Case 1342

Ex # 4 and 5 put

NEW MEXICO
OIL CONSERVATION COMMISSION

SUPPORTING INFORMATION
APPLICATION FOR PERMISSION TO USE
CENTRALIZED AUTOMATIC PRODUCTION FACILITIES
AND AUTOMATIC CUSTODY TRANSFER EQUIPMENT

SHELL OIL COMPANY
PEARL QUEEN FIELD
LEA COUNTY, NEW MEXICO

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OIL CONSERVATION COMMISSION

SUPPORTING INFORMATION
APPLICATION FOR PERMISSION TO USE
CENTRALIZED AUTOMATIC PRODUCTION FACILITIES
AND AUTOMATIC CUSTODY TRANSFER EQUIPMENT

PEARL QUEEN FIELD
LEA COUNTY, NEW MEXICO

SHELL OIL COMPANY
ROSWELL, NEW MEXICO

OCTOBER 28, 1957

TABLE OF CONTENTS

ABSTRACT

This brochure has been assembled to supplement Shell Oil Company's application to the New Mexico Oil Conservation Commission to use centralized automatic production facilities and automatic transfer equipment in the Pearl Queen Field, Lea County, New Mexico, and should be considered along with the letter of application. The proposed method of handling and measuring production is illustrated by drawing and description and the advantages to the lessors, State of New Mexico and Shell Oil Company are enumerated.

CONTENTS OF LETTER OF APPLICATION

APPLICATION BY SHELL OIL COMPANY
FOR EXCEPTION TO RULE 309 OF THE RULES AND REGULATIONS
OF THE NEW MEXICO OIL CONSERVATION COMMISSION

By this letter of application Shell Oil Company requests approval of an exception to Section (a) of Rule 309 of the Rules and Regulations of the New Mexico Oil Conservation Commission to permit (1) oil to be transported from a lease for measurement, and (2) the production of more than 8 wells into common storage in the Pearl Queen Pool, Lea County, New Mexico.

It is the desire of the Company to install a system employing centralized automatic production facilities and lease custody transfer on Shell's leases in the Pearl Queen Field. These leases and their location are described as follows:

1. Shell's McIntosh "E" lease consisting of 80 acres in the E/2 SW/4, Section 21, T-19-S, R-35-E.

2. Shell's McIntosh "D" lease consisting of 320 acres in the E/2, Section 21, T-19-S, R-35-E.

3. Shell's McIntosh "B" lease consisting of 120 acres in the E/2 NW/4 and NW/4 SW/4, Section 22, T-19-S, R-35-E.

4. Shell's McIntosh "A" lease consisting of 40 acres in the SW/4 SW/4, Section 22, T-19-S, R-35-E.

5. Shell's McIntosh "C" lease consisting of 200 acres in the NE/4 and NE/4 SE/4, Section 28, T-19-S, R-35-E.

6. Shell's McIntosh lease consisting of 120 acres in the W/2 NW/4 and NW/4 SW/4, Section 27, T-19-S, R-35-E.

7. Shell's Kimberlin lease consisting of 120 acres in the E/2 SW/4 and W/2 SE/4, Section 22, T-19-S, R-35-E.

8. Shell's State "PB" lease consisting of 80 acres in the E/2 NW/4, Section 27, T-19-S, R-35-E.

9. Shell's State "PA" lease consisting of 80 acres in the E/2 SW/4, Section 27, T-19-S, R-35-E.

10. Shell's Hooper lease consisting of 80 acres in the W/2 NE/4, Section 27, T-19-S, R-35-E.

SHELL OIL COMPANY

№ 357

Lease Production Record

Date_____

LEASE STATE PA PEARL QUEEN FIELD

Meter

TANK SAMPLE	AUTO. LINE SAMPLE
API GRAVITY	API GRAVITY
Observed ..... @___°F	Observed ..... @___°F
Corrected ..... @ 60°F	Corrected ..... @ 60°F
BS&W ..... %	BS&W ..... %

METER READING (Uncorrected)

Volume (BBL) — Finish	
Volume (BBL) — Start	
Gross Volume (BBL)	

	BBL READING — Finish
	BBL READING — Start

TOTAL BBL DELIVERED
(Corrected to 60°F)

RUN TICKET NO._____

REMARKS:_____

_____

_____

_____
Gauger's Signature

SHELL OIL COMPANY

No. 358

Automatic Custody Transfer Shipping Record

Date_____

LEASES PEARL QUEEN FIELD

Meter

TANK SAMPLE	AUTO. LINE SAMPLE
API GRAVITY	API GRAVITY
Observed ..... @___°F	Observed ..... @___°F
Corrected ..... @ 60°F	Corrected ..... @ 60°F
BS&W ..... %	BS&W ..... %

METER READING (Uncorrected)

Volume (BBL) — Finish		
Volume (BBL) — Start		
Gross Volume (BBL)		

	BBL READING — Finish
	BBL READING — Start

TOTAL BBL DELIVERED
(Corrected to 60°F)

RUN TICKET NO._____

REMARKS:_____

_____

_____

_____

Gauger's Signature

11. Shell's Allen Estate "A" lease consisting of 80 acres in the E/2 NE/4, Section 27, T-19-S, R-35-E.

12. Shell's Allen Estate lease consisting of 160 acres in the E/2 and NW/4 SE/4, Section 27 and NE/4 NE/4, Section 34, T-19-S, R-35-E.

13. Shell's Record "A" lease consisting of 40 acres in the SW/4 SE/4, Section 27, T-19-S, R-35-E.

14. Shell's State "PD" lease consisting of 160 acres in the NW/4, Section 34, T-19-S, R-35-E.

15. Shell's State "PC" lease consisting of 80 acres in the W/2 NE/4, Section 34, T-19-S, R-35-E.

16. Shell's State "PE" lease consisting of 120 acres in the SE/4 NE/4, Section 34, and SW/4 NW/4 and NW/4 SW/4, Section 35, T-19-S, R-35-E.

17. Shell's State "PF" lease consisting of 80 acres in the N/2 SE/4, Section 34, T-19-S, R-35-E.

18. Shell's State "PG" lease consisting of 160 acres in the S/2 SE/4, Section 34 and S/2 SW/4, Section 35, T-19-S, R-35-E.

19. Shell's Record lease consisting of 1120 acres in the S/2 SW/4, Section 23, All Section 26, and N/2 N/2 and SW/4 NE/4 and SE/4 NW/4 and NE/4 SW/4 and NW/4 SE/4 and S/2 SE/4, Section 35, T-19-S, R-35-E.

20. Shell's State "PI" lease consisting of 80 acres in the SE/4 NE/4 and NE/4 SE/4, Section 35, T-19-S, R-35-E.

21. Shell's State "PH" lease consisting of 640 acres in Section 2, T-20-S, R-35-E.

22. Shell's Record "B" lease consisting of 640 acres in Section 25, T-19-S, R-35-E.

23. Shell's State "PJ" lease consisting of 480 acres in N/2 and SW/4, Section 36, T-19-S, R-35-E.

The said system is designed to perform the following functions automatically:

1. Control on-off producing periods of wells.

2. Measure and record production from each lease before the production enters common storage.

3. Test each well periodically to determine volume rates of oil, gas, and water.

4. During custody transfer, prevent (a) transferring oil to the pipeline if the positive displacement meter is not functioning properly, (b) overrunning daily and/or monthly allowable, and (c) transferring non-merchantable oil. Also, during transfer, a composite sample will be stored under pressure for determination of API gravity and BS&W content.

By copy of this letter, all operators, owning offsetting interests in the Pearl Queen Area, have been notified by certified mail of this application.

Wherefore, Shell Oil Company requests that the foregoing application for an exception to Rule 309 be heard before the New Mexico Oil Conservation Commission in Santa Fe, New Mexico, at the regularly scheduled November meeting.

INTRODUCTION

Shell Oil Company is initiating a development program in the Pearl Queen Field which may eventually include 23 leases and 128 wells; Shell's leases are shown in Exhibit I. The extent of development will, of course, be dependent upon successful completions but a sufficient number of wells have been completed to enable Shell to plan the location of centralized gathering and measuring facilities.

The Pearl Queen Field presents an unusual opportunity for the installation of modern oil handling and measuring equipment using latest techniques to produce the properties in the most efficient manner. The proposed design incorporates features to conserve oil vapors above ground, to eliminate waste of crude from tank cleaning, and to avoid tank spillage, thus conserving crude oil in the reservoir.

DESCRIPTION OF PROPOSED FACILITIES

The initial Pearl Field facilities will consist of (1) two remotely located gathering stations and (2) one central station with custody transfer equipment. The locations of these facilities are shown in Exhibit II. An extension of this initial system is shown in Exhibit III, indicating probable future remote and central facility locations if the entire area is productive.

Remote Stations

Well control, well testing, lease production measurement, and gas separation will be performed at the remote locations. The paths which the produced fluid will take during test and during normal production are shown in Exhibit IV, which is a diagram of remote station No. I-1. When a specific well is on test, the fluid will follow a path (shown in red) through the test separator and back to the particular production separator serving its lease. Fluid from the wells, other than the specific well being tested, will bypass the test separator and be routed directly to central storage through the individual lease production separators. (This path is shown in orange.) Routing of the produced fluid is automatically controlled by diaphragm valves on the well production and test header manifold and on the test separator manifold. The on-off producing period, the test sequence, and the length of the test of the wells connected to each remote location facility will be automatically controlled by equipment installed at that remote station.

From the test separator, the fluid passes through a monitor cell of Shell's "Phase-Null" cut recorder (0-70% BS&W cut range) and a positive displacement meter. The gross fluid and net oil measurements obtained are transmitted to a data recorder. The gas from the test separator is measured

by a positive displacement or orifice meter and measurement data are transmitted to the control house where the volume is recorded. It is our intent to test each well automatically on a schedule; however, provision is made to place a well on test at any time.

From the production separators, fluid passes through a positive displacement meter located immediately upstream from the separator dump valve. This fluid is then combined with the production from other leases and transferred to the central facility and lease custody transfer station. Mixing of the fluid from separate leases takes place in a 100-barrel tank equipped with automatic controls to start and stop a transfer pump. This tank is equipped with two separate high level switches to shut in all wells connected to the remote station if transfer of crude is interrupted for any reason. The positive displacement meter on the production separator will be equipped with temperature compensation (to correct measurements to a base of 60° F.), a large numeral counter, and a ticket printer. By inserting a ticket in the printer at the beginning of a measurement period, and printing the opening reading, the ticket is locked automatically and sealed in place and cannot be removed without mutilation until the closing reading is printed. An automatic sampler is operated in conjunction with each production separator. The volume of sample taken is directly proportional to the production from the lease, and is used to determine the average gravity and BS&W content of the lease production. Royalty payments for each lease will be based on its allocated share of the total net production shipped from the central facility, as determined by the printed tickets from the lease production meters and the BS&W content obtained with the sampler. We believe that this method is fair to all parties.

Central Facility and Custody Transfer

The central facility, shown in Exhibit V, provides equipment to perform all of the functions of a remote station and in addition has facilities for treating all of the produced fluid and transferring oil to the purchaser automatically. Currently, oil is being transported from the lease by truck. However, it is anticipated that pipe line facilities will eventually be provided for the field.

Incoming fluid is automatically routed to the heated gun barrel for treating; oil from the gun barrel gravitates into a surge tank and is transferred to the purchaser through custody transfer equipment. The surge tank is equipped with liquid level float switches as shown in Exhibit VI. As the tank fills to the upper operating level, a control valve opens and, when the manual truck connection is opened by the trucker, oil will be pumped into the tank truck. When a pipe line connection is available, the upper operating level switch will open the control valve and start both charging pump and pipe line shipping pump. Oil will be transferred until the number of barrels set on a Predetermined Shipping Control Counter has been reached or until the oil level reaches the lower operating level; the meter run set stop valve will then close and the pump will stop. The high level and the emergency high level switches are safety devices to shut in all wells connected to the central facility, either directly or through the remote facilities. The switches are independent of each other; the emergency will act only if the high level switch fails.

Oil is pumped from the bottom of the surge tank and passes through the following custody transfer equipment in succession:

1. The Charging Pump performs two functions. It is used to maintain a pressure in the metering system above the vapor pressure of the crude and to pump unmerchantable oil (determined by cut monitor) back through the treating system.

2. The Strainer will trap any foreign objects which might get into the line.

3. The Cut Monitor, operating on a dielectric constant principle, allows only merchantable oil to pass through the meter. If the set value of 1 per cent BS&W is exceeded, the monitor closes the set stop valve and shuts down the pipe line shipping pump. The excess cut signal from the monitor also actuates a three-way, two-position reroute valve and recirculates the non-merchantable oil through the treating system. As soon as the oil is acceptable, the monitor causes the bypass to close and shipping is resumed. If the oil does not become merchantable, probably through fault of the treating plant, the surge tank will fill until the high level switch operates to shut down the producing wells.

4. The Sampler will be driven by electrical impulses from the meter so that a small measured sample from each barrel of oil passing through the meter is drawn into a hermetically sealed sample container.

5. The Gas Eliminator will remove free air or gas if it should accidentally get into the line.

6. The Meter will be the positive displacement type with counters reading in units, tenths, and hundreths of barrels. Each meter is equipped with a temperature compensator and dual recording heads; one head is equipped with a ticket printer to record volume measurements

corrected to 60° F., and the other head is equipped to record gross volume on a counter. By inserting a ticket in the printer at the beginning of a measurement period, and printing the opening reading, the ticket is locked in place automatically and sealed and can not be removed without mutilation until the closing reading is printed. A lock-out safety device on the meter, which requires manual reset, closes the set stop valve (after a short delay) in the event the counter ceases to function. The predetermined shipping control is designed to shut down custody transfer operations whenever maximum daily and/or monthly production has been run from the central facility.

7. The Set Stop Valve is the main control valve for the custody transfer system. The valve is opened by the upper operating level switch and closed by the lower level operating switch in the surge tank. In addition, the valve will be closed if any of the following conditions occurs, regardless of the signal from the upper operating level switch:

(a) If signal from cut monitor indicates unmerchantable oil

(b) If meter counter fails

(c) If daily allowable has been transferred

(d) If monthly allowable has been transferred

(e) If power fails

8. The Back Pressure Regulator is manually set to maintain pressure on the meter above the vapor pressure of the crude.

9. The Shipping Pump, when pipe line connection is made, will be the property of the pipe line company and will be operated automatically by the same controls operating the meter run set stop valve.

The ACT control panel, which is locked and sealed, contains the various relays, switches, time delays, etc., to accomplish the functions set out above. Every effort has been made to design fail-safe equipment to prevent malfunctions which could cause mismeasurement of oil.

MEASUREMENT ACCURACY

Custody Transfer

Positive displacement meters used for custody transfer measurement of crude oil should be at least as accurate as manual tank gauges, the current standard means of measurement. Based on Shell's experience, and that of others in the industry, it has been found that meters are as accurate as the most carefully controlled manual methods of gauging. The major sources of error as a result of manual tank gauging are:

1. Wax and corrosion incrustations on the inside of tank walls reduce the actual tank volume.
2. Average temperature of oil in the tank differs from the observed temperature.
3. Basic sediment under gauge hatch changes from opening to closing gauge.
4. In many cases, per cent error is excessive when measuring liquid level to nearest 1/4 inch.
5. Widely used abridged ASTM Table 7 for oil volume correction to 60° F. is less accurate than ASTM Table 6. (The proposed meters will correct at the coefficient of expansion of the oil being shipped as determined by ASTM Table 6.)

In addition to these errors, there are a number of smaller possible errors in manual gauging, among these are tank strapping inaccuracy, tank expansion and contraction, tank tilt, and out-of-roundness, and bottom flexure from high to low gauge.

In the only report we have seen on the matter it was stated that extensive investigation had shown that the volume of oil computed from

tank gauging methods may differ from -1.0% to ⁄0.15% of the true volume as a result of these errors. As determined by field tests by Shell and the work of other companies, the summation of positive displacement meter errors is approximately ⁄0.15% As the magnitude of this error is considerably less than that for manual tank gauging, positive displacement meters should offer the more accurate means of oil measurement.

Considerably more data are available to support the case for positive displacement meters for lease custody transfer service. However, the data currently available have already been presented to the Commission by Shell Oil Company in their application for the use of automatic custody transfer equipment in the Bisti Field, San Juan County, New Mexico. To add it to this brochure would only be repetitious.

Lease Production Allocation

In most respects, the system described in the brochure is comparable to the system proposed by Shell Oil Company for the Bisti Field, San Juan County, New Mexico. The outstanding difference is in the method of allocating production among the leases.

The Bisti Field, for the most part, is a unitized operation and does not have the lease production allocation problem found in the Pearl Queen Field. In cases where allocation is necessary for wells not admitted to the participating area in a prescribed period, it was the Commission's order that the oil either be measured in tanks or metered continuously by means of positive displacement meters prior to being commingled with oil production from the participating area of the Carson Unit Area.

In essence, it is our request that permission be granted to allocate production in the same manner on a permanent basis. This method of allocation is not new and has been in use in other localities by Shell and other companies for some time. In the Quitman Field in Texas, Shell uses positive displacement meters to measure production and allocate royalty payments from ten leases; custody transfer is accomplished from one central location. The difference between adjusted meter volume and gauged volume for the first five months of operation was 0.22 per cent. During this period, 48,000 barrels of crude were handled. A similar installation, plus an automatic custody transfer installation at the central collection point, is operated by Western Gulf Oil Company in California. Again, royalty payments are based on volumes recorded by the positive displacement meters located on the various leases. In the Esperanza Field in California, Shell is installing equipment identical to that described in this brochure.

The State of Louisiana granted permission to Shell to commingle production from gas-condensate wells on six leases and to allocate production on the basis of positive displacement meter measurements. Percentage differences between meter volumes and gauged volumes have been consistently one-half of one per cent, or less.

Positive displacement meters have also been used in many cases to measure production from different pay zones prior to commingling production. In one such case in the Big Mineral Field of Texas, Shell metered a total of 1,456,137 barrels of crude from five pay zones with a cumulative difference of 0.28 per cent.

Preliminary tests on the Kimberlin lease in the Pearl Queen Field indicate that accuracies within ±0.2 per cent may be expected from the

positive displacement meters measuring crude from the leases. We believe that allocation of lease production based on measurements of this indicated accuracy is fair to all parties.

The accuracy of the meters used for lease production and test measurement will be maintained by a routine recalibration and replacement program. The calibration data of meters used in similar or the same service as above described indicate that a calibration check for each 100,000 barrels of fluid through-put would prevent a meter factor drift greater than 0.1 per cent.

Meter Calibration--Custody Transfer Meter

Meter calibration tests (meter proving) will be conducted by Shell Oil Company and witnessed by the transport company until pipe line facilities are available. The Shell Pipe Line Corporation will provide for proving and maintaining the custody transfer metering facilities following installation of their gathering system. The frequency of calibration will be determined by experience. It is anticipated that calibration tests will be run every 30 days initially and that this program will be revised as experience dictates.

Calibrations are made to determine a factor by which the meter reading is multiplied to compute the true volume of oil measured. Another important objective of calibration is to detect mechanical trouble before it significantly affects meter accuracy. Since a meter factor change is usually indicative of internal wear, a sizable factor change from one calibration to the next indicates that maintenance is required.

Meters will be proved in accordance with the API ASME Code 1101, "Installation, Proving, and Operation of Positive Displacement Meters in Liquid Hydrocarbon Service". Several alternate calibration methods are approved by this code. The volumetric method, which will be used, specifies that a metered volume be remeasured in a container of accurately known volume. Comparison of the two measurements indicates the accuracy of the meter being checked. This container, or prover tank, will have a capacity such that the meter can flow into it for at least one minute at maximum flow rate. It will be internally coated to prevent scale and wax deposition on the walls and will be insulated to maintain constant oil temperatures during proving operations.

This tank will be calibrated initially, and at reasonable intervals thereafter, by the water withdrawal method. This method determines the prover tank volume by first filling with water which is then withdrawn into measures calibrated by the National Bureau of Standards. Calibrations are repeated until two consecutive volume measurements agree within 0.02 per cent. The average of these two measurements is taken as the prover tank volume at the pressure and temperature of the tests. Proper correction factors are applied to tank volume for temperature conditions other than calibration temperature. The prover is calibrated at its operating pressure (in this case, atmospheric pressure). Standard industry practice is to first fill the prover tank with the oil to wet the walls and bring it to the oil temperature. The tank is then drained, and calibration runs are made until two meter factor determinations agree within 0.05 per cent. The average of these two values is taken as the meter

factor for the following operating period. With properly designed proving equipment and experienced personnel, usually only two or three calibration runs are needed to achieve the desired reproducibility.

A meter proving data sheet which will be witnessed and signed by transport company or pipe line and lease operator representatives becomes a permanent record of both parties.

Sample Testing

The API gravity and BS&W content of the oil tendered to the transport or pipe line company will be determined from that of the automatically-obtained composite sample whenever a run is completed. Representatives of Shell and the transport or pipe line company will jointly witness these tests.

Throughout the oil industry during the past several years, large quantities of crude oil have been accounted for on the basis of automatically-obtained line samples. Both Shell Oil Company and Shell Pipe Line Corporation have conducted tests regarding the reliability and accuracy of these devices, and both have concluded that samples obtained by properly designed, installed, and maintained automatic samplers are more accurate than those taken manually.

ECONOMIC BENEFITS

The use of centralized automatic production handling facilities and well control as herein described instead of conventional tankage is expected to result in economic benefits of considerable magnitude.

Petroleum Conservation

Conservation of crude oil will result because the proposed metering system eliminates the exposure of crude to air throughout the gathering and storage systems. Thus, light petroleum fractions are retained in the crude, thereby maintaining volume, gravity, and value. Tank cleaning, and the attendant waste, will be minimized; automatic controls at the central facility will prevent spillage.

No quantitative data that show how much loss in gravity will be prevented by a completely closed oil handling system are available for the Pearl Queen Field. However, Shell made detailed studies in the Wasson Field in Texas which showed definite gravity increases when a closed oil handling and automatic custody transfer system was installed. The closed system prevents normal losses due to hand gauging methods which require frequent opening of tank gauge hatches. Conserving the oil will mean additional revenue to the lessors, to the State of New Mexico, and to Shell. In addition, if the closed system maintains the gravity in a higher price bracket, lessors will receive more revenue.

Operating Economy

The lease operating costs of the Pearl Queen Field will be materially decreased by the centralization of treating and storage facilities, use of automatic equipment, elimination of hand gauging, and

reduction of equipment maintenance. Inasmuch as the economic limit is reached when the cost of production equals the revenue from production, the reduction in operating costs will serve to increase the economic life of the field resulting in additional oil recovery from the reservoir. This increased oil recovery means additional revenue to the lessors and to the State of New Mexico and to Shell.

Safety

In addition to the increased revenue, the safety of personnel will be improved with the elimination of tank gauging and the attendant hazards from tank vapors, climbing, and fire.

Fire hazards will be decreased, at least in proportion to the reduction in the number of storage tanks, and possible losses will also decrease by minimizing above-ground storage.

R 35 E

T 19 S

Shell | Shell | 21 | 22 | 23

Shell | McIntosh "B" | Shell

McIntosh "E" | McIntosh "D" | McIntosh "A" | Kimberlin | Shell

Shell | Shell | Shell | Shell | Shell | Shell | Shell

State "PB" | G. Hooper | "A" Allen Estate

28 | 27 | 26 | 25

McIntosh "C" | McIntosh

Shell | Record "A"

State PA | Record | Record "B"

Shell | Shell | Shell | Shell

Allen Estate

Shell | Shell

State "PD" | State "PC"

34 | 35 | 36

Shell | Shell

State "PF" | State "PE" | State "PI"

Shell

State "PG" | State "PJ"

Shell

2

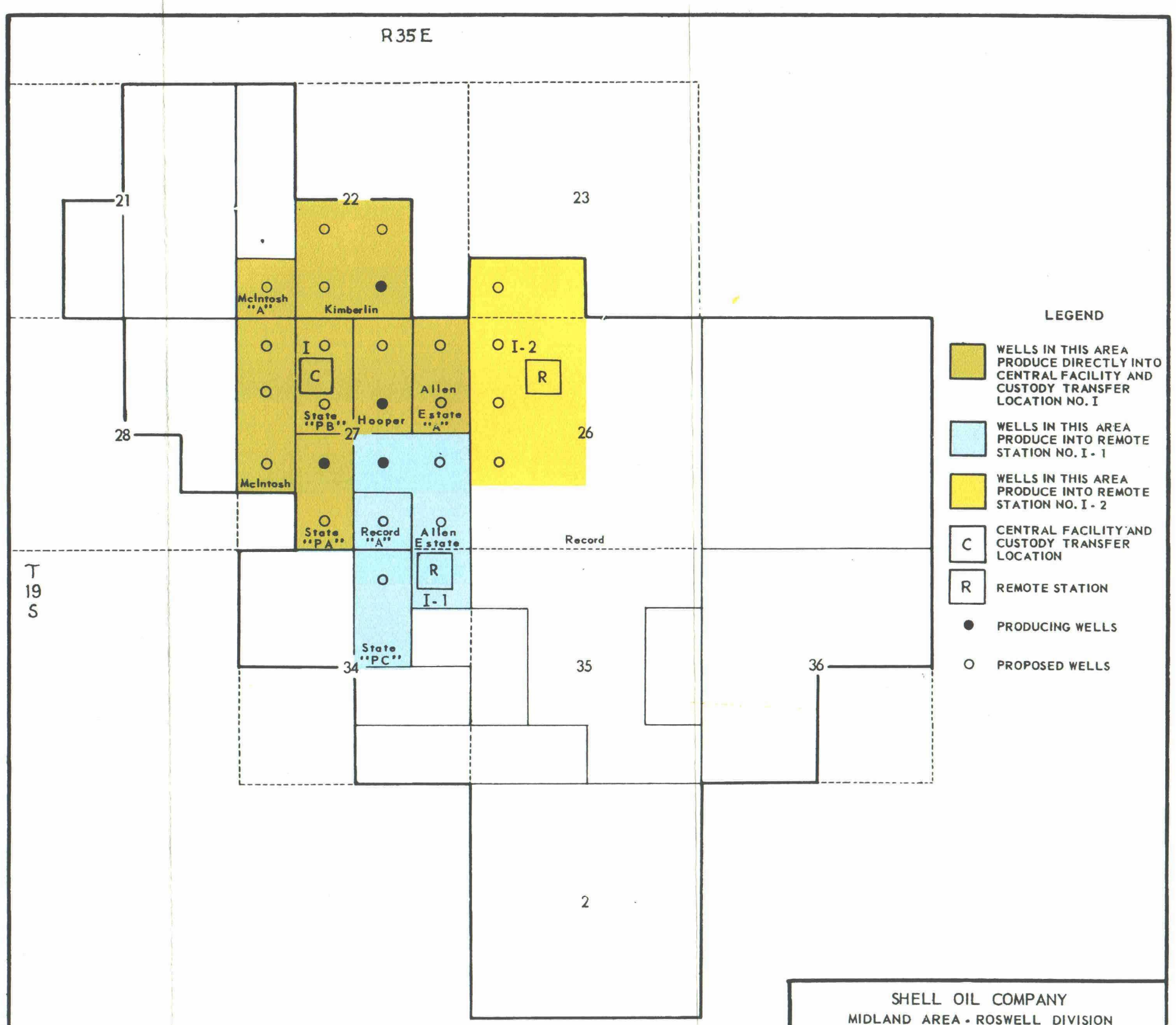
State "PH"

SHELL OIL COMPANY
MIDLAND AREA • ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD

PROPOSED LEASES INCLUDED
WITHIN EXCEPTION
LEA COUNTY, NEW MEXICO

Scale: 1"= ½ mile
Date 10/9/57
Data By G F Y - J W M
Approved R L E
Drawn By J W D

EXHIBIT I

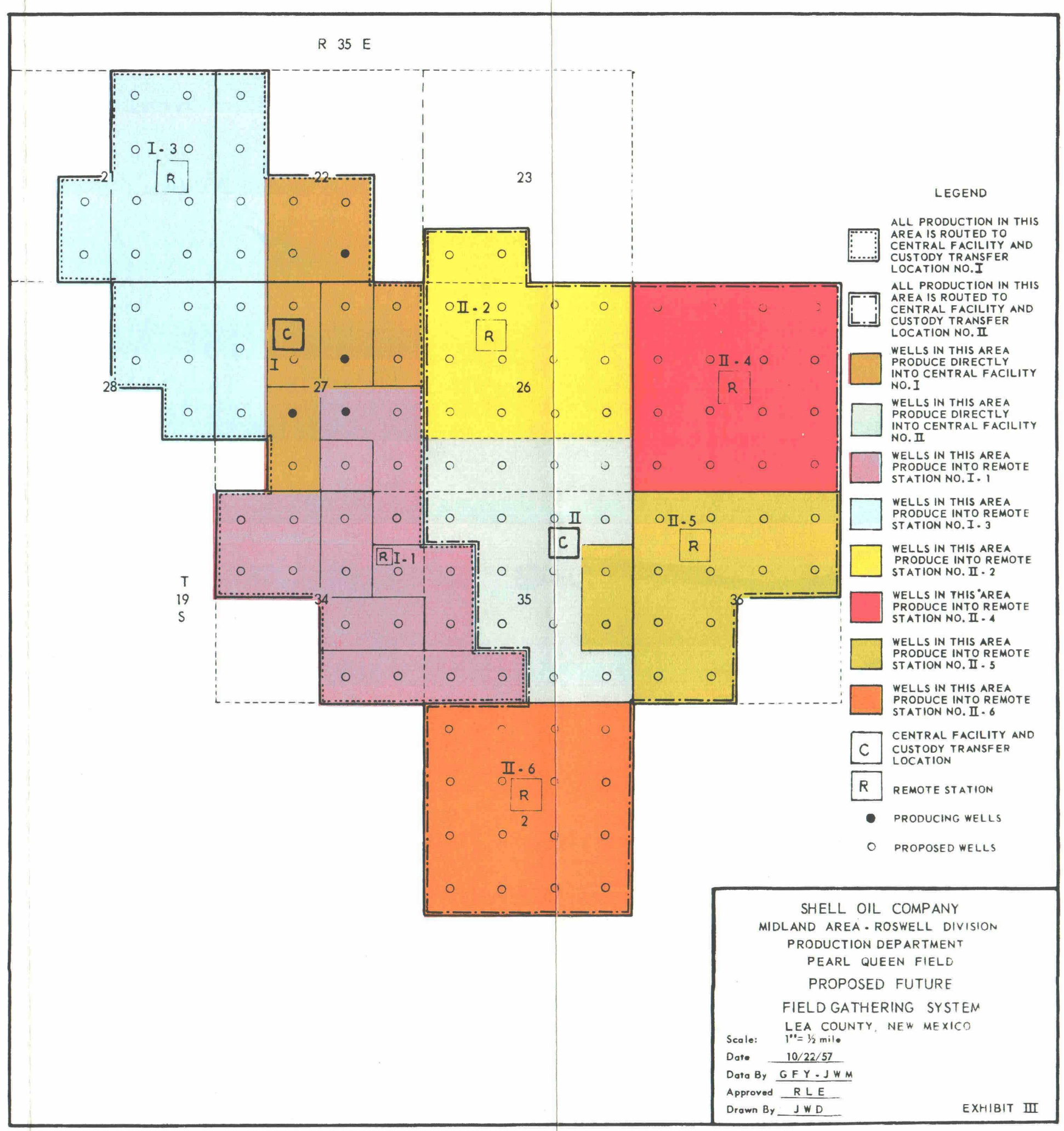


SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD
LEA COUNTY, NEW MEXICO

PROPOSED INITIAL FIELD GATHERING SYSTEM

Scale: 1" = ½ mile
Date: 10/22/57
Data By: G F Y - J W M
Approved: R L E
Drawn By: J W D

EXHIBIT II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34
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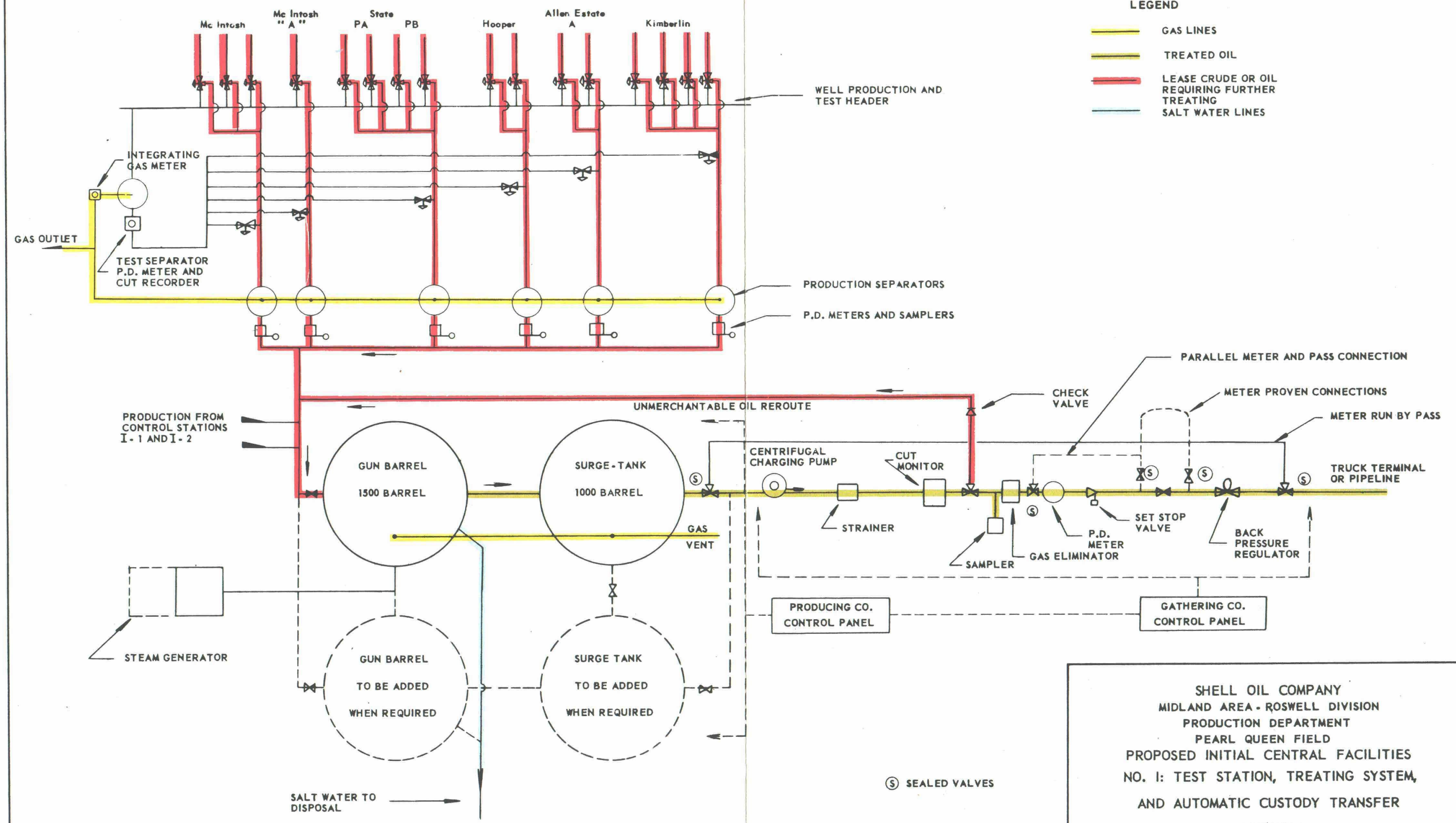
36
I-3
R
C
I
II-2
R
II-4
R
R I-1
C
II
II-5
R
II-6
R
2
LEGEND
ALL PRODUCTION IN THIS AREA IS ROUTED TO CENTRAL FACILITY AND CUSTODY TRANSFER LOCATION NO. I
ALL PRODUCTION IN THIS AREA IS ROUTED TO CENTRAL FACILITY AND CUSTODY TRANSFER LOCATION NO. II
WELLS IN THIS AREA PRODUCE DIRECTLY INTO CENTRAL FACILITY NO. I
WELLS IN THIS AREA PRODUCE DIRECTLY INTO CENTRAL FACILITY NO. II
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. I - 1
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. I - 3
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. II - 2
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. II - 4
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. II - 5
WELLS IN THIS AREA PRODUCE INTO REMOTE STATION NO. II - 6
C CENTRAL FACILITY AND CUSTODY TRANSFER LOCATION
R REMOTE STATION
PRODUCING WELLS
PROPOSED WELLS
SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD
PROPOSED FUTURE
FIELD GATHERING SYSTEM
LEA COUNTY, NEW MEXICO
Scale: 1"= ½ mile
Date 10/22/57
Data By G F Y - J W M
Approved R L E
Drawn By J W D
EXHIBIT III

WELLS PRODUCING DIRECTLY INTO CENTRAL FACILITIES



LEGEND

- GAS LINES
- TREATED OIL
- LEASE CRUDE OR OIL REQUIRING FURTHER TREATING
- SALT WATER LINES

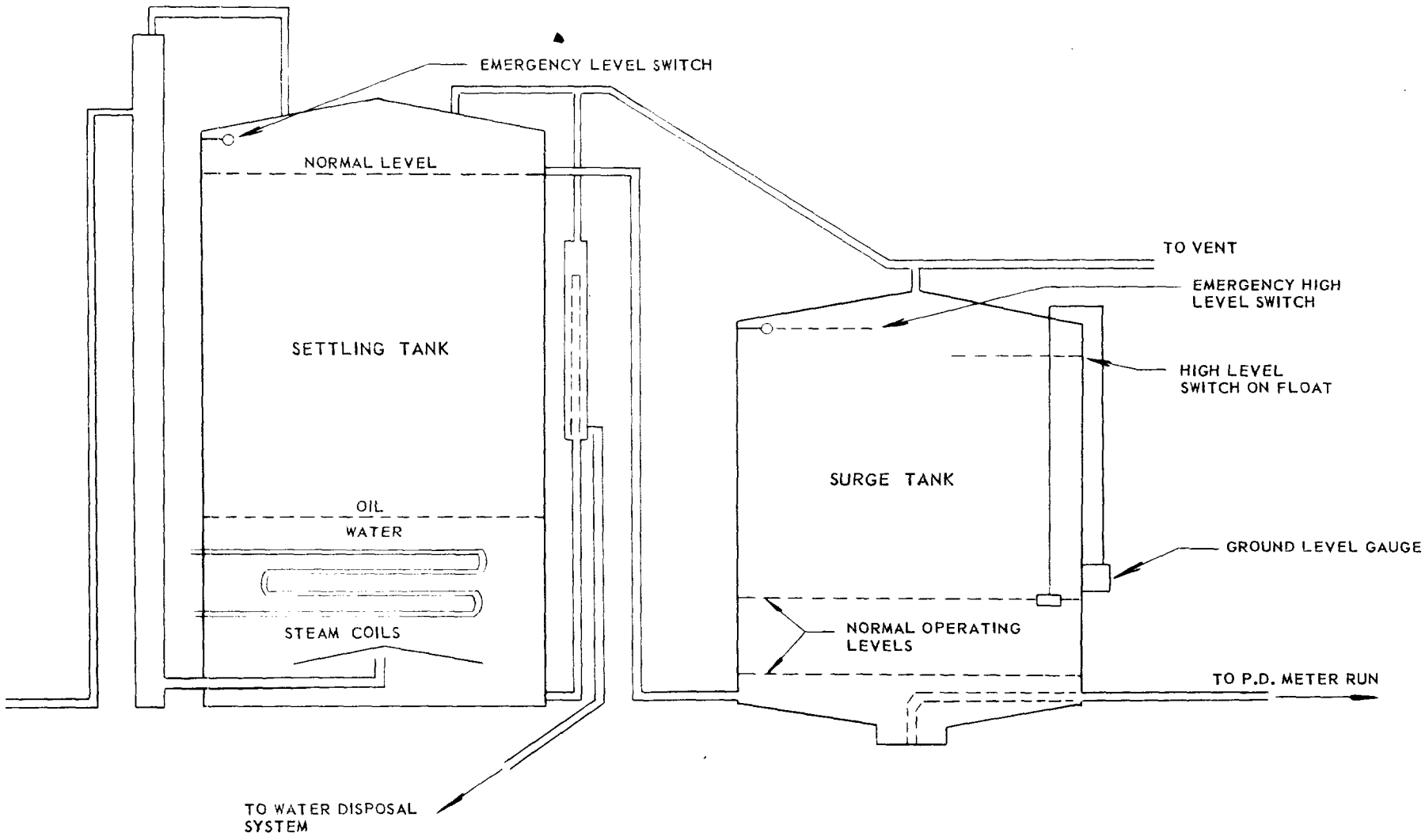
SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD

PROPOSED INITIAL CENTRAL FACILITIES
NO. 1: TEST STATION, TREATING SYSTEM,
AND AUTOMATIC CUSTODY TRANSFER
FACILITIES

LEA COUNTY, NEW MEXICO

Date 10/22/57
Data By G F Y - J W M
Approved R L E
Drawn By D V H

EXHIBIT V



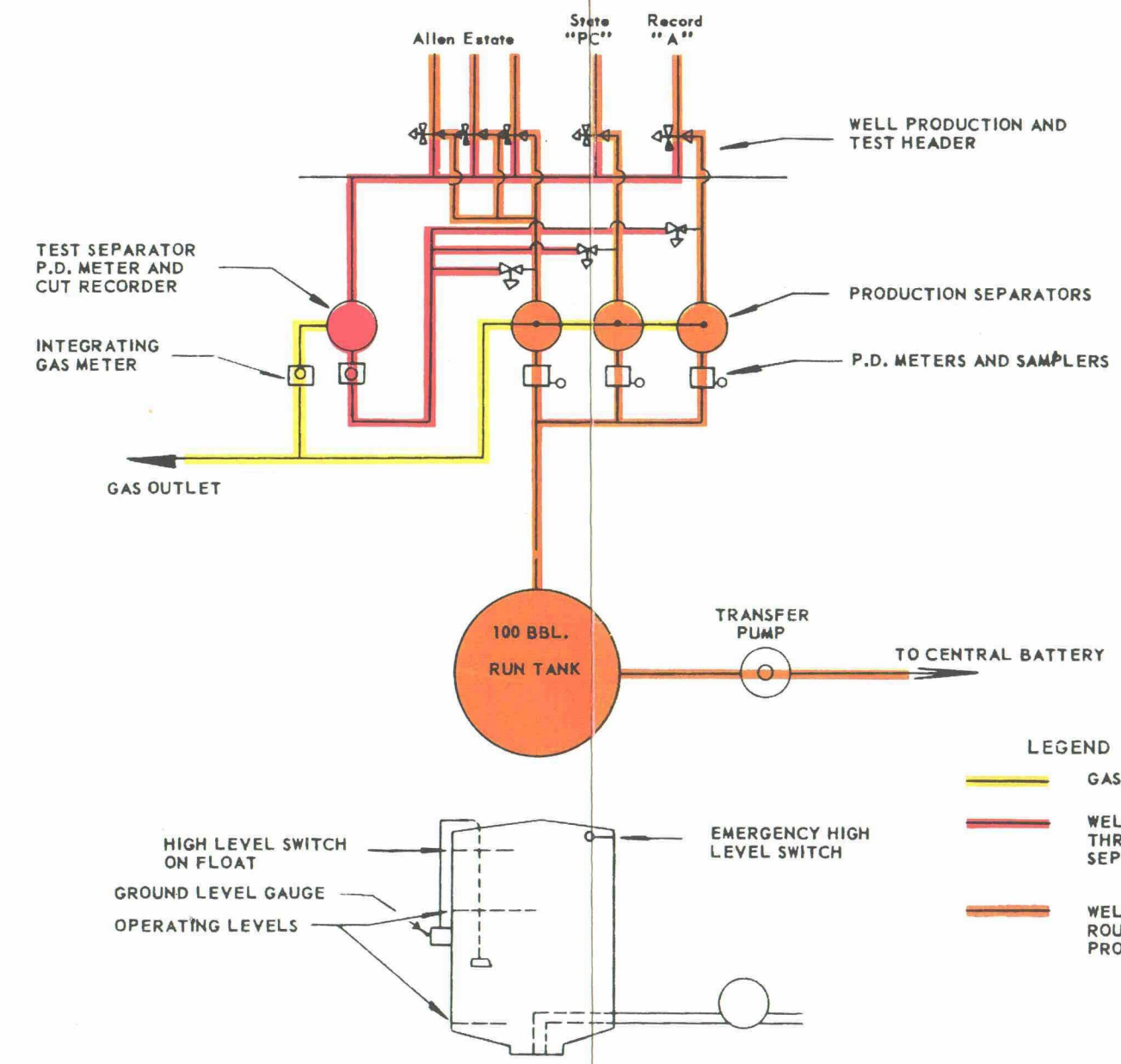
SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD

PROPOSED CENTRAL SETTLING TANK
AND SURGE TANK INSTALLATION
LEA COUNTY, NEW MEXICO

Date 10/22/57
Data By G F Y - J W M
Approved R L E
Drawen By D V H

EXHIBIT VI

WELLS PRODUCING INTO REMOTE CONTROL STATION NO. I - 1



Shell Exhibit 4
Case 1342

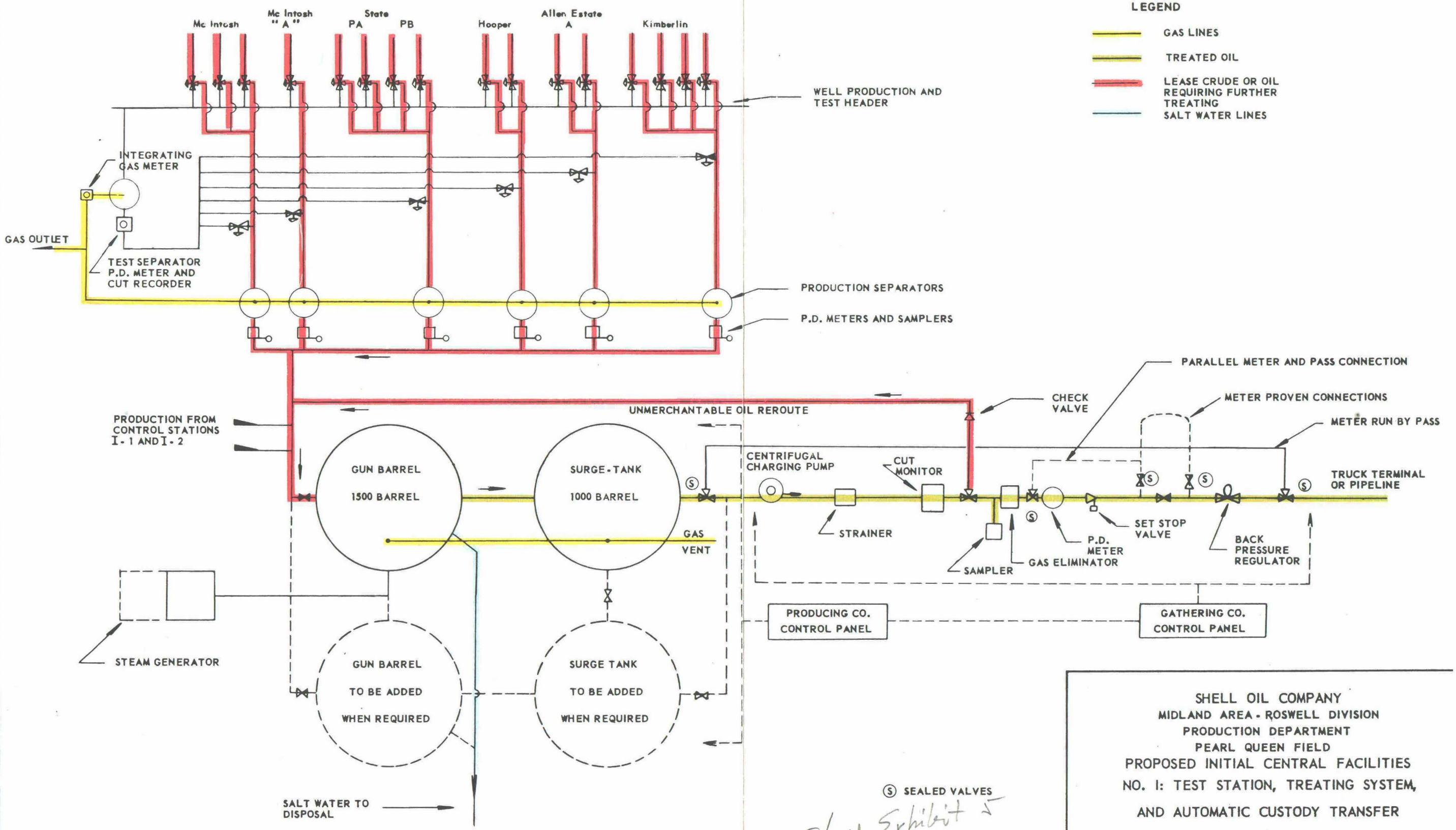
SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD
PROPOSED REMOTE
CONTROL STATION NO. I - 1
LEA COUNTY, NEW MEXICO

Date 10/22/57
Data By G F Y - J W M
Approved R L E
Drawn By D V H

EXHIBIT IV

Order R-1101

WELLS PRODUCING DIRECTLY INTO CENTRAL FACILITIES



LEGEND

- GAS LINES
- TREATED OIL
- LEASE CRUDE OR OIL REQUIRING FURTHER TREATING
- SALT WATER LINES

Shell Exhibit 5
Case 134

SHELL OIL COMPANY
MIDLAND AREA - ROSWELL DIVISION
PRODUCTION DEPARTMENT
PEARL QUEEN FIELD
PROPOSED INITIAL CENTRAL FACILITIES
NO. 1: TEST STATION, TREATING SYSTEM,
AND AUTOMATIC CUSTODY TRANSFER
FACILITIES
LEA COUNTY, NEW MEXICO

Date 10/22/57
Data By G F Y - J W M
Approved R L E
Drawn By D V H

EXHIBIT 1

Order R-1101