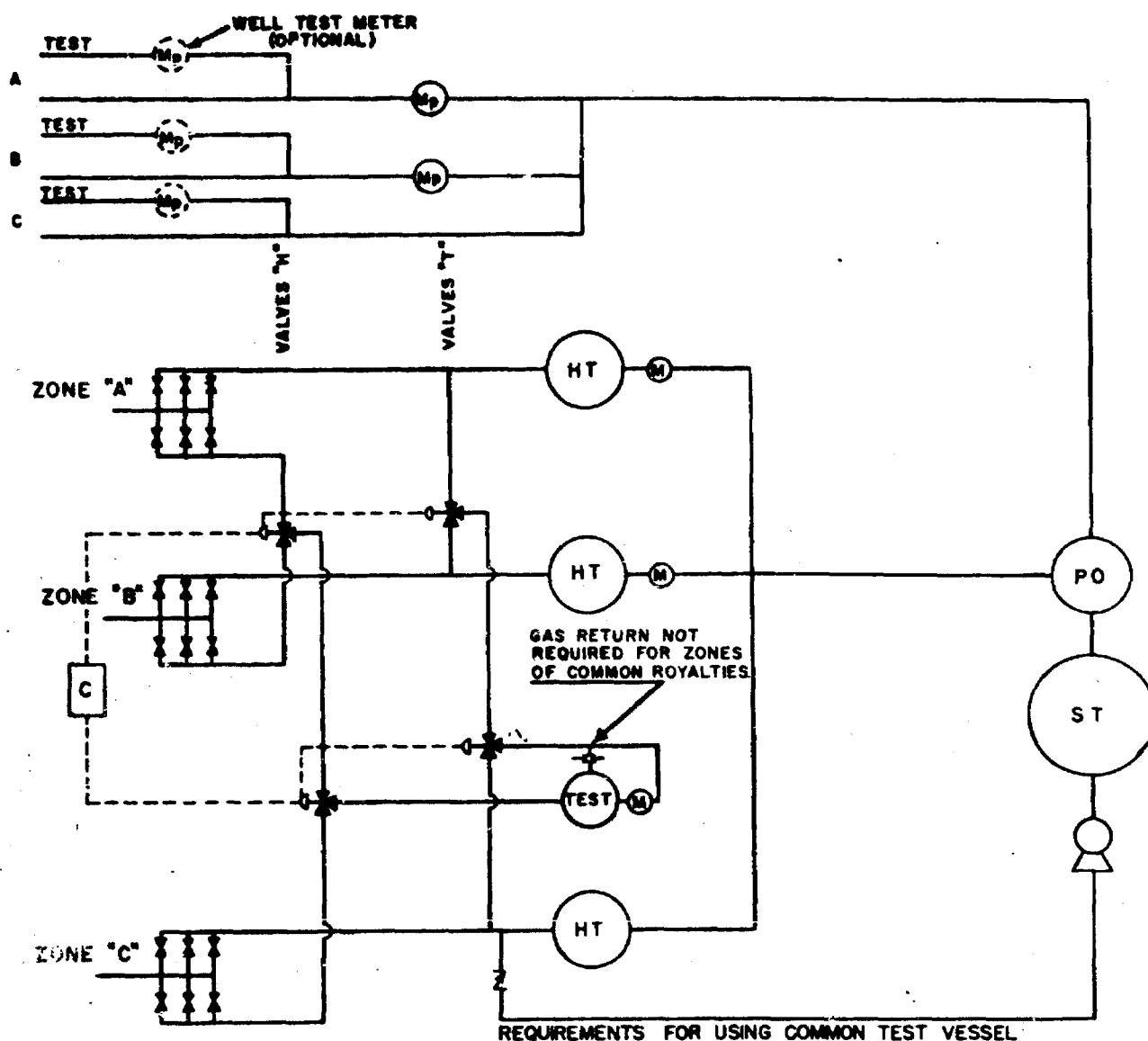
NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.
APPROVED:
REVISED:
APPROVED:

DATE: 5-4-61

DWG. NO.

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.

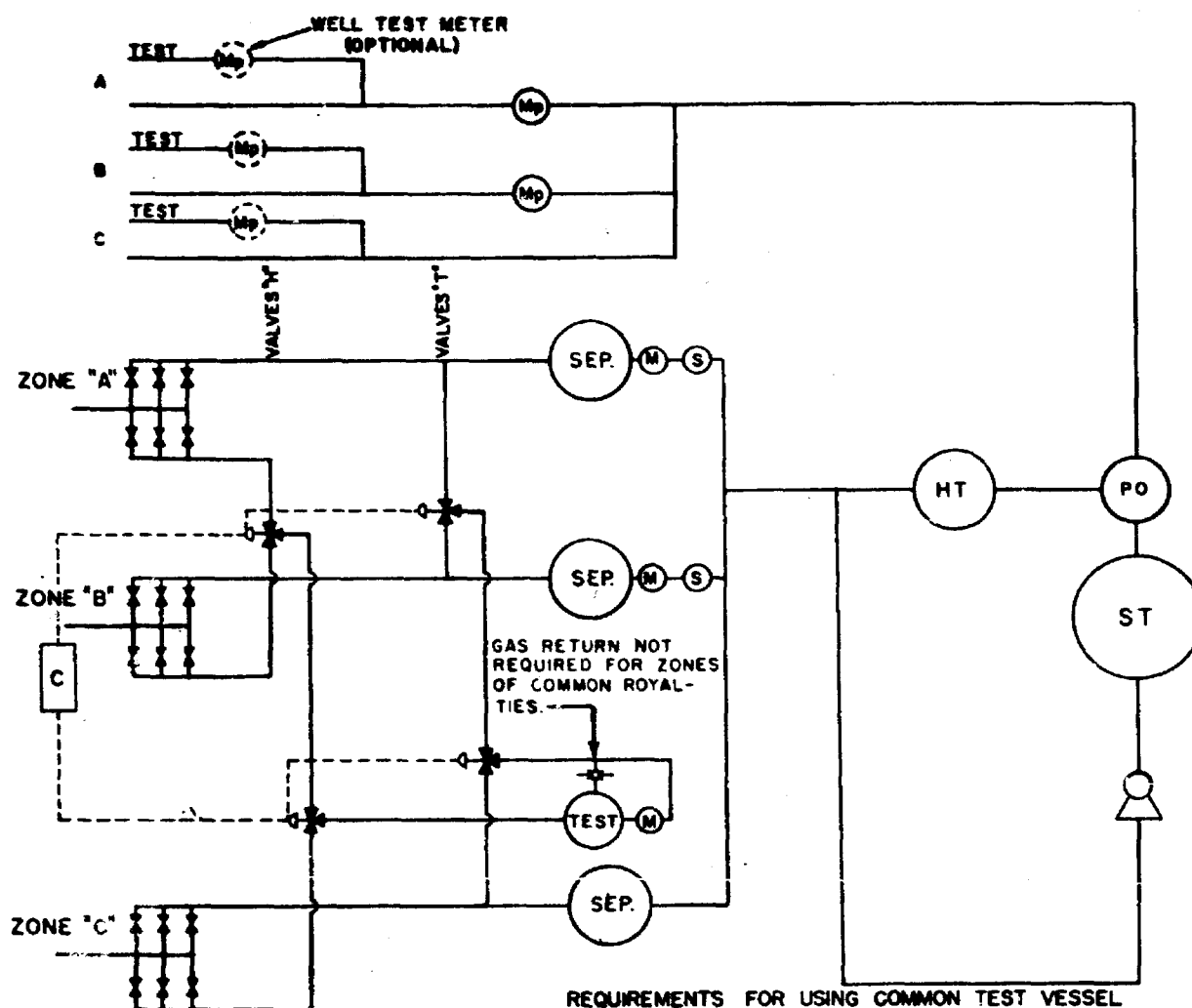
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
	GAS METER.
	LIQUIDS MEASURING FACILITIES.
	METER FOR POWER OIL.
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
	HEATER TREATER.
	POWER OIL TANK.
	STOCK TANK.
	PUMP.
	SEPARATOR.

INDIVIDUAL TREATERS USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION 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 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.

SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL).
	GAS METER.
	LIQUIDS MEASURING FACILITIES.
	METER FOR POWER OIL.
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR).
	HEATER TREATER.
	POWER OIL TANK.
	STOCK TANK.
	PUMP.
	SAMPLER.
	SEPARATOR.

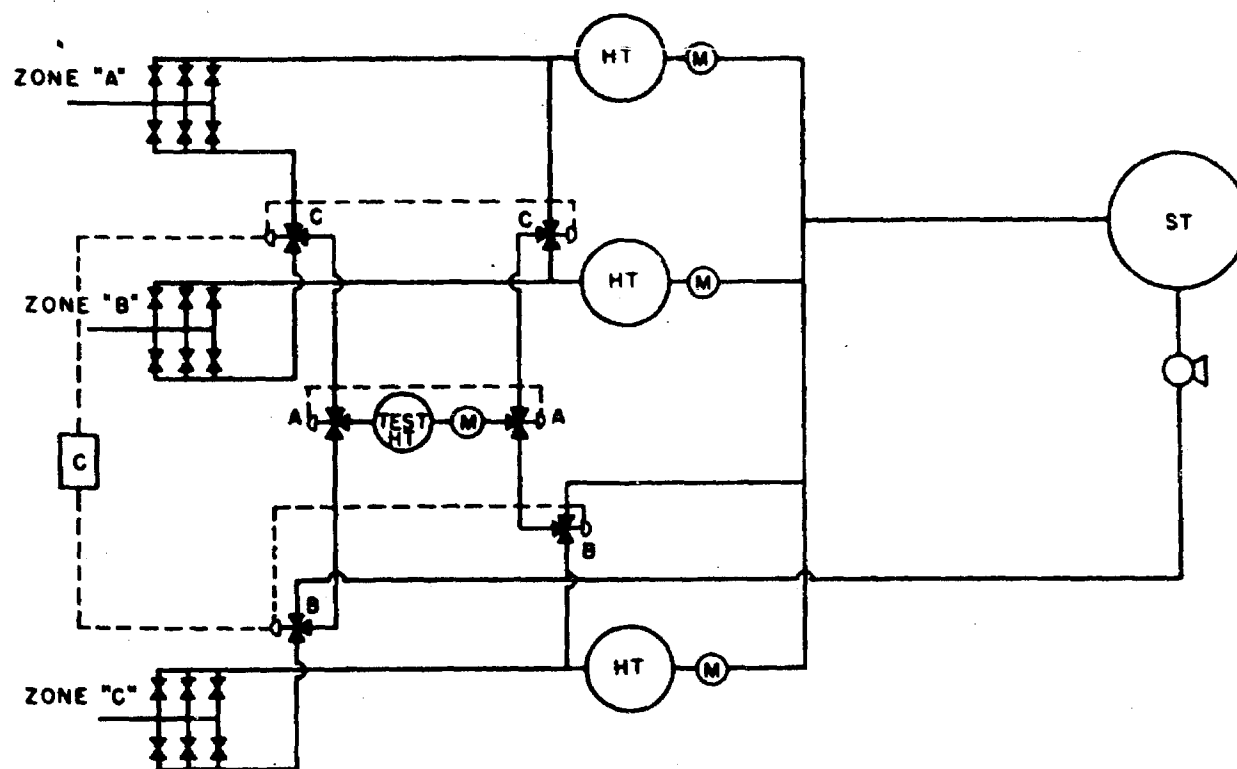
COMMON TREATER USED IN COMINGLING ZONES OF COMMON ROYALTIES BY SUBTRACTION METHOD

NEW MEXICO OIL CONSERVATION COMMISSION
COMMITTEE ON COMINGLING

DRAWN: H.M.S.
APPROVED: _____
REVISED: _____
APPROVED: _____

DATE: 5-4-61

DWG. NO.
A-6



SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	LIQUIDS MEASURING FACILITIES
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR

BAD OIL RETURN (ALTERNATE NO. 2) WHEN TEST TREATER IS INSTALLED		
NEW MEXICO OIL CONSERVATION COMMISSION COMMITTEE ON COMINGLING		
DRAWN: H. M. S.	DATE: 5-4-61	DWG. NO.
APPROVED _____	_____	A-8
REVISED _____	_____	
APPROVED _____	_____	

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-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.

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

probe in 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 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

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

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.

$\sum Z's$ = 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

$$Z_1 = 500 \text{ bbls.}$$

$$Z_2 = 500 \text{ bbls.}$$

$$Z_3 = 500 \text{ bbls.}$$

$$\Sigma Z's = 1500 \text{ bbls.}$$

$$A = 1530 \text{ bbls.}$$

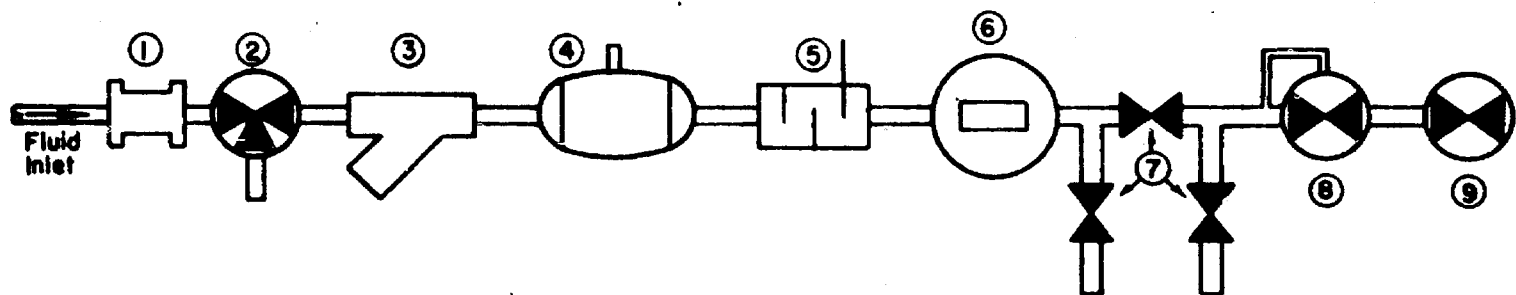
Then:

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

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

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

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

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

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✓ R. L. Sumerwell (Alternate to R. L. Elkins)	Shell Oil Company
✓ C. M. Bumpass (Sub-committee Chairman)	Gulf Oil Corporation
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MINIMUM STANDARDS FOR
COMINGLING CRUDE OIL

I ZONE COMINGLING (Common Royalty)

A. MARGINAL ZONES

Zone comingling without metering will be permitted where all wells in the zones to be comingled 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

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

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.

$\sum Z's$ = 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

$\sum Z's$ = 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.

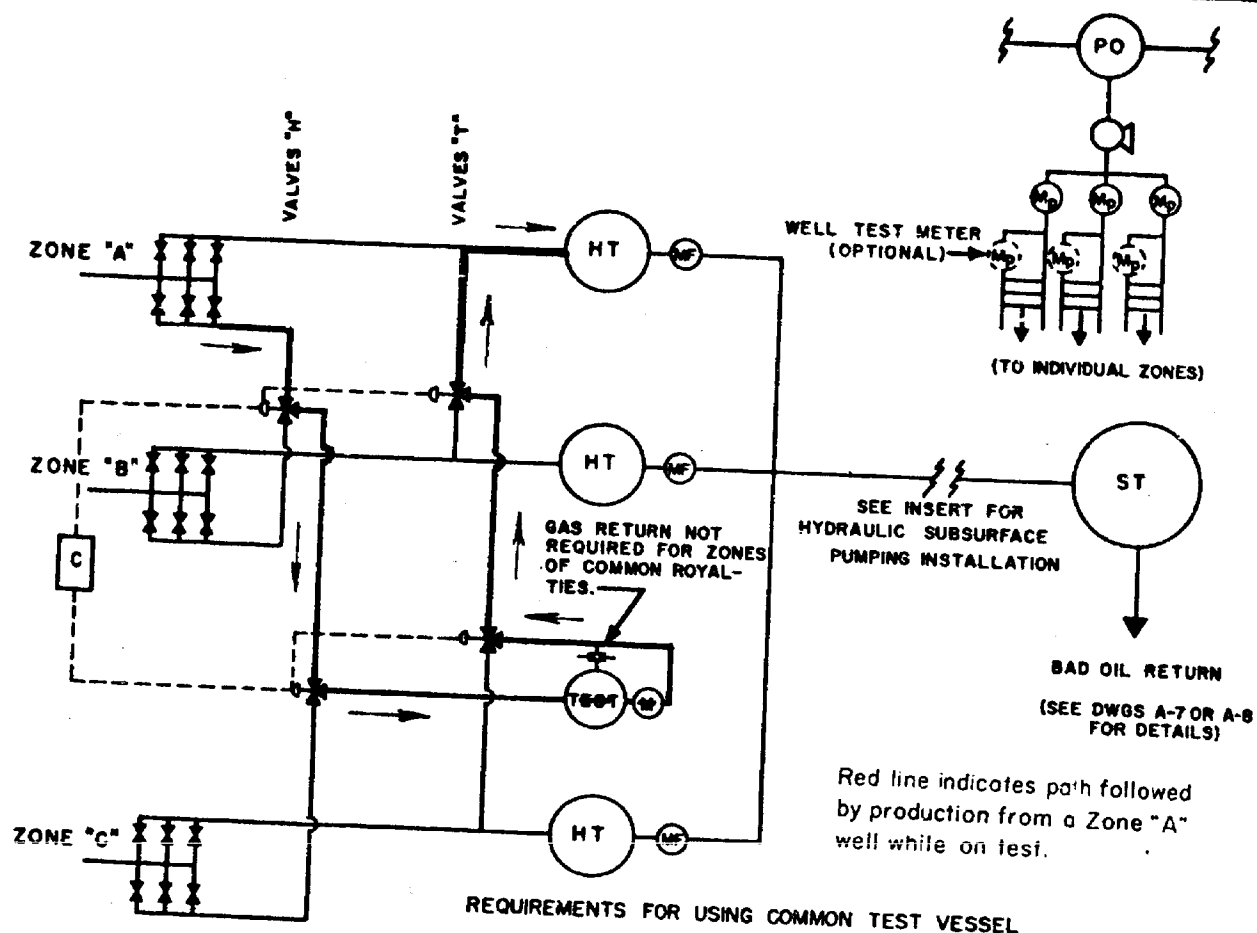
E. If the piping arrangement submitted with the commingling application does not conform with the piping arrangement actually installed, a drawing showing the revised piping arrangement shall be submitted to the Commission for approval.

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

- Drawing A-1 Individual treaters used in commingling common or separate royalties.
- Drawing A-2 Common treater used in commingling common or separate royalties.
- Drawing A-3 Individual treaters used in commingling common or separate royalties when normally closed, two-way valves are installed.
- Drawing A-4 Common treaters used in commingling common or separate royalties when normally closed, two-way valves are installed.
- Drawing A-5 Individual treaters used in commingling common royalties by "Subtraction Method".
- Drawing A-6 Common treater used in commingling common royalties by "Subtraction Method".
- Drawing A-7 Bad oil return (Alternate No. 1).
- Drawing A-8 Bad oil return (Alternate No. 2) when test treater is installed.
- Drawing A-9 Positive displacement meter system.

HYDRAULIC SUBSURFACE PUMPING INSTALLATION



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.

SYMBOLS

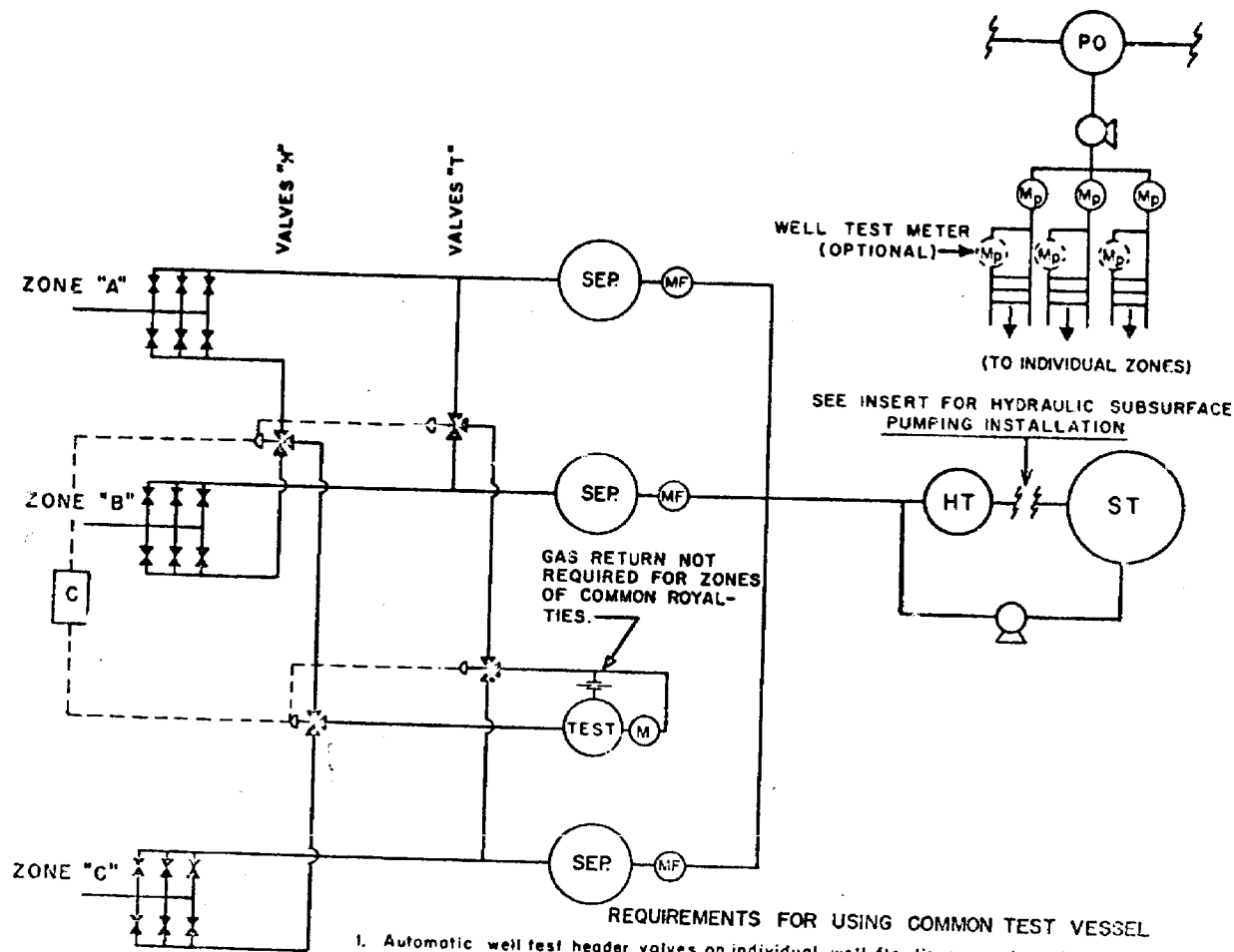
- ⊕ CHECK VALVE.
- ⊞ BLOCK VALVE.
- ⊞ 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⊞ 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⊞ CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- ⊞ GAS METER
- ⊞ TEST METER
- ⊞ METER FOR POWER OIL
- ⊞ TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- ⊞ HEATER TREATER
- ⊞ POWER OIL TANK
- ⊞ STOCK TANK
- ⊞ PUMP
- ⊞ SEPARATOR
- ⊞ 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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

SYMBOLS

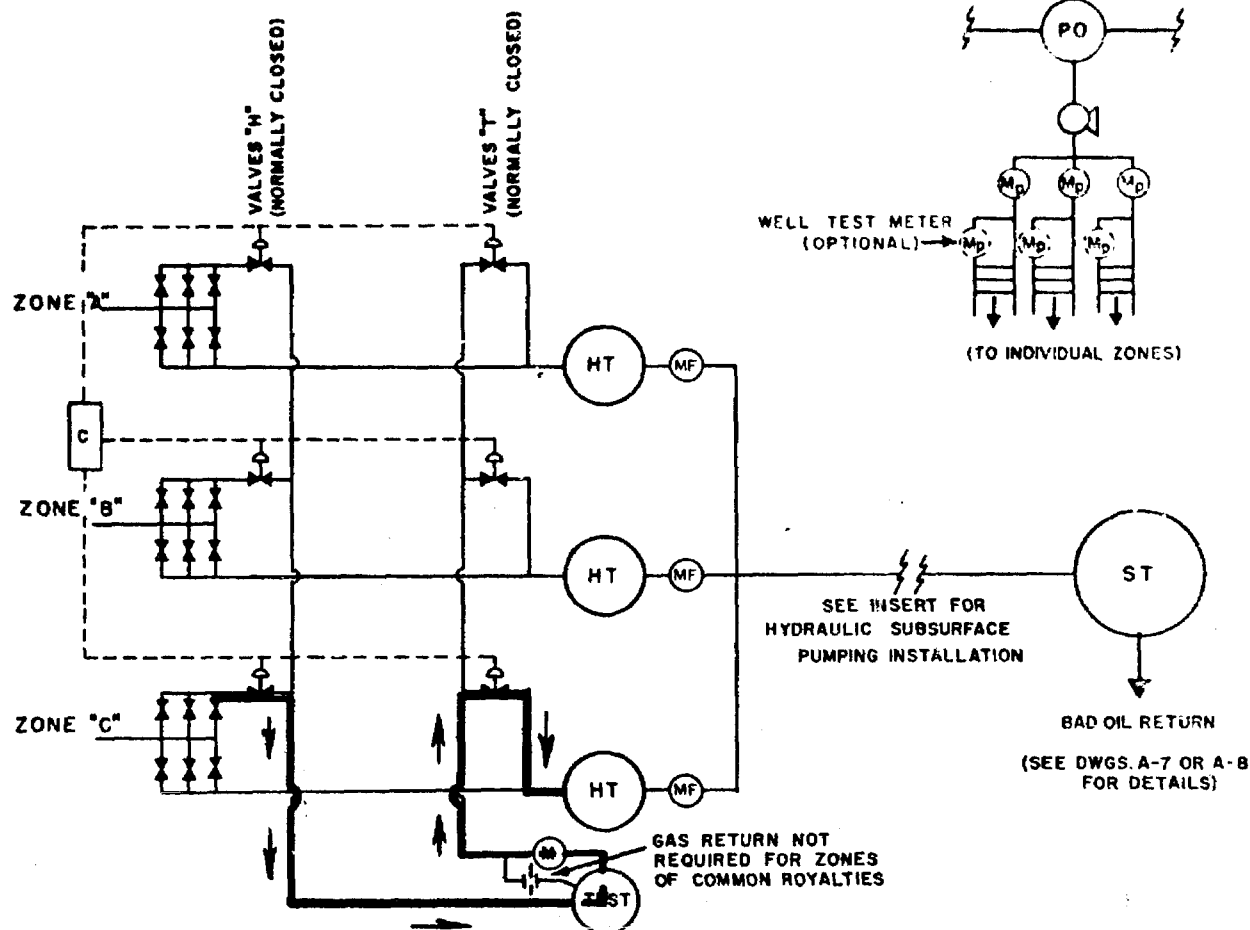
	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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

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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

Red line indicates path followed by production from a Zone "C" well while on test.

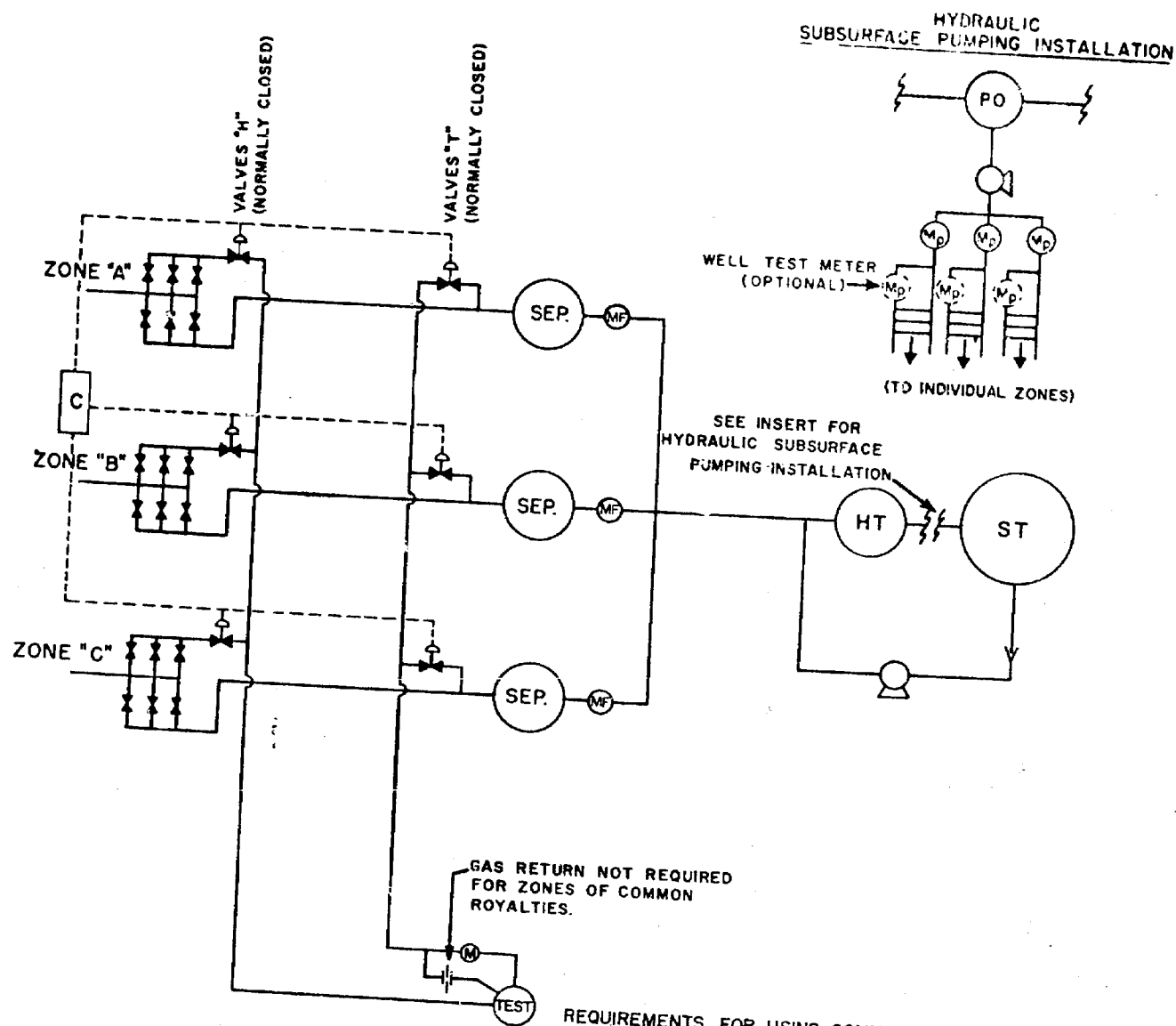
SYMBOLS

	CHECK VALVE.
	BLOCK VALVE.
	2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
	3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
	CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
	GAS METER
	TEST METER
	METER FOR POWER OIL
	TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
	HEATER TREATER
	POWER OIL TANK
	STOCK TANK
	PUMP
	SEPARATOR
	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



SYMBOLS

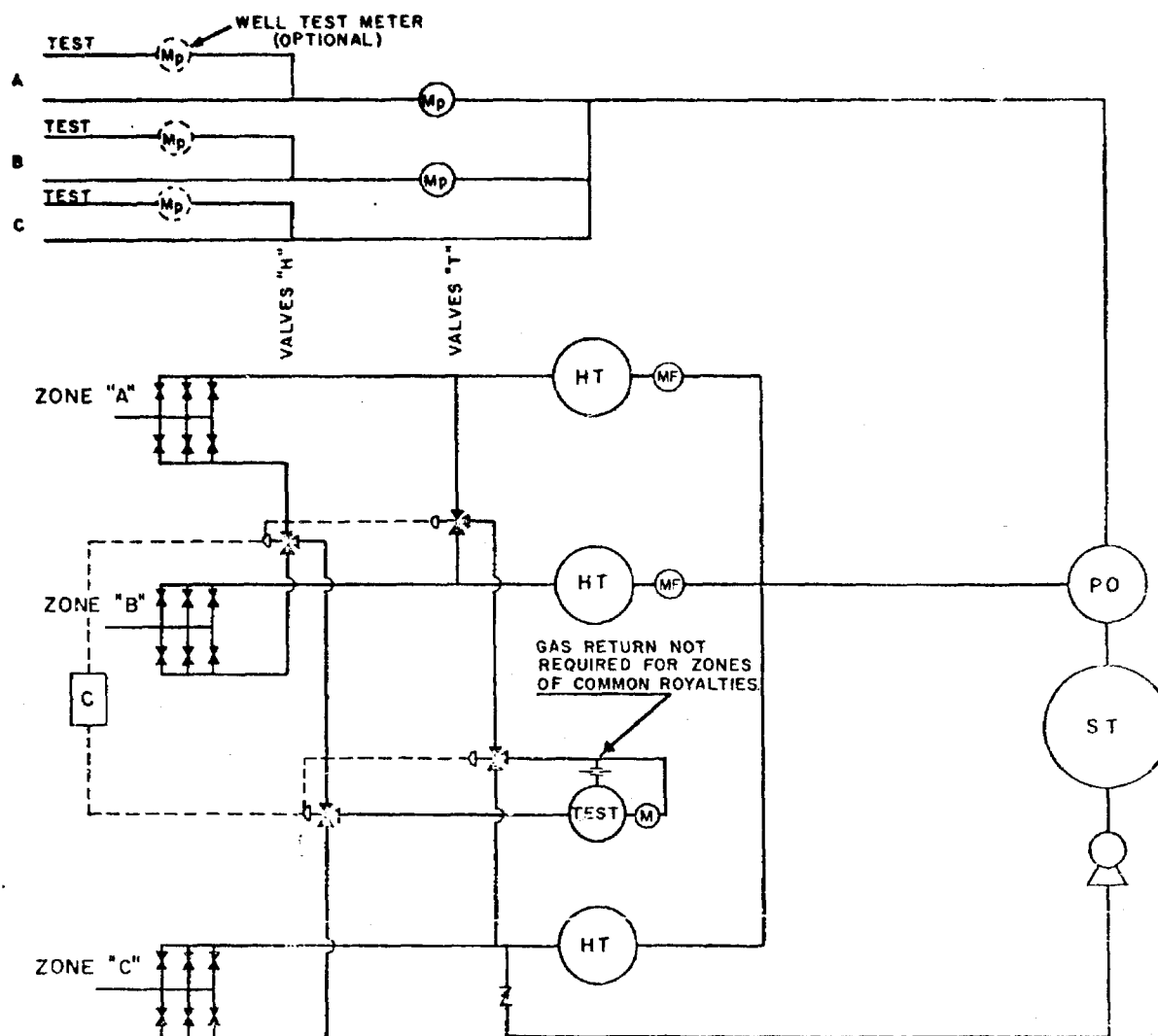
- ⌵ CHECK VALVE.
- ⌵ BLOCK VALVE.
- ⌵ 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⌵ 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⌵ CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- ⌵ GAS METER
- ⌵ TEST METER
- ⌵ METER FOR POWER OIL
- ⌵ TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- ⌵ HEATER TREATER
- ⌵ POWER OIL TANK
- ⌵ STOCK TANK
- ⌵ PUMP
- ⌵ SEPARATOR
- ⌵ METERING FACILITIES (METER & SAMPLER IF APPLICABLE)

- # **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 overrides on automatic well test header valves on individual well flowlines may be installed on production side only.

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



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.

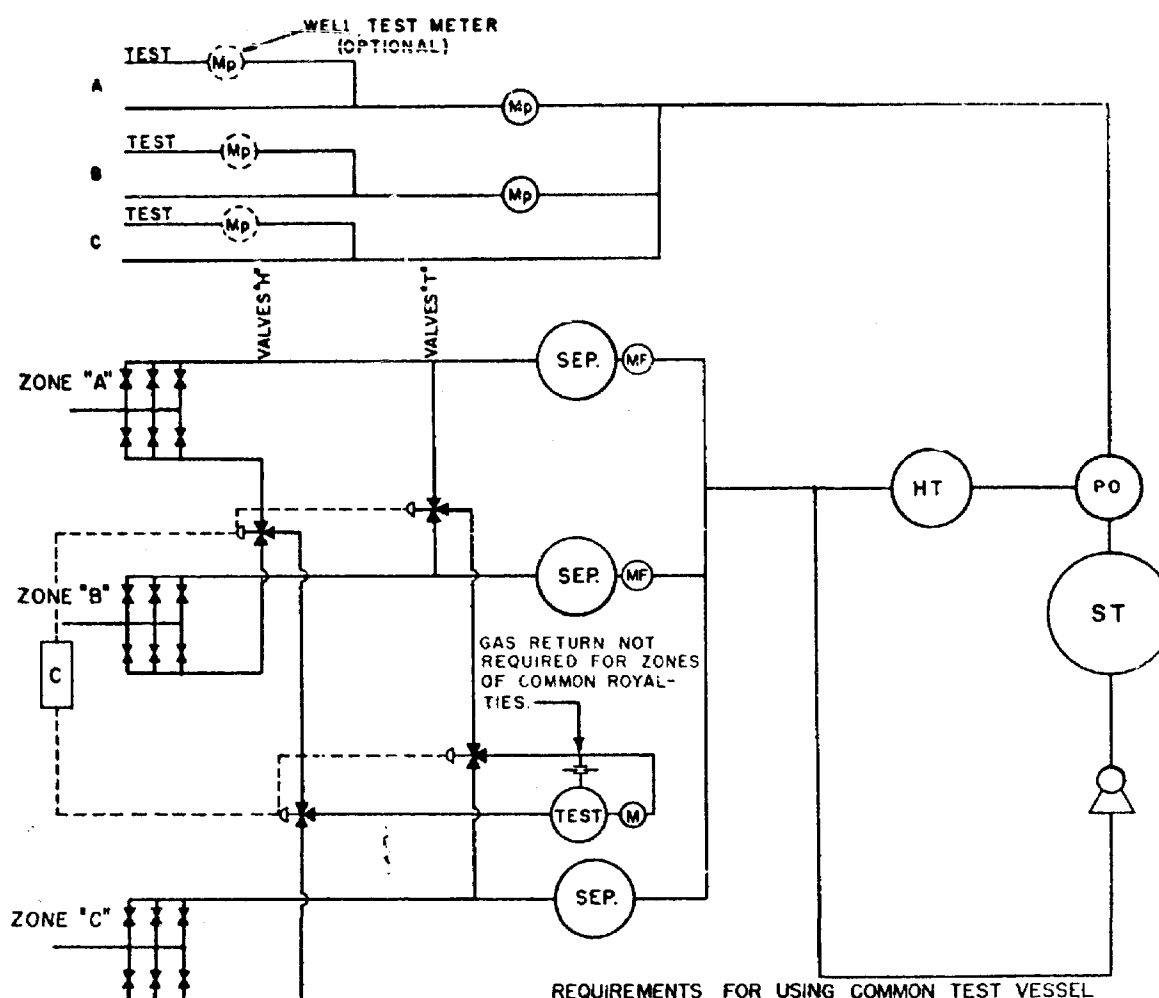
SYMBOLS

- CHECK VALVE.
- BLOCK VALVE.
- 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- GAS METER
- TEST METER
- METER FOR POWER OIL
- TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- HEATER TREATER
- POWER OIL TANK
- STOCK TANK
- PUMP
- SEPARATOR
- 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 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 used, refer to drawing A-4.

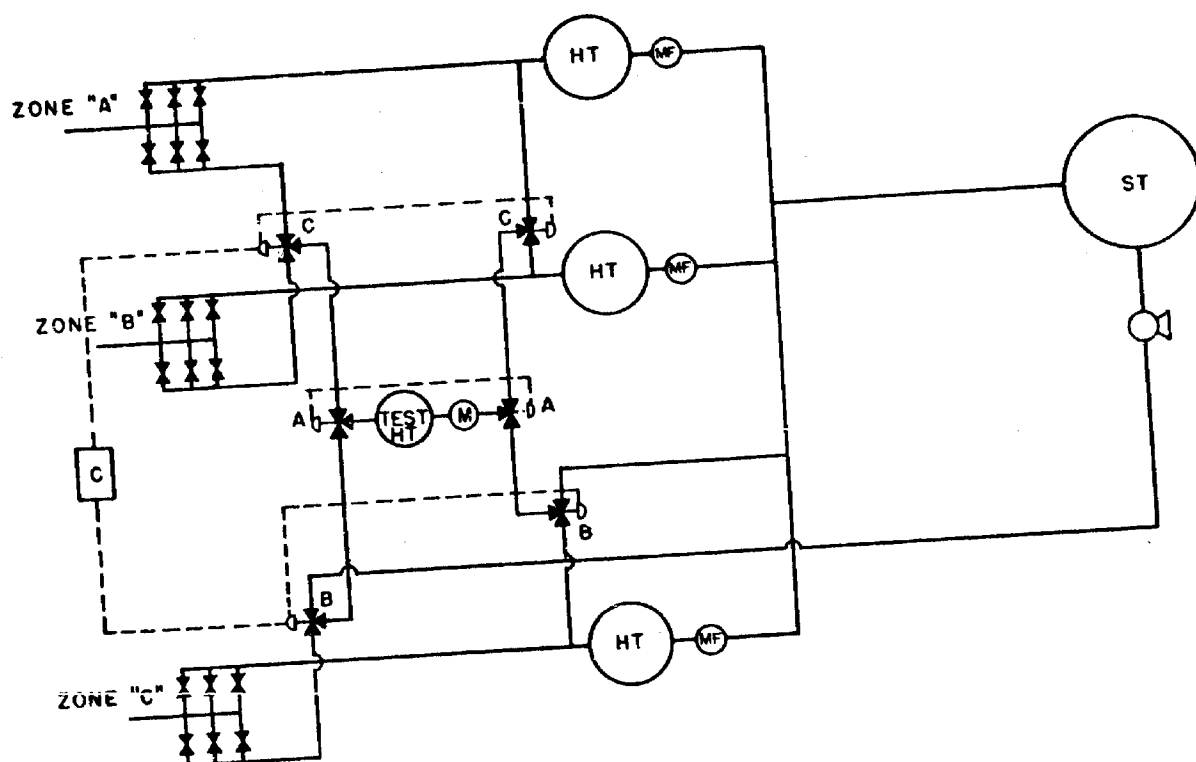
SYMBOLS

Z	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

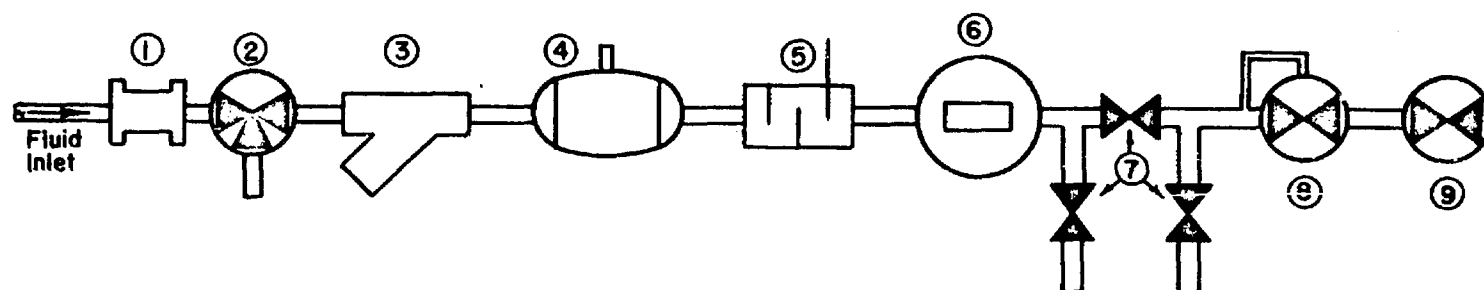
- ⌌ CHECK VALVE.
- ⌌ BLOCK VALVE.
- ⌌ 2 WAY VALVE (PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⌌ 3 WAY VALVE (MANUAL, PNEUMATIC OR ELECTRICALLY CONTROLLED).
- ⌌ CONTROL PANEL (PNEUMATIC OR ELECTRICAL)
- ⌌ GAS METER
- ⌌ TEST METER
- ⌌ METER FOR POWER OIL
- ⌌ TESTING VESSEL (HEATER-TREATER OR SEPARATOR)
- ⌌ HEATER TREATER
- ⌌ POWER OIL TANK
- ⌌ STOCK TANK
- ⌌ PUMP
- ⌌ SEPARATOR
- ⌌ 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

vertical metering

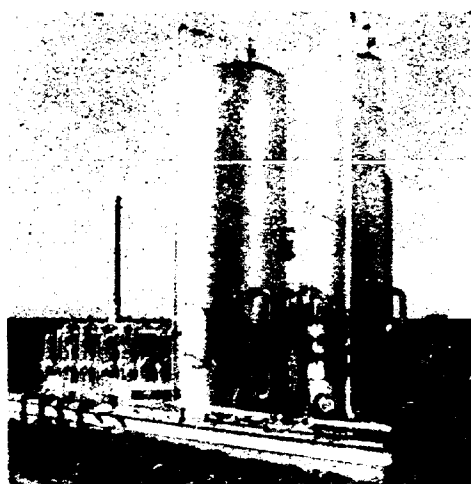
FREE WATER KNOCK-OUT

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

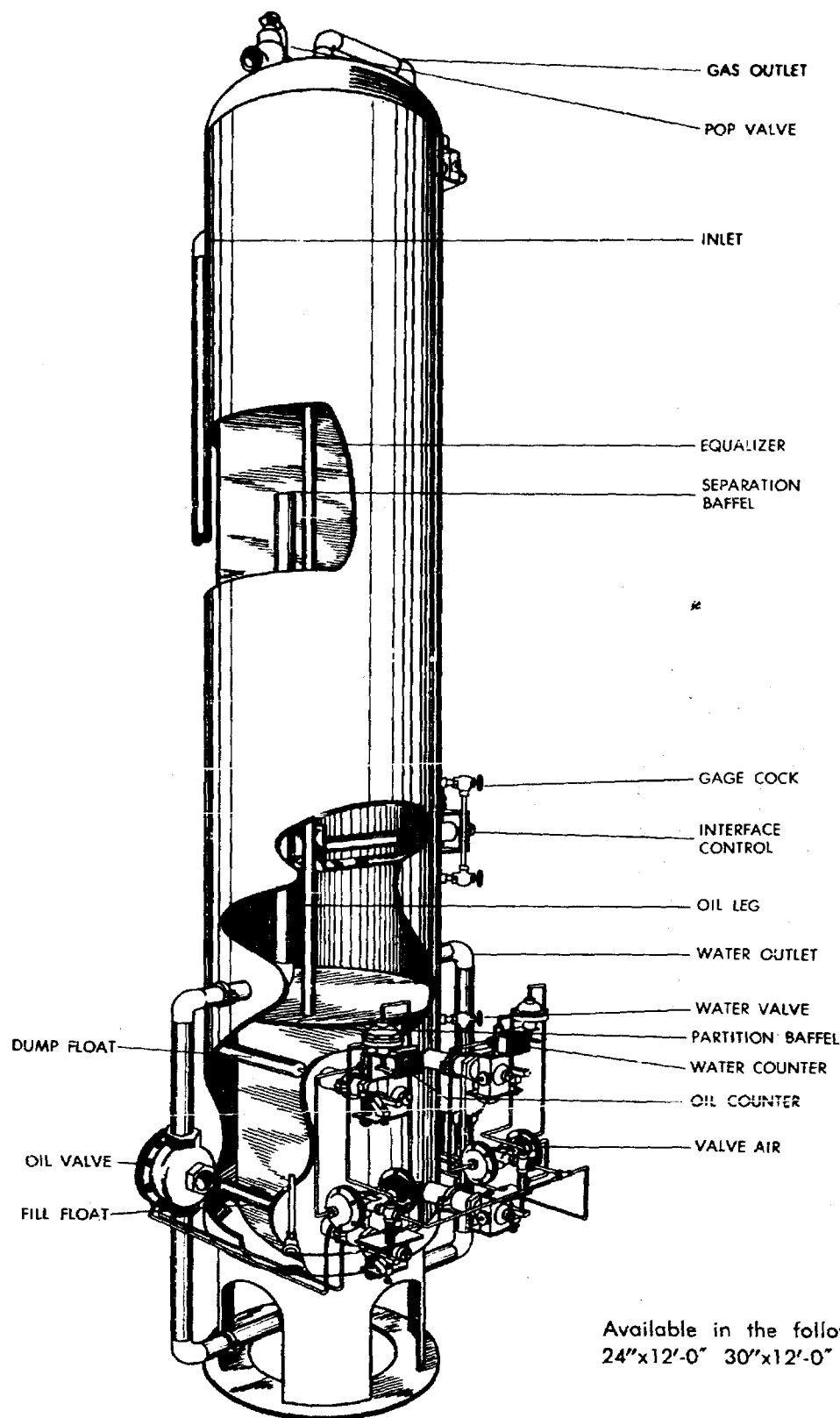
ENGINEERING COMPANY

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"



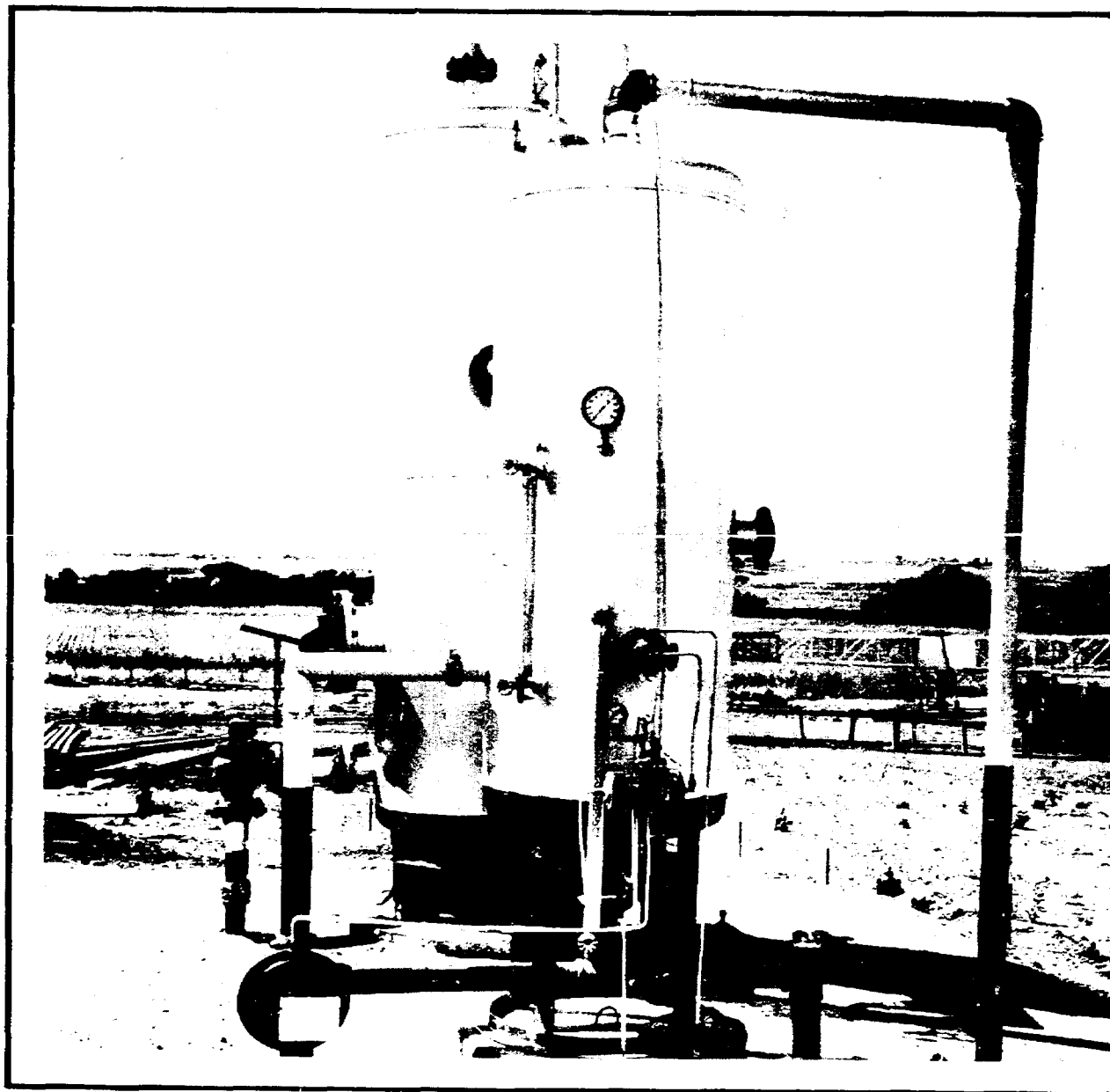
ODEX

ENGINEERING COMPANY

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

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

METERING SEPARATORS



LEASE AUTOMATION EQUIPMENT (LAQ)

BULLETIN 104

NATIONAL TANK COMPANY • TULSA, OKLA.

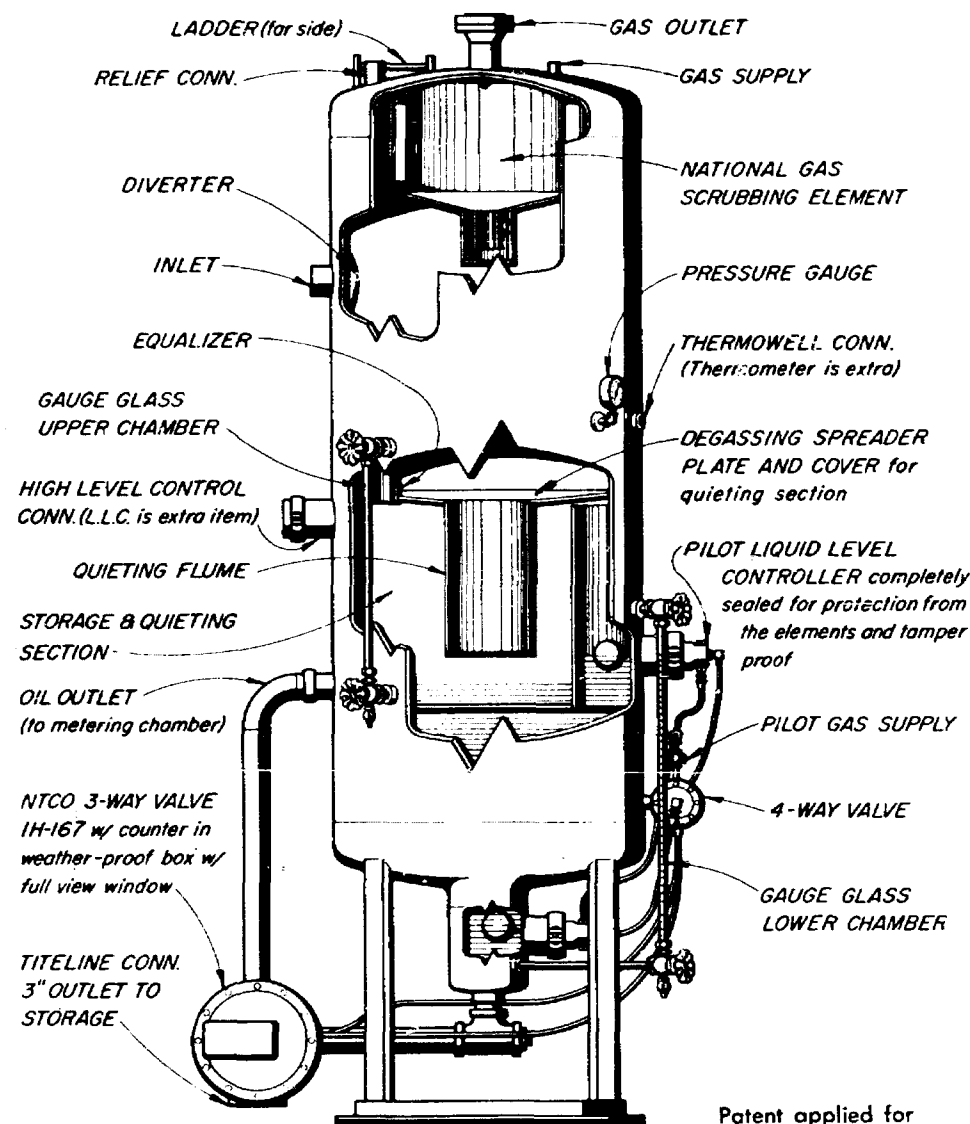
Page 151

April, 1957



NATIONAL TANK COMPANY
TULSA, OKLAHOMA, U. S. A.

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 SEPARATORSSERAPHIN 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		Oklahoma E. Kansas C. Kansas Hugoton N. Texas Permian Basin S. Texas Houston S. Louisiana Ark-La-Tex Ark. Valley Reg.			
Catalog Number	SIZE		Alabama Mississippi	Montana Tri-State Julesburg N. Dakota Big Horn Four Corners	California Michigan Craig
LMS-124-6	24" x 6'	\$ 855.00	\$ 877.00	\$ 892.00	\$ 946.00
LMS-124-10	24" x 10'	\$ 895.00	\$ 913.00	\$ 940.00	\$ 985.00
LMS-130-6	30" x 6'	\$1022.00	\$1040.00	\$1071.00	\$1126.00
LMS-130-10	30" x 10'	\$1060.00	\$1081.00	\$1113.00	\$1166.00
LMS-136-6	36" x 6'	\$1446.00	\$1475.00	\$1518.00	\$1580.00
LMS-136-10	36" x 10'	\$1496.00	\$1526.00	\$1571.00	\$1646.00
LMS-148-13	48" x 12½'	\$1871.00	\$1908.00	\$1965.00	\$2056.00

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

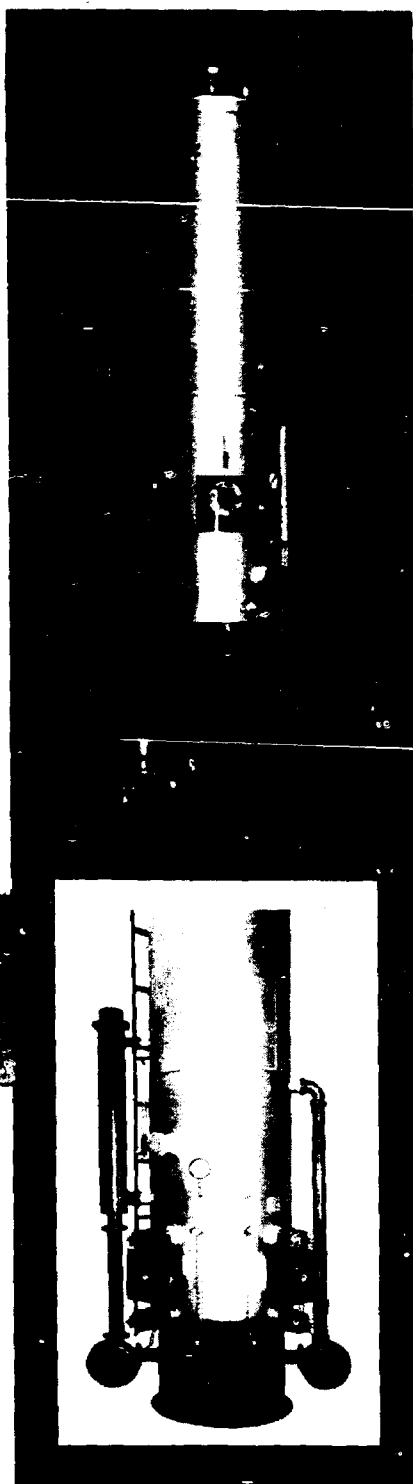
Catalog No.	Dia. x Shell Length	Nominal W.P.	METERING SECTION DUMP CAPACITY	Size Inlet	Flanged Gas Outlet
LMS-124-6	24" x 6'	125	$\frac{1}{2}$ Bbl.	3" Scrd.	3"
LMS-124-10	24" x 10'	125	1 Bbl.	3" Scrd.	3"
LMS-130-6	30" x 6'	125	1 Bbl.	3" Scrd.	3"
LMS-130-10	30" x 10'	125	1 Bbl.	3" Scrd.	3"
LMS-136-6	36" x 6'	125	2 Bbl.	3" Scrd.	3"
LMS-136-10	36" x 10'	125	2 Bbl.	3" Scrd.	3"
LMS-148-13	48" x 12 $\frac{1}{2}$ '	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.

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.

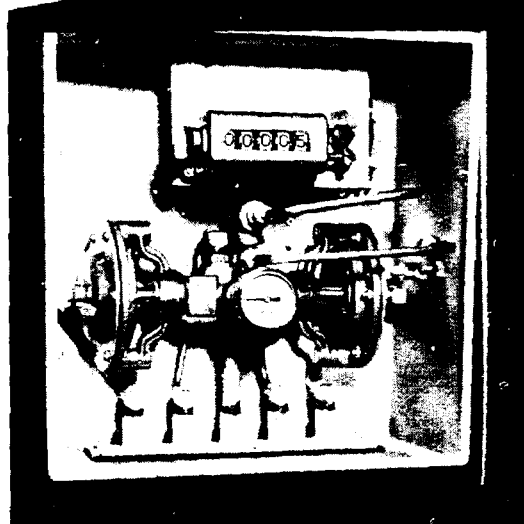
NATIONAL TANK COMPANY

DRAWER 1710
TULSA, OKLAHOMA

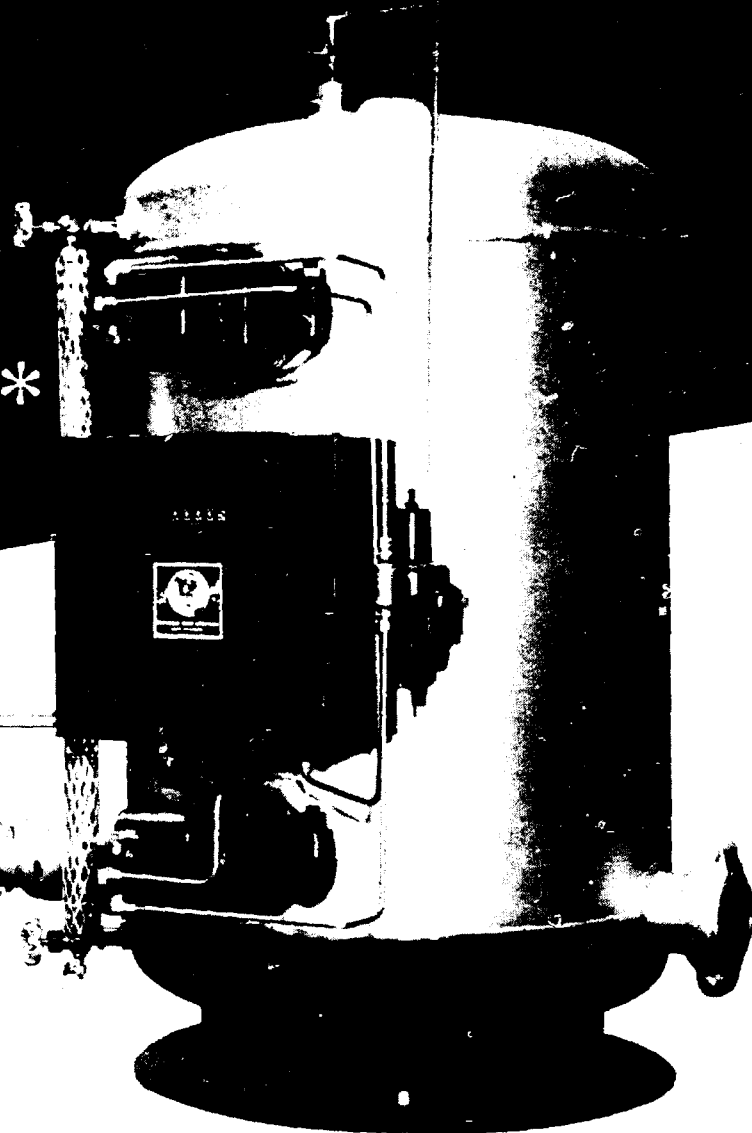
PRINTED IN U.S.A.

National[®] LIQUA-METER*

Featuring National's
New 3-Way
Valve



Tamper-proof, weather-proof control box with counter and rugged oil field controls.



1 bbl. capacity Liqua-Meter

For measuring liquid produced from individual wells or individual zones under a common royalty, the Liqua-Meter is recommended. Used in conjunction with a test separator or treater, the Liqua-Meter is used to determine the production of individual wells or zones without interrupting the production of other wells which continue to flow through the production separator. A counter records the number of dumps of the meter and is readily convertible to barrels run during the test.

Standard sizes are 1/2, 1 and 2 bbl. per dump. Other sizes on special order. Standard units available with two types of controls: Type "A" has one float, snap-acting pilot, manway and three-way valve. Type "B", shown, has two level controls, power booster relay, no manway, three-way valve, and meter control assembly and counter in tamper and weather-proof box.

Accurate within the limits prescribed by producer, royalty owner and regulatory body for measuring oil to be commingled.

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 Liqua-Meters.

*Trademark of National Tank Company

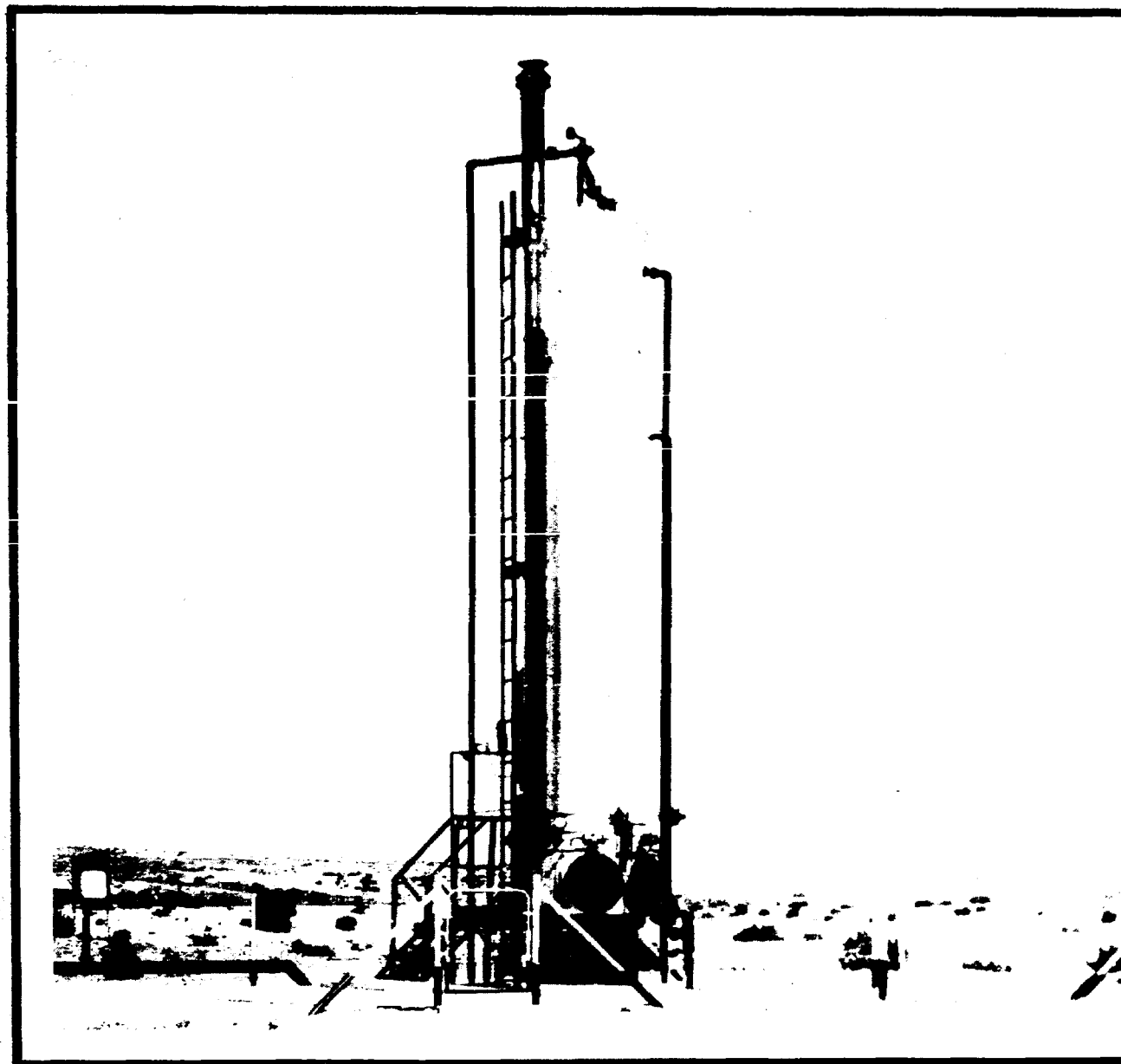
NATIONAL TANK COMPANY

DRAWER 1710

TULSA, OKLAHOMA

PRINTED IN U.S.A.

METERING TREATERS



LEASE AUTOMATION EQUIPMENT (LAQ)

BULLETIN 105

PRINTED IN U.S.A.



NATIONAL TANK COMPANY • TULSA, OKLA.

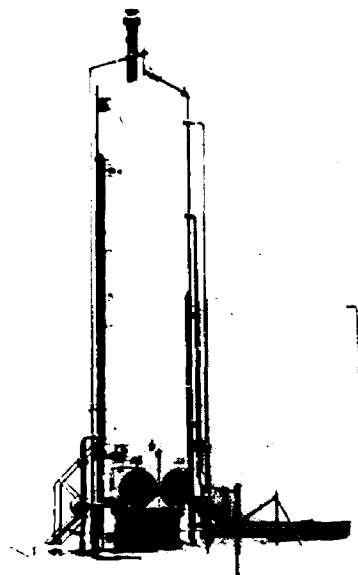
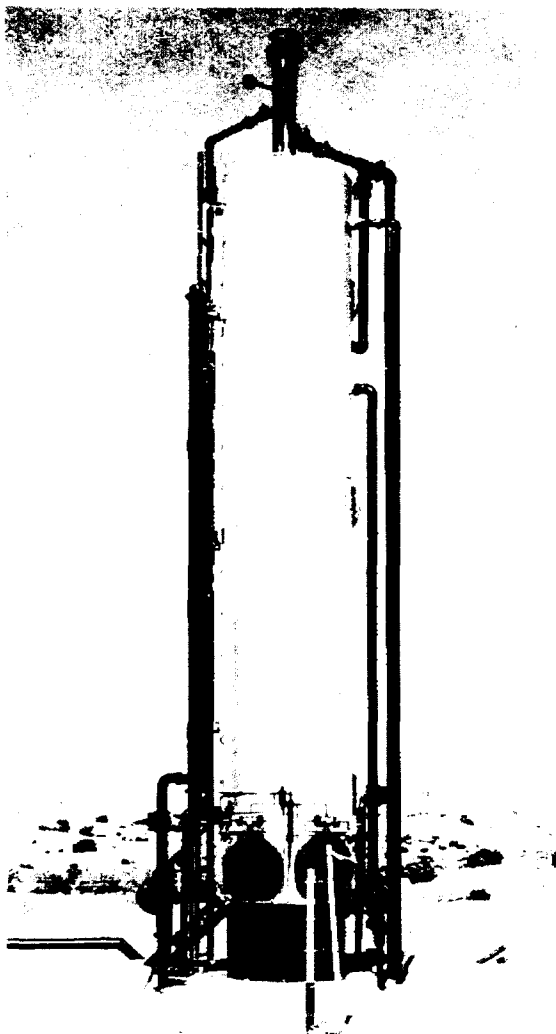
June, 1958

Page 171



NATIONAL TANK COMPANY
TULSA, OKLAHOMA, U. S. A.

NATIONAL'S[®] *metering treater*



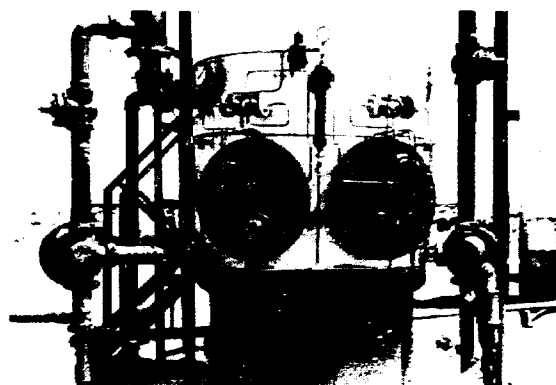
COMBINES EFFICIENT
EMULSION TREATING
WITH AUTOMATIC
METERING
AND RECORDING

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 into 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



INSTALLATION AND OPERATING INSTRUCTIONS

MIC-O-FLOAT MODEL CMEAG-401

INSTALLATION

The Model CMEAG-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 CMEAG-401 has a working pressure of 160 PSI.

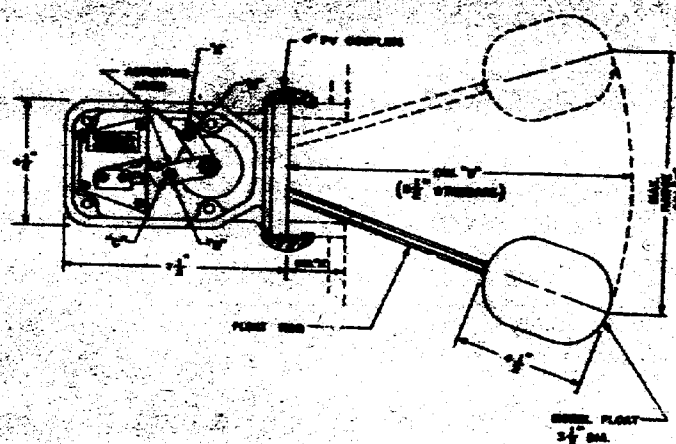


FIGURE 1

WIRING

The CNEAQ-401 is equipped with a S.P.D.T. Motor Switch.

All electrical connections enter from a 1/2 inch conduit opening located adjacent to the terminal strip. Each connection must be made on the terminal strip for ease in making connections.

CONTACT RATING

S.P.D.T. 15 Amps at 125 V. AC

LEVEL ADJUSTMENT

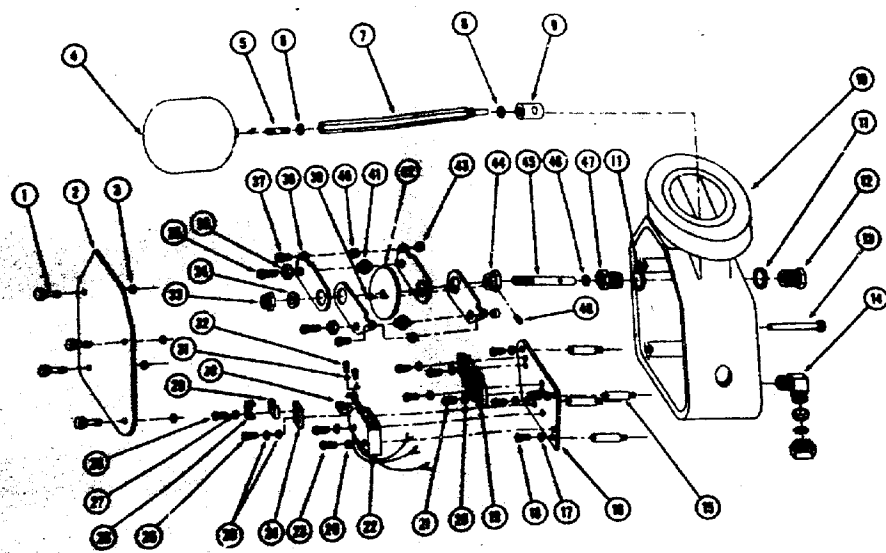
The CNEAQ-401 is provided with a level adjustment screw. For setting of both the high and low level, no power change this upon the following procedure should be followed (Figure 1).

To Change Low Level Set Point

1. Loosen lock nut "C".
2. Turn adjust screw "D" until the desired distance of 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 desired distance of the desired position.
3. Tighten lock nut "A" holding adjust screw "B" in position.



INCO-FLOAT PARTS LIST

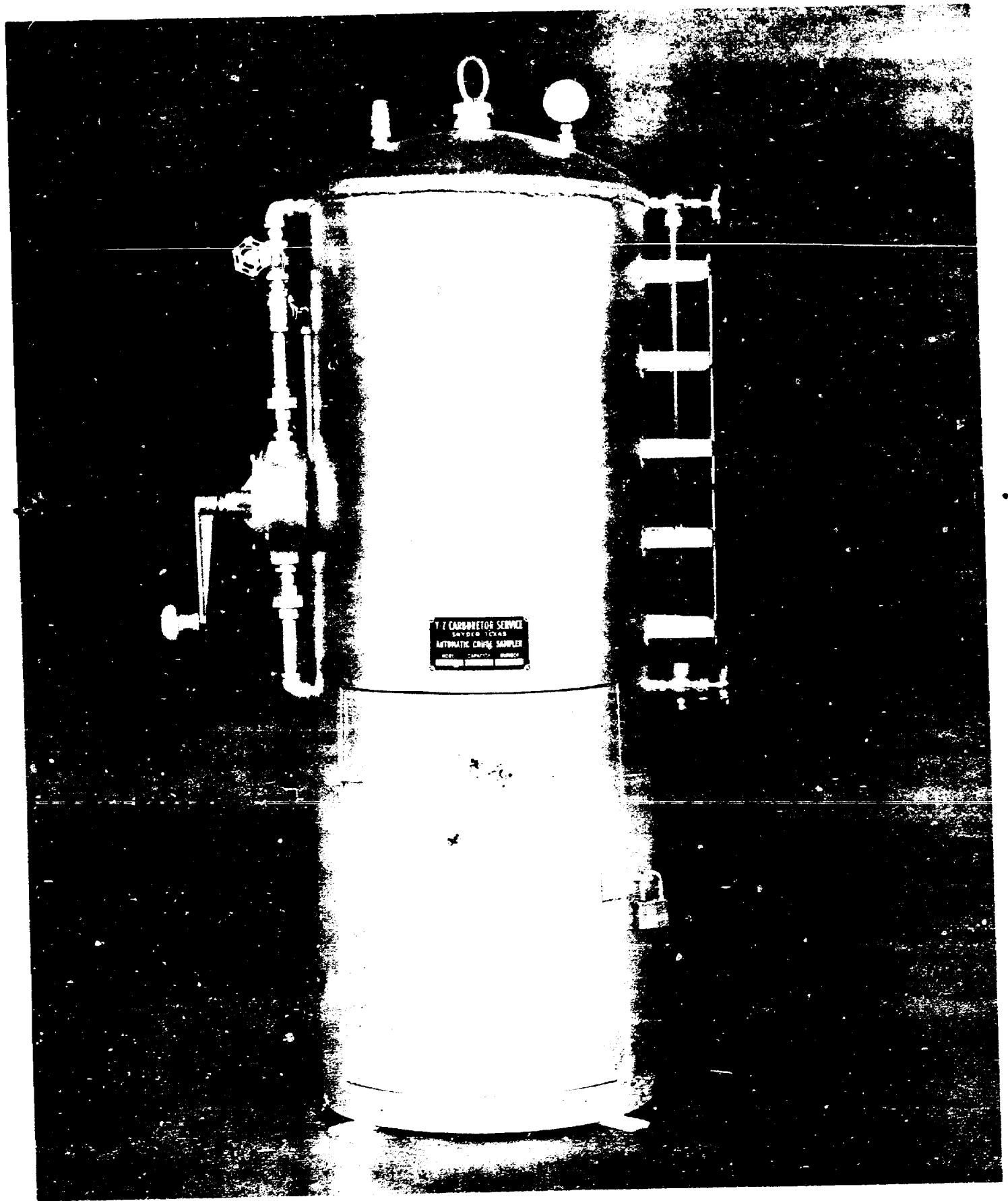
Qty.	Part No.	Qty.	Description	Qty.	Part No.
4	H 1-2307	25	Screw HD. HD.	1	H 68-3671
1	H 62-2122	26	Upper Mig. Bracket	1	H 67-3759
4	H 3-2351	27	Lock Washer	1	H 66-3760
1	H 25-1731	28	Screw, HD. HD.	1	H 65-3761
1	H 25-1800	29	Washer	1	H 64-3762
1	H 24-3669	30	Magnet Receiver	1	H 63-3763
1	H 22-3629	31	Lock Washer	2	H 62-3764
1	H 21-3675	32	Washer, HD. HD.	2	H 61-3765
1	H 20-3675	33	Washer	1	H 60-3766
1	H 17-2475	34	Washer	1	H 59-3767
1	H 16-1408	35	Cap Screw	2	H 58-3768
1	H 15-2016	36	Washer	2	H 57-3769
1	H 14-2016	37	Cap Screw	1	H 56-3770
1	H 13-2012	38	Adjusting Arm	1	H 55-3771
1	H 12-2012	39	Washer	1	H 54-3772
1	H 11-2012	40	Washer	1	H 53-3773
1	H 10-2012	41	Washer	1	H 52-3774
1	H 9-2012	42	Washer	1	H 51-3775
1	H 8-2012	43	Washer	1	H 50-3776
1	H 7-2012	44	Washer	1	H 49-3777
1	H 6-2012	45	Washer	1	H 48-3778
1	H 5-2012	46	Washer	1	H 47-3779
1	H 4-2012	47	Washer	1	H 46-3780
1	H 3-2012	48	Washer	1	H 45-3781
1	H 2-2012	49	Washer	1	H 44-3782
1	H 1-2012	50	Washer	1	H 43-3783
1	H 0-2012	51	Washer	1	H 42-3784
1	H 0-2012	52	Washer	1	H 41-3785
1	H 0-2012	53	Washer	1	H 40-3786
1	H 0-2012	54	Washer	1	H 39-3787
1	H 0-2012	55	Washer	1	H 38-3788
1	H 0-2012	56	Washer	1	H 37-3789
1	H 0-2012	57	Washer	1	H 36-3790
1	H 0-2012	58	Washer	1	H 35-3791
1	H 0-2012	59	Washer	1	H 34-3792
1	H 0-2012	60	Washer	1	H 33-3793
1	H 0-2012	61	Washer	1	H 32-3794
1	H 0-2012	62	Washer	1	H 31-3795
1	H 0-2012	63	Washer	1	H 30-3796
1	H 0-2012	64	Washer	1	H 29-3797
1	H 0-2012	65	Washer	1	H 28-3798
1	H 0-2012	66	Washer	1	H 27-3799
1	H 0-2012	67	Washer	1	H 26-3800
1	H 0-2012	68	Washer	1	H 25-3801
1	H 0-2012	69	Washer	1	H 24-3802
1	H 0-2012	70	Washer	1	H 23-3803
1	H 0-2012	71	Washer	1	H 22-3804
1	H 0-2012	72	Washer	1	H 21-3805
1	H 0-2012	73	Washer	1	H 20-3806
1	H 0-2012	74	Washer	1	H 19-3807
1	H 0-2012	75	Washer	1	H 18-3808
1	H 0-2012	76	Washer	1	H 17-3809
1	H 0-2012	77	Washer	1	H 16-3810
1	H 0-2012	78	Washer	1	H 15-3811
1	H 0-2012	79	Washer	1	H 14-3812
1	H 0-2012	80	Washer	1	H 13-3813
1	H 0-2012	81	Washer	1	H 12-3814
1	H 0-2012	82	Washer	1	H 11-3815
1	H 0-2012	83	Washer	1	H 10-3816
1	H 0-2012	84	Washer	1	H 9-3817
1	H 0-2012	85	Washer	1	H 8-3818
1	H 0-2012	86	Washer	1	H 7-3819
1	H 0-2012	87	Washer	1	H 6-3820
1	H 0-2012	88	Washer	1	H 5-3821
1	H 0-2012	89	Washer	1	H 4-3822
1	H 0-2012	90	Washer	1	H 3-3823
1	H 0-2012	91	Washer	1	H 2-3824
1	H 0-2012	92	Washer	1	H 1-3825
1	H 0-2012	93	Washer	1	H 0-3826
1	H 0-2012	94	Washer	1	H 0-3827
1	H 0-2012	95	Washer	1	H 0-3828
1	H 0-2012	96	Washer	1	H 0-3829
1	H 0-2012	97	Washer	1	H 0-3830
1	H 0-2012	98	Washer	1	H 0-3831
1	H 0-2012	99	Washer	1	H 0-3832
1	H 0-2012	100	Washer	1	H 0-3833

INSTRUMENTS, INC.

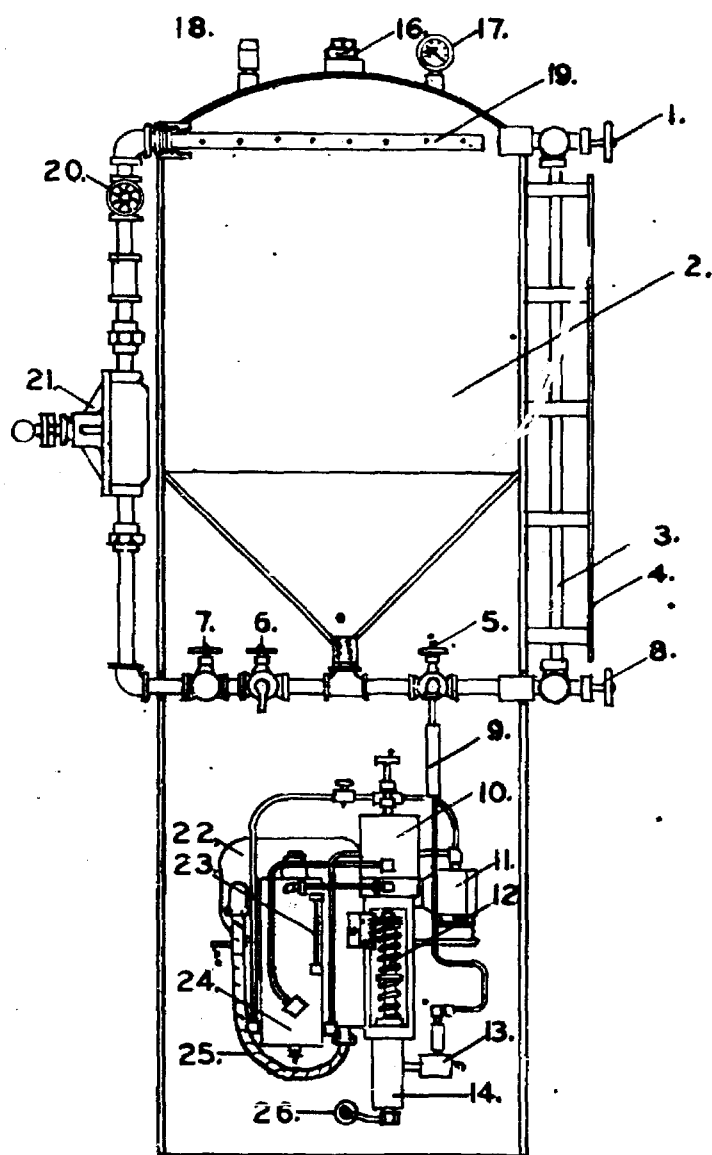
TORONTO, ONTARIO

P.O. BOX 556

MISSISSAUGA



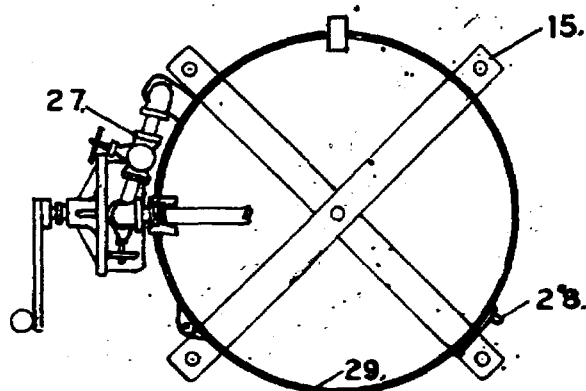
Y-Z CARBURETOR SERVICE



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

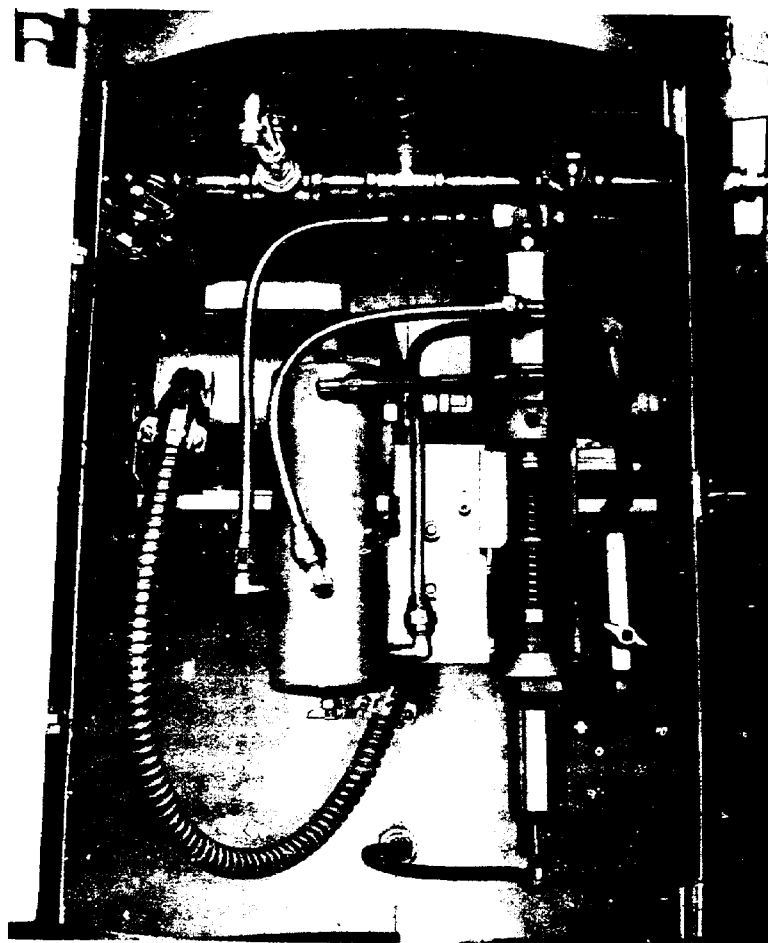
I. V. (Jack) ZECK

TED R. ZECK

Y. & Z. CARBURETOR SERVICE

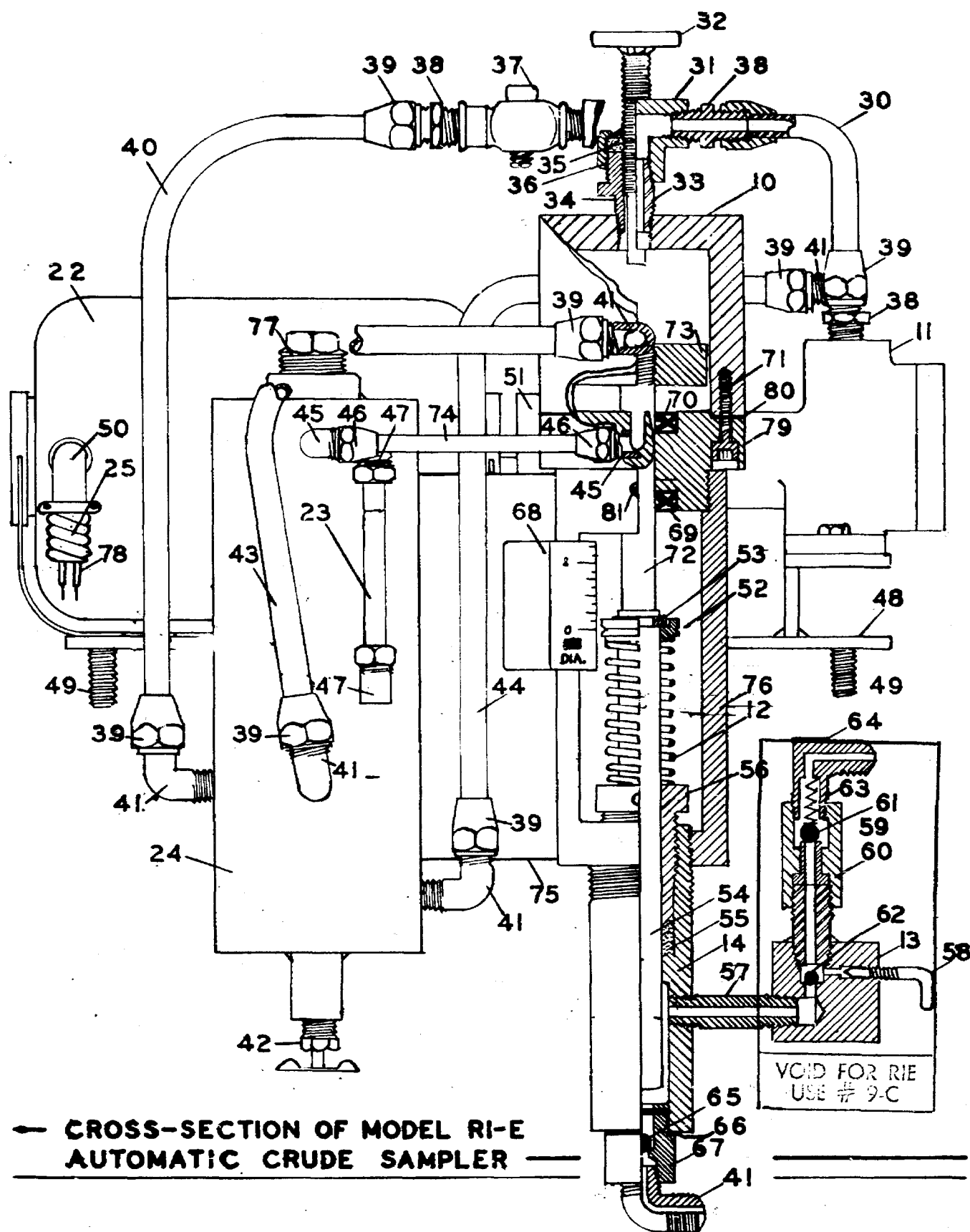
Dial 3-6632 -- P. O. Box 176

SNYDER, TEXAS



MODEL RI-E

— Y-Z CARBURETOR SERVICE —



— 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 $\frac{1}{2}$ " 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 $\frac{1}{2}$ " 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 $\frac{1}{4}$ 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 $\frac{1}{2}$ " 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

Dial 3-6632 — P. O. Box 176
SNYDER, TEXAS

Y-Z CARBURETOR SERVICE

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

RIE (drip proof unit).....\$75.00

RIEX (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.

Y. & Z. CARBURETOR SERVICE

Dial 3-6632 — P. O. Box 176

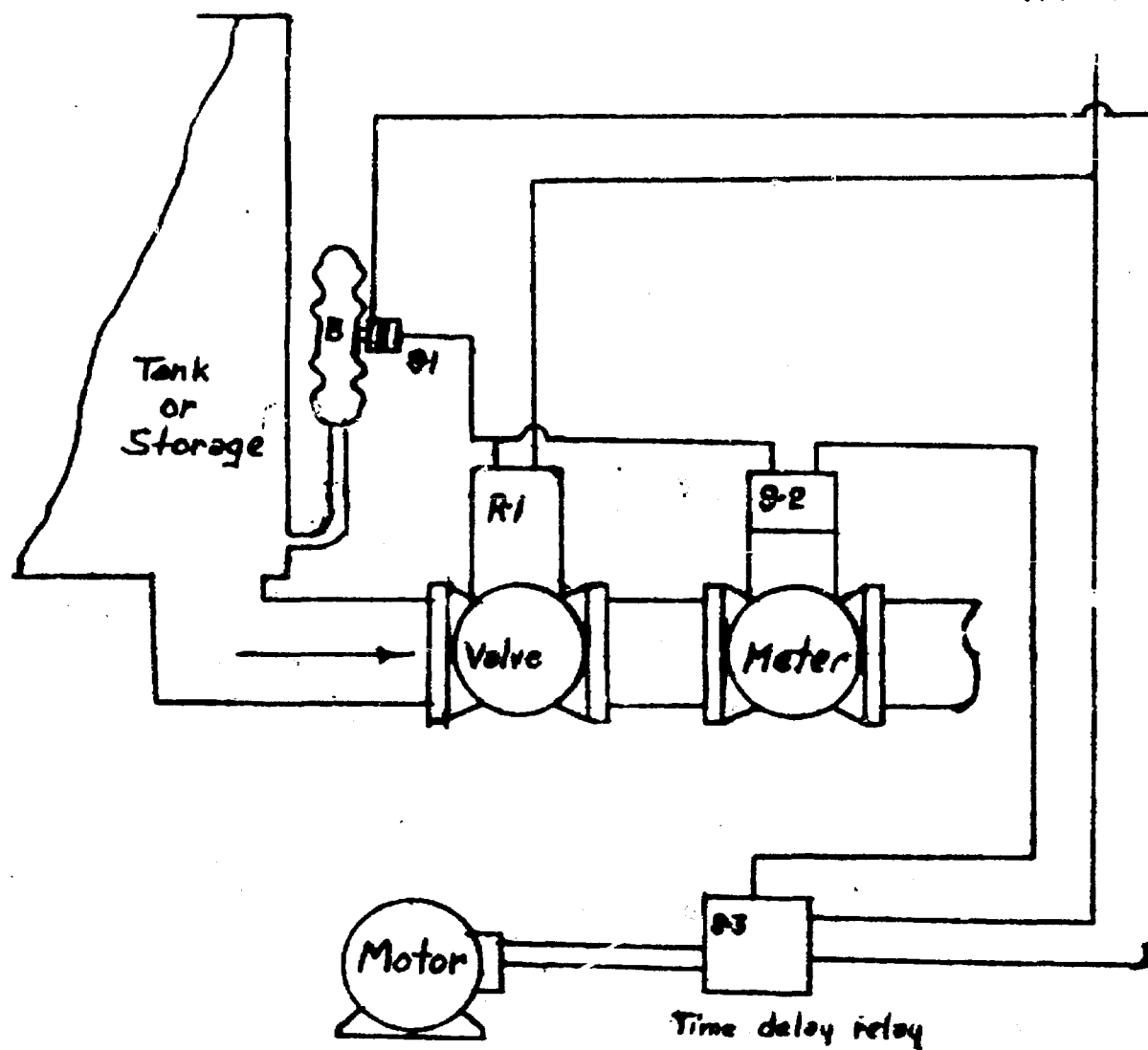
SNYDER, TEXAS

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

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

110 V.A.C.



SUGGESTED WIRING DIAGRAM
FOR
MODEL P-1E
AUTOMATIC CHILLED 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

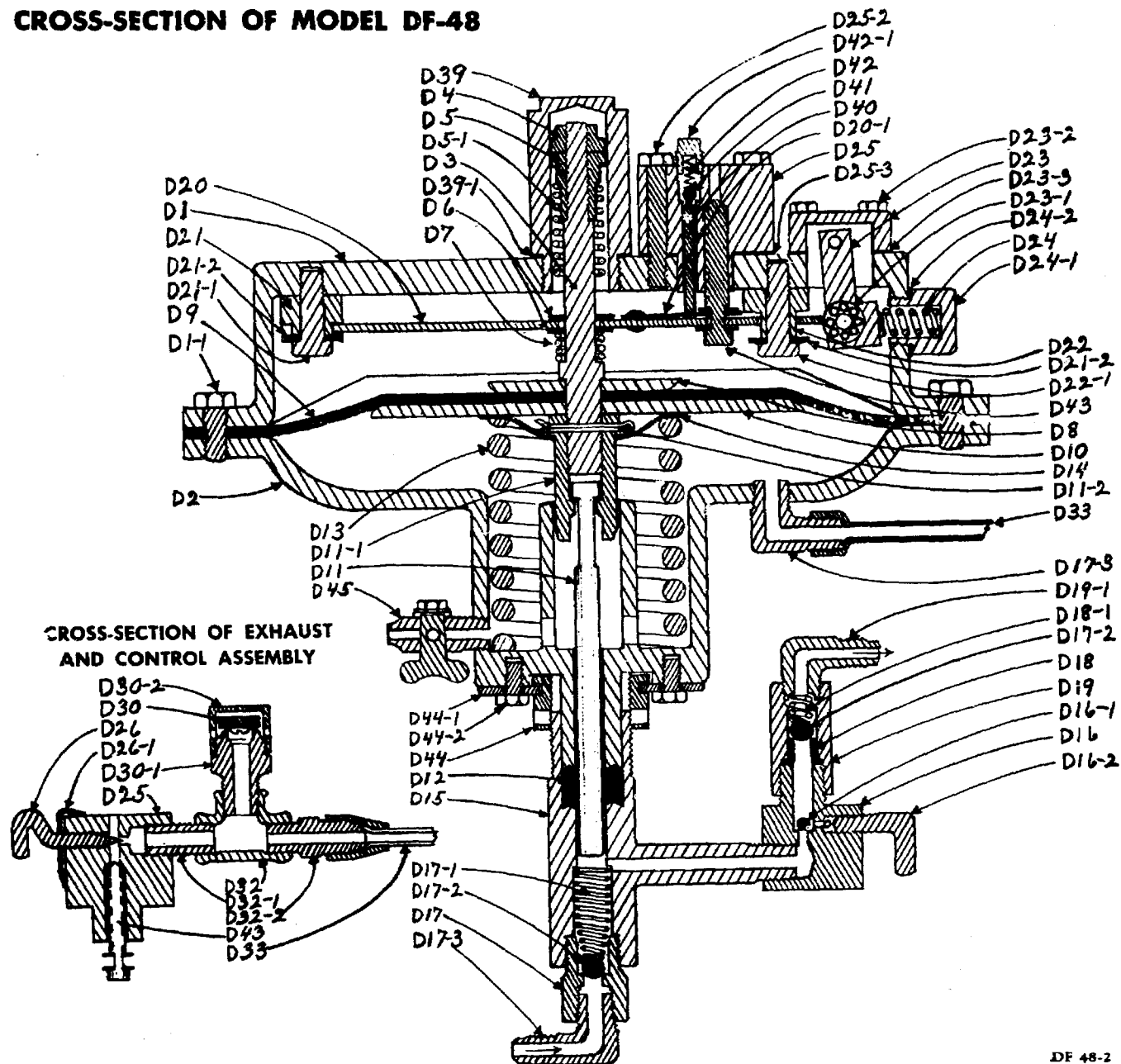
Snyder, Texas

Y-Z CARBURETOR SERVICE

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

Y. & Z. CARBURETOR SERVICE

Dial 3-6632 — P. O. Box 176
SNYDER, TEXAS

Y-Z CARBURETOR SERVICE

Part No.	Part Name	Price	Part No.	Part Name	Price	Part No.	Part Name	Price
D1	Top casting	\$20.24	D24-1	Plug	\$1.56	D43	Valv	\$5.52
D1-1	Cap screw $\frac{3}{8} \times \frac{3}{8}$	.10	D24-2	Gasket	.33	D44	Packing nut	4.95
D1-2	Cap screw $\frac{3}{8} \times 2\frac{1}{2}$	.20	D25	Std. valv block	14.38	D44-1	Split ring	3.85
D2	Bottom casting	18.15	D25-1	R.M. spec. block	17.19	D44-2	Bolts $\frac{1}{4} \times \frac{3}{8}$	.10
D3	Dia. shaft	7.04	D25-2	Bolts $\frac{1}{4} \times 1\frac{1}{4}$	.12	D44-3	Key	.72
D4	Lock nut	1.65	D25-3	Gasket	.33	D45	Drain cock	1.87
D5	Spring nut	2.42	D26	Control needle	3.34	D46	Line check	8.47
D5-1	Spring	.51	D26-1	Hold spring	.44	D46-1	Body	3.71
D6	Washers	.18	D27	Drip pot	4.95	D46-2	Cage	1.95
D7	Spring	.33	D27-1	Cap	7.15	D46-3	Plug	1.99
D8	Top dia. plate	1.54	D27-2	Bolts $5/16 \times \frac{3}{4}$	.10	D46-4	Spring	.51
D9	Diaphragm	4.07	D27-3	Strainer	.41	D46-5	"O" Ring	.48
D10	Bottom dia. plate	2.42	D28	Tank valv	9.74	D47	Stand	12.76
D11	Piston	4.49	D28-1	Body	4.86	D48	Tank	9.53
D11-1	Nut	5.50	D28-2	Stem	1.62	D48-1	Lid	4.51
D11-2	Cotter	.22	D28-3	Strainer	1.50	D48-2	Band	1.61
D12	"V" Packing rings		D28-4	Strainer nut	1.98	D48-3	Bolts $\frac{1}{4} \times \frac{1}{4}$	.15
	50 or less (ea.)	.62	D28-5	Wing nut	.85	D49	Gauge stick	1.06
	Over 50 (ea.)	.51	D28-6	Cap nut	.42	D50	R.M. control tube	2.45
D13	Spring	2.64	D28-7	Gasket	.40	D51	Bracket	.44
D14	Saddle washer	.66	D28-8	Gasket	.40	D52	Pressure gauge	2.42
D15	Pump body	12.08	D30	Check plug	.74	D53	Elb $\frac{1}{4} \times \frac{1}{4}$	.62
D16	Disc. block	7.26	D30-1	Body	2.64	D54	Nipple $\frac{1}{4} \times 1\frac{1}{4}$	.69
D16-1	Ball $3/16$	.33	D30-2	Cap	1.83	R55	Regulator	15.40
D16-2	Prime valv	.99	D31	Split tube check	2.04	R1	Body	4.62
D17	Suction check	4.49	D31-1	Retainer ring	.45	R2	Cap	3.19
D17-1	Spring	.33	D31-2	Body	3.14	R3	Housing	4.07
D17-2	Ball $5/16$	.33	D31-3	Cap	2.04	R4	Spring	.62
D17-3	Elb $\frac{3}{8} \times \frac{1}{4}$	.62	D32	Tee	.94	R5	Guide screw	.95
D18	Disc. seat	.95	D32-1	Nipple $\frac{1}{4} \times 1$	.44	R6	Yoke	2.02
D18-1	Spring	.51	D32-2	Adapter $\frac{3}{8} \times \frac{1}{4}$	.57	R7	Plug nut	.95
D19	Cage	6.38	D33	Vac. tube std.	1.43	R8	Seat	1.30
D19-1	Elb (special)	1.07	D34	Vac. tube R.M.S.	1.34	R9	Bolts $\frac{1}{4} \times 1\frac{1}{2}$	.10
D20	Trip bar	8.05	D35	Chemical tube	1.43	R10	Gasket	.37
D20-1	Spring and rivet	.68	D36	Gas inlet tube	.96	R11	Strainer	.13
D21	Pivot block	.99	D37	Chemical line	2.09	R12	Diaphragm	.68
D21-1	Bolt $\frac{3}{8} \times 1$	.16	D38	Gas line	2.09	R13	Nuts	.07
D21-2	Washer	.10	D38-1	Adapter $\frac{1}{4} \times \frac{1}{4}$	.40	R14	Dia. washer	.92
D22	Bumper block	1.17	D39	Cap	7.15	R15	Washer	.09
D22-1	Bolt $\frac{3}{8} \times 1\frac{1}{2}$	.16	D39-1	Gasket	.40	R16	Nut	.18
D23	Snap assem.	14.38	D40	Push rod	3.80	R17	Spring	.79
D23-1	Bearing and pin	3.69	D41	Check ball $\frac{1}{4}$ "	.33	R18	Saddle	.42
D23-2	Bolts $5/16 \times 1$	.10	D42	Spring	.33	R19	Control screw	1.06
D23-3	Gasket	.33	D42-1	Plug	.66			
D24	Spring	.51						

Y. & Z. CARBURETOR SERVICE

Dial 3-6632 — P. O. Box 176

SNYDER, TEXAS

Y-Z AUTOMATIC CRUDE SAMPLERS

PRICES

<u>MODEL</u>	<u>TYPE</u>	<u>PRICE (fob Snyder)</u>
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