Production Cost Control -- A People Problem

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INTRODUCTION

The cost-control procedures to be discussed were developed in the Western Division of Standard Oil Company of Texas, which is a subsidiary of Standard Oil Company of California. The Western Division operates approximately 2500 wells, located in the Permian Basin of West Texas and southeast New Mexico. Production ranges from 1300 ft pumping to 16,000 ft, flowing oil and gas. Operated oil and gas equivalent production was 132,000 BOPD in 1969 and will be approximately 145,000 BOPD in 1970.

In early 1961 the cost-control system now used in the Western Division of Sotex was visualized. It could not be implemented, however, because the records necessary for control were not available. In 1963-64 this system was developed and sold to operating people with the result that the steady 10 per cent per year increase in field controllable costs was arrested. There has been no decrease in production as a result of the program. On the contrary, the Division's production has increased considerably each year without a corresponding increase in cost. With optimum producing expense as its eventual objective, the program's ultimate goal is maximum profits at all times. Success is attributable to direct and active support by Division and District management.

The system identifies areas of abnormal cost by comparing actual costs with forecast goals based on guiding standards. Comparison of actual costs vs. guides identifies the particular fields in which costs are above the forecast, tells why, and does so in time to allow corrective action.

RESULTS

For quite some time, the Western Division's field controllable costs had increased 9 to 10 per cent each year, or approximately $500,000 per year. There had been a corresponding increase in production and, for this reason, the cost increase was not questioned.

1964 was the first year in which this production cost-control system was really used to forecast and control producing expenses. In that year, the rate of increased cost was broken; and in 1965 the trend was reduced further. Figures 1-4 portray the results of the Western Division cost-control efforts. Reference to Fig. 1 will show that, if the cost trend had continued through 1969, field controllable costs would possibly have been $2,000,000 more than actual in 1969. Results such as this show what can be done by people who have open minds and the desire to improve their costs.

PHILOSOPHY

Before proceeding to discuss the development of this cost-control program, it is believed a short discussion of the philosophy of cost control is advisable. No system of cost control will dispense control like a vending machine. Control is provided by management; and how well management supports the system depends upon how well they subscribe to the philosophy behind it. Effective production cost control lies in the hands of two key supervisors—the division and the district superintendent. Direct and active support by these men will underwrite the success of even a poor program; and conversely, their indifference will scuttle the world's best cost-control system. The basic considerations and concept of what a cost-control system should include follow.

Motivation of People—Primary Requirement

When the words "production cost control" are spoken, people usually associate them with control of operational problems. For example, is the proper producing equipment being used? Does corrosion exist? Is there an abrasion problem? Have consolidation and LACT been utilized to reduce labor? These are specific problems which must be solved to reduce cost; but they do not constitute the company, the corporation, perhaps the industry problem in regard to production cost control. The real problem is the individual men involved. Production cost is per-

sonal to specific individuals. The production cost of a given field is the personal business of the production foreman; of a district, it is the personal business of the district superintendent; and when these costs are criticized by higher headquarters, operating people rebel. This is a normal human reaction, but it is the reason why control and reduction of producing cost are extremely difficult.

To make real progress in cost control, the attitude of people must be completely reversed, i.e., from rebellion—even contempt—to support and enthusiasm. Simply stated, the objective is to sell people on the idea that they can do something about their costs.

Normally, good people—once they know the problem—and believe a solution possible—will not sit still until it is corrected. Everyone wants to achieve; the system merely shows the way and people provide the action.

Control Should Be Continuous, Not Spasmodic—In Good Times As Well As Bad

The status of cost control in the oil industry has improved during the past few years only because of depressed profits. This industry reacts to economic barometers as do other large business organizations. Tight control of expenditures is maintained in periods of low profits, and relaxed control resulting in increased unessential expenditures in periods of prosperity. This should not be. The objective should be maximum profit regardless of a "feast or famine" situation.

Controls Should Have Optimum Goals

Companies should never be complacent because operations have yielded a succession of ever-more profitable years. That last year's profit exceeded the year before is no criterion of efficient operation or sound management, no matter how appealing it may be to stockholders. Any organization, no matter how successful, should inquire of itself: "How close did last year's profit come to what it should have been?"

Control Requires A Planned Cost-Accounting System

Control of costs can give the answer to "What should profit be?" In a large business, or even a small business, accounting cost control is the only sure way to control cost; and this is dependent upon action by management. Cost accounting, which is far different from simply "accounting", is needed. Indeed, it may be said that too often the business whose costs are high is one which demanded too little of its accounting system during prosperous times.

Review Costs Frequently

Review of costs must be frequent to give timely information and allow action before those costs become history. Prompt action to influence cost is easy when it is known where and why costs are high.

DEVELOPMENT

In 1960-1961, efforts toward the present cost-control system were initiated. Tabulations such as those in Table 1 were made in an effort to determine what should be done. Note the large variation in total pulling cost for what is similar-type production. Under secondary recovery at 2000-4500 ft, the McFarland 37 lease was operated at $252/well/month vs. the Keystone-Colby at only $41/well/month. These two fields have similar characteristics. Costs should have been similar, but they were not. Other such instances were found. These differentials in costs planted the thought that the only time costs for similar production will be similar is when all problems have been solved. In other words, if a norm were established for production with all problems solved, then when actual costs differed from the norm a problem must exist. From this reasoning, the basic decision was made to control costs and find areas of high cost by comparing actual figures with "what costs should be". The intent is to forecast producing expense with reason. Just because $100,000 was spent in a given field one year, it does not follow that it must be spent the next year. The philosophy that present expense is necessary must be discarded.

To implement this, certain steps are required.

Costs To Be Controlled

It is first necessary to determine the costs to be controlled and the format of breakdown to accomplish control. Control of normal and remedial well-stimulation costs is desired. Inasmuch as remedial well-stimulation expenses may be increased or decreased easily, no system of control is believed necessary, except to forecast and monitor such expense separately. Cost of normal operation, on the other hand, is quite

difficult to control. Because it is too large and involved to comprehend readily, it must be broken down into small understandable costs which can be dealt with individually. The four primary cost breakdowns of normal operations used in this system, along with breakdown needed to control that cost, are given in Table 2.

Establishment of Cost-Accounting System

A cost-accounting statement utilizing the cost breakdown in Table 2 must be established. Much coordination with accounting and production personnel resulted in the evolution of an operating statement such as that shown in Table 3. The purpose of this table is to show that the accounts on the statement as late as 1960-1962 were not descriptive of producing operations and could not be analyzed. Table 4 presents the format of the 1965 operating cost statement.

The importance of deciding what is desired from an accounting system before its format is determined cannot be overemphasized. Operating people must determine the cost-accounting statement's ultimate use, and operating people must be involved in its preparation. Cost accounting is essential to effective cost control as it monitors progress.

Determination of Cost Guides

Table 5 gives the guiding standards developed for this system. The basis for the guides of cost per well per month was chosen, because it is believed to be the easiest to understand at all levels. At the very outset, it is stressed that if the use of guiding standards is to be effective, operating people must subscribe to them and to the belief that operating costs for similar production should be similar.

Surface Operating.—Take, for example, a pumper-gauger in Texas, New Mexico or California. He is similar physically; he drives a Ford or Chevrolet pickup; he works at about the same speed; he handles comparable equipment; he should perform the same amount of work in Texas or in California. On this basis, then, surface operating costs should be the same for similar production, assuming no difference in wage scales. Further, it is believed the large majority of pumpers do the type job which should be done; and for surface operating, a good guiding standard would be a purely statistical average of actual experience. This is the case. Note Tables 6 and 7.

Surface Maintenance. — Surface maintenance costs are a reflection of surface facilities. It is believed that similar equipment is used nationwide and for similar facilities, maintenance costs should not differ. Once again, it would appear that the large majority of foremen do maintenance which should be done and that the surface maintenance guide should also be a purely statistical average of experience. This is the case. Note Tables 6 and 7.

Subsurface (Well Pulling). — Subsurface costs are influenced by equipment and hole conditions. Equipment may be eliminated as a cost function because it must be assumed that proper design has been accomplished. This in turn dictates that fields of similar production may not have the same manufacturer's equipment but the specifications will be the same and the same performance expected. Thus, from an equipment viewpoint, subsurface costs should be comparable.

Hole conditions in similar production are not the same. To handle this situation it is necessary to remember that costs for comparable production should be the same only when all problems have been solved. This indicates that money must be included in the guide to cause hole conditions to become similar, hence the category for Chemicals under Subsurface Costs.

Unlike surface operating and surface maintenance, Subsurface Guides are not based entirely on experience. The basis for cost is frequency of occurrence. For example, it is believed that rod parts should occur not more than twice a year, that a pump should run an average of 9 months before repair, that tubing leaks should occur only once every two years, and from experience, an effective chemical treatment can be obtained for between $5.00 and $9.00 per well per month. Experience assisted in determining the frequency of occurrence but the guide is the cost to handle what is considered normal pulling frequency. This cost must naturally increase with depth and a different frequency was determined for primary and secondary production. Study of Table 8 will reveal the procedure used to obtain subsurface guides.

Other Costs.—In all cases, other costs are actual costs. Table 2 gives costs included in this category. Such costs can only be changed by major alterations of plant; for example, from gas to electric power or vice versa. Other costs

have been found to be what costs should be in almost every field studied; and in most cases, very little can be done about them. No guides for other costs have been established.

Forecast of Normal Operations

The year's expected normal operations are forecast for each field. An example is given using the Keystone-Colby Sand Field waterflood, which is producing from a depth of 3200 ft. Referring to the cost guides, Table 5, it is seen that this field falls in the category for floods in the 2000 to 4500 ft depth range. There are 49 pumping and 45 injection wells.

From Table 5, the guides are:

	Cost/Well/Month
Surface operating	$45.00
Surface maintenance	45.00
Subsurface	54.00

Then cost per month is calculated:

Surface operating	
=$45 X 94 wells*	= $4,230
Surface maintenance	
=$45 X 94 wells*	= $4,230
Subsurface	
=$54 X 49 wells	= $2,646
Fixed cost (past experience)	= $4,330
Total Normal Cost per Month	= $15,436
Year's Normal Guide	
=$15,436 X 12	=$185,000
1965 Actual Cost	=$174,000
1968 Actual Cost	=$180,000

*Surface guides based on both producing and injection wells.

Each field's normal operations, based on the guides, is calculated as in the foregoing example. From the sum of all fields in a given district, that district's normal goal is obtained together with what should be spent on surface operating, surface maintenance, and subsurface. Table 9 is an excerpt from the 1965 forecast for the Snyder District.

At this point, the reader is probably wondering how the guides compare with actual costs. Table 10 shows mid-1964 actual costs vs. forecast guides.

Administration

Control.—The district or division cost-control report consists of only two sets of curves as given in Figs. 5 and 6. Brief review of these curves will show that when objectives are not being met the reason is very obvious. 1968 curves are shown in Fig. 7.

It should be noted that, to control producing expense, the first subdivision is between normal and remedial well-stimulation expenses. Usually, when an increase in producing expense is shown during the first half, management wonders "Is this caused by remedial well stimulation or normal?" If these are forecast separately, the answer is obvious.

Analysis.—Normally, only actual total normal operations are compared to forecast normal guides—this saves time. However, when a field is noted where actual is much higher than the guide, a further breakdown is needed to determine why costs are high. Three of the fields presented in Table 11 have costs very close to the guides; no action is necessary. The North Ward-Estes Field, however, has an actual cost of $13,000 per month and it should be $8,000. A 40-per cent cut is indicated as desirable. Now review of the primary costs is needed. Note that all except other costs are much too high. An analysis of each category is necessary to determine what is wrong.

Under surface maintenance, repairs to waterflood pumps and surface lines was the problem. With respect to surface operating, it appears there was 50 per cent too much operating labor. This was borne out by investigation and has been corrected. As to subsurface costs, excessive pump repair caused by an expensive but ineffectual inhibitor program was responsible. The inhibitor was changed, with good results. It will be shown later that this field's objective, shown to be possible in 1964, was met in 1968.

Table 12 gives another example of how to determine the source of excessive cost when it is not readily apparent. It is evident that a pump problem exists. As can be seen, subsurface costs 1960-1963 averaged $150.61/well/month vs. the guide of $60.00/well/month. In 1965, subsurface costs were $86.89/well/month. It may further be seen that the specific problem was overcome as pump repairs went from $45.97 to $19.92 in 1965, and pulling unit costs from $92.51 to $42.30/well/month. This was done through an

effective inhibitor program at a cost of $15.22/well/month. A 42-per cent reduction in subsurface costs was made. It is this type of change which management must believe possible for a program such as this to be really effective.

REMARKS

Initiation of this program in late 1963 was met with both enthusiasm and doubt. Acceptance was slow. Existing expenses were necessary. With time, however, it was seen that certain costs were not essential and acceptance gradually increased. After five years of operation there have been no changes in procedures but progress has been made. For example, a corporate wide format for the operating statement is now in effect whereas previously each company had their own format. Now similar costs between companies can be compared. Forecast objectives for each field are now printed monthly beside the actual cumulative cost to date. Note Table 13. Of great importance is the fact that people have seen that the seemingly impossible reductions, requested in 1964, are possible; they have been done. Please note Table 14, North Ward-Estes (Yates) where costs have been reduced approximately 40 per cent. Within the Western Division, people have seen that costs way out of line can be corrected —but what about others?

A typical reaction of others was noted when this system was presented to the Northern Division of Standard of Texas. People will readily accept the philosophy of the system and its mechanics, but they are very reluctant to relinquish the belief that their costs are not different. They want to develop their own guides. This was done and Table 15 shows a comparison of guides developed by both Divisions. There is little difference.

By making their own guides greater acceptance of the system was obtained because, from their own data, they could see the validity of the guides already established. From this experience, it is quite obvious that if this type program is to ever be expanded, the data base for the guides must be extremely broad, that is, corporate wide. Corporate guides would use data so broad that their validity should not be questioned. This is the next step. To realize the full potential of this approach, corporate support is needed.

RECENT DEVELOPMENTS

In 1970 a print-out by machine as seen in Table 16 will be obtained for each field in the Division. Brief review of this print-out will quickly show management where effort should be expended to achieve the greatest results. It will also be noted that there are no guides for the items under "Other Costs". It is hoped that with 1970 and subsequent data, some relationship between type of production and other costs may be determined.

Further, for 1970 the Cost Guides for surface operating and surface maintenance have been combined into one cost, simply Surface Costs. Combined 1970 guiding standards are shown in Table 17.

SUMMARY

Through the application of cost-control procedures presented, it is now possible to:

1. Compare actual costs to what they should be—not to the past.
2. Create an atmosphere which will cause people to believe costs can be improved.
3. Allow people to set and to monitor their own progress.
4. Have a continuous rather than a spasmodic cost-control program.
5. Recognize efficiency when it is seen and, conversely, its lack.
6. Create a bit of enthusiasm for cost reduction.

There are many reasons why costs are being improved within the Standard Oil Company of Texas. The primary one, however, is that operating management and staffs from division level to foreman were and are receptive to the action. The big problem is in convincing people that operating costs not only can be reduced; but that, in many instances, large-scale reductions are possible. There is no doubt that costs can be improved. The key to doing so, however, lies in the attitude of superintendents, staffs, and foremen.

In brief, successful cost control is nothing more than causing people to try. Remember, people not procedures, reduce cost.

SOTEX - WESTERN DIVISION

FIELD CONTROLLABLE COST PER YEAR
(INCLUDES RR, WS, MEJ - EXCLUDES DIV. EXP. & SDP)

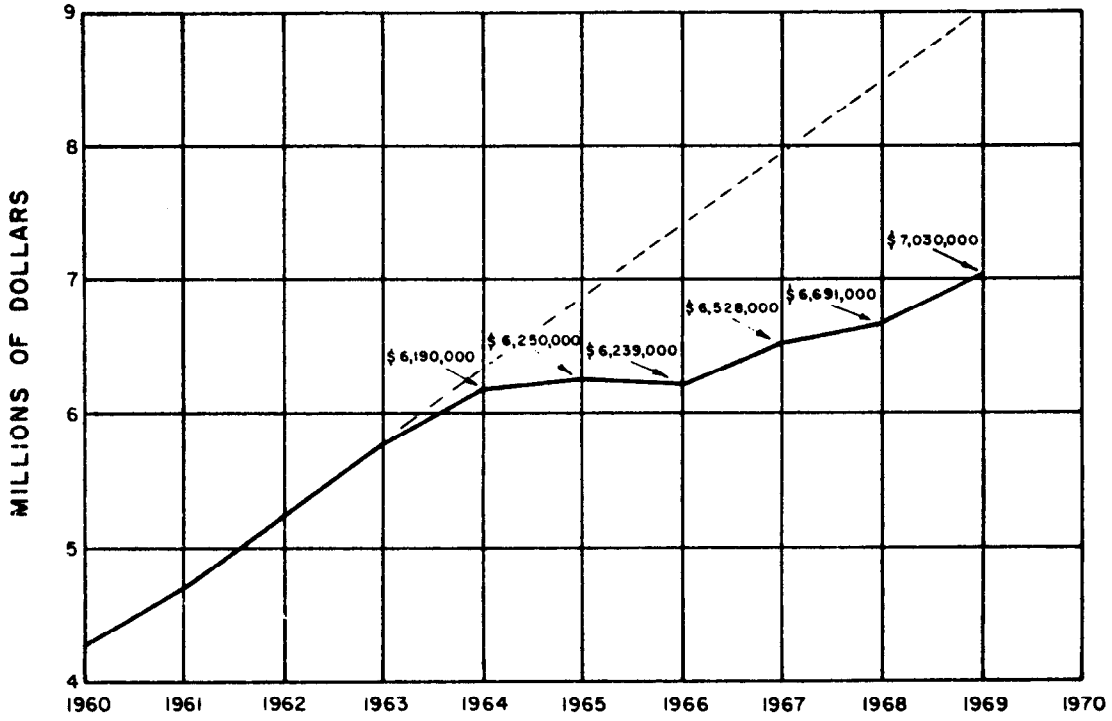

FIGURE 1

OIL & GAS PRODUCTION IN EQUIVALENT BARRELS - BOPD (OPERATED)

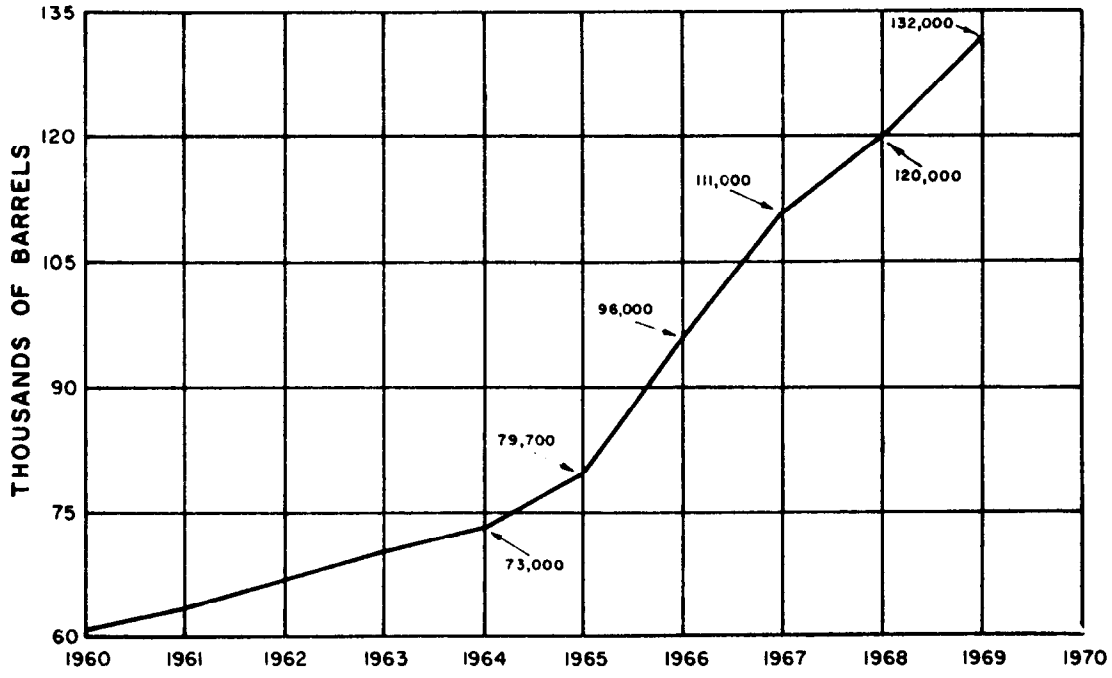

FIGURE 2

SOTEX

WESTERN DIVISION

NORMAL OPERATIONS

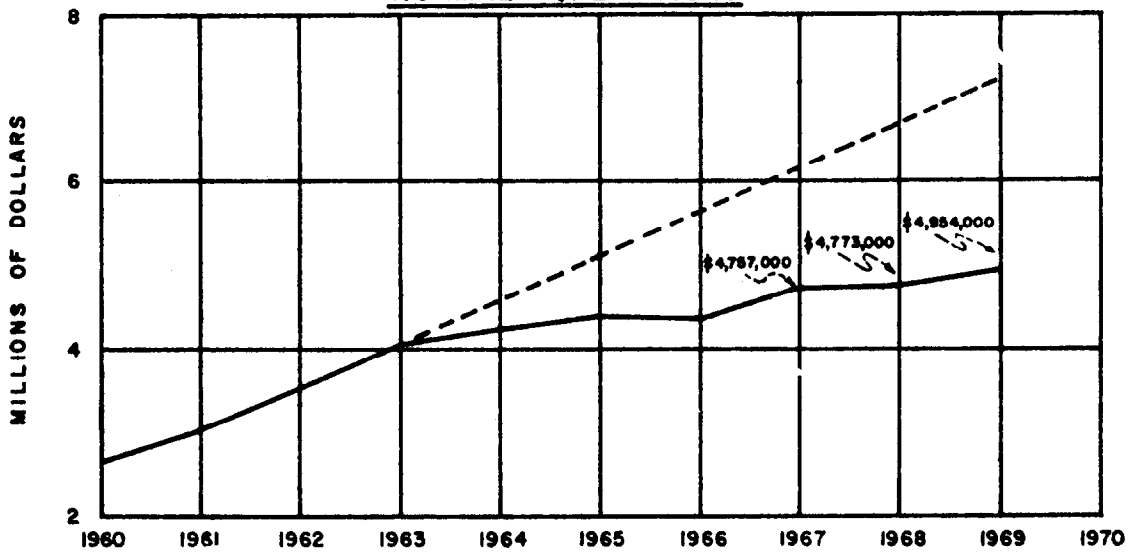

FIGURE 3

PRODUCTION COST

$$(\text{COST / BBL} = \frac{\text{TOTAL FIELD CONTROLLABLE (FIG. 1)}}{\text{TOTAL OPERATED PRODUCTION (FIG. 2)}}$$

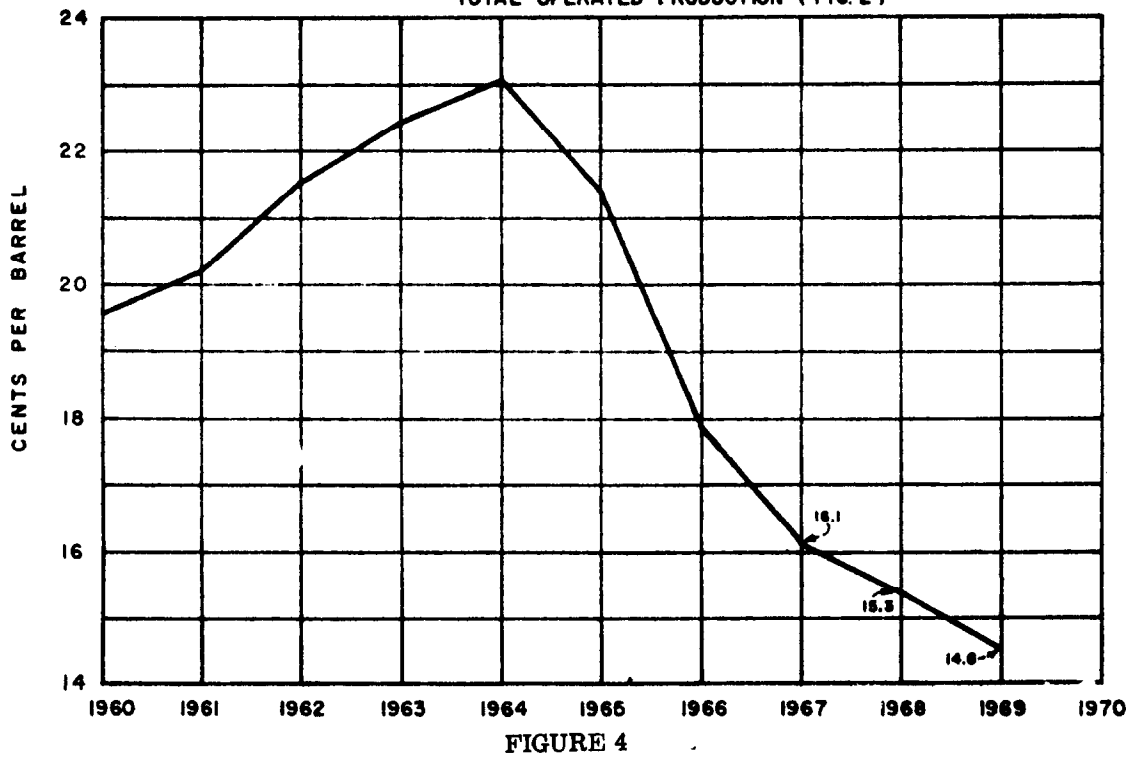

FIGURE 4

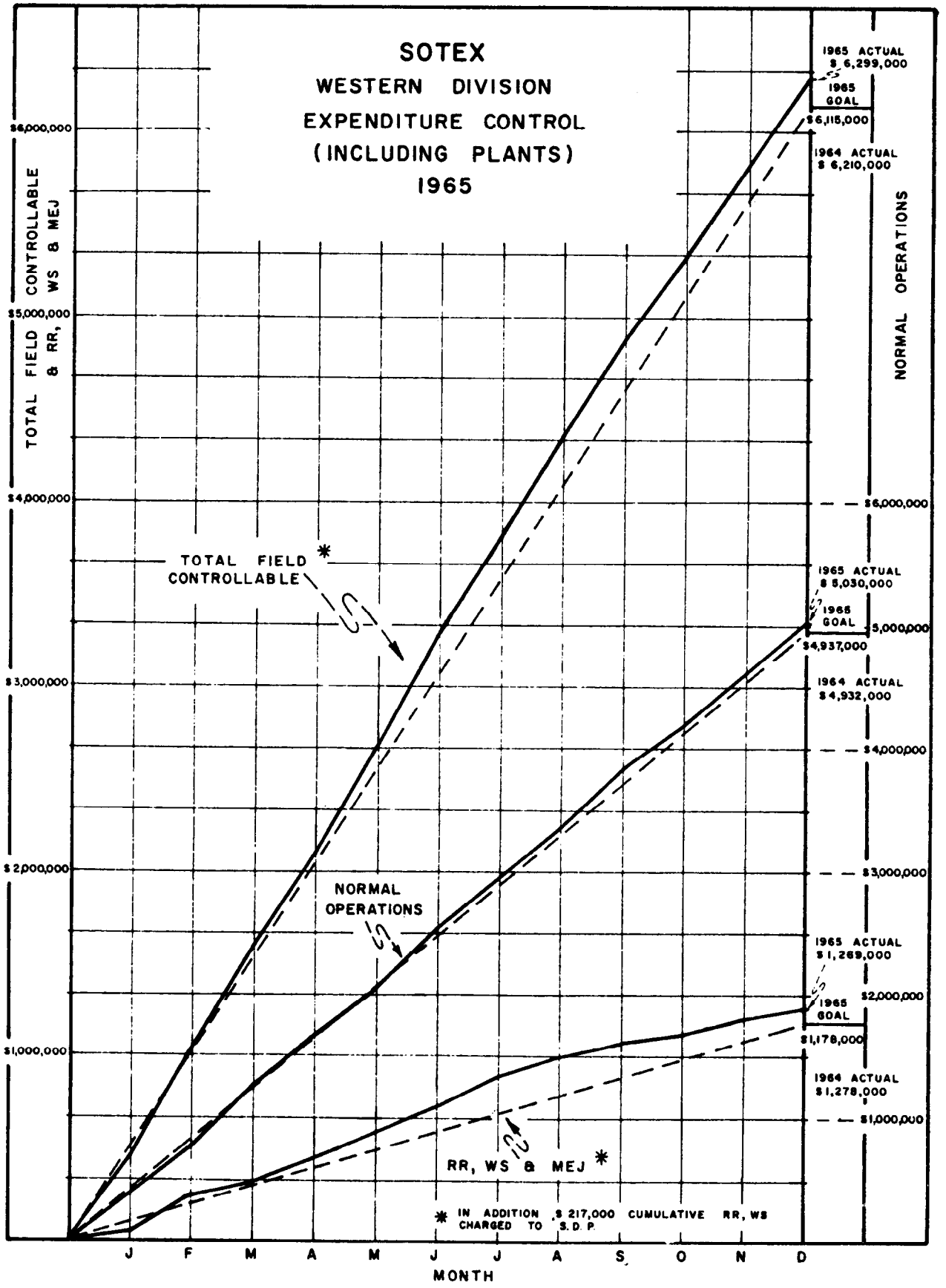
SOTEX
WESTERN DIVISION
EXPENDITURE CONTROL
(INCLUDING PLANTS)
1965
TOTAL FIELD CONTROLLABLE & RR, WS & MEJ
NORMAL OPERATIONS
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
1965 ACTUAL $ 6,299,000
1965 GOAL $6,118,000
1964 ACTUAL $ 6,210,000
$6,000,000
1965 ACTUAL $ 5,030,000
1965 GOAL $4,937,000
$5,000,000
1964 ACTUAL $4,932,000
$4,000,000
$3,000,000
1965 ACTUAL $1,269,000
1965 GOAL $1,178,000
$2,000,000
1964 ACTUAL $1,278,000
$1,000,000
TOTAL FIELD CONTROLLABLE *
NORMAL OPERATIONS
RR, WS & MEJ *
* IN ADDITION $ 217,000 CUMULATIVE RR, WS CHARGED TO S.D.P.
J F M A M J J A S O N D
MONTH

FIGURE 5

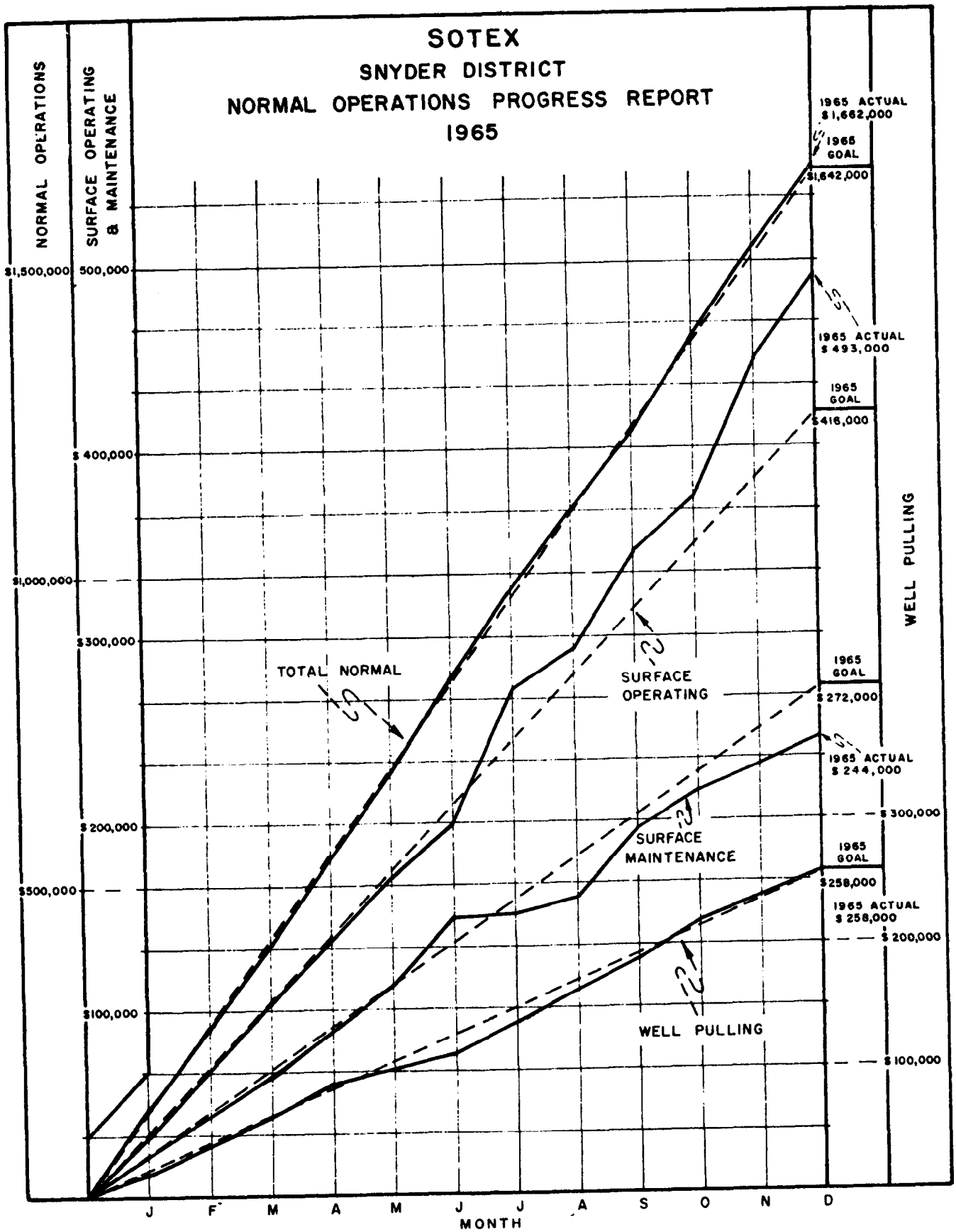
SOTEX
SNYDER DISTRICT
NORMAL OPERATIONS PROGRESS REPORT
1965
NORMAL OPERATIONS
SURFACE OPERATING & MAINTENANCE
WELL PULLING
$1,500,000
500,000
$ 400,000
$1,000,000
$300,000
$ 200,000
$500,000
$100,000
TOTAL NORMAL
SURFACE OPERATING
SURFACE MAINTENANCE
WELL PULLING
1965 ACTUAL $1,662,000
1965 GOAL $1,642,000
1965 ACTUAL $ 493,000
1965 GOAL $416,000
1965 GOAL $272,000
1965 ACTUAL $ 244,000
$ 300,000
1965 GOAL $258,000
1965 ACTUAL $ 258,000
$ 200,000
$ 100,000
J F M A M J J A S O N D
MONTH

FIGURE 6

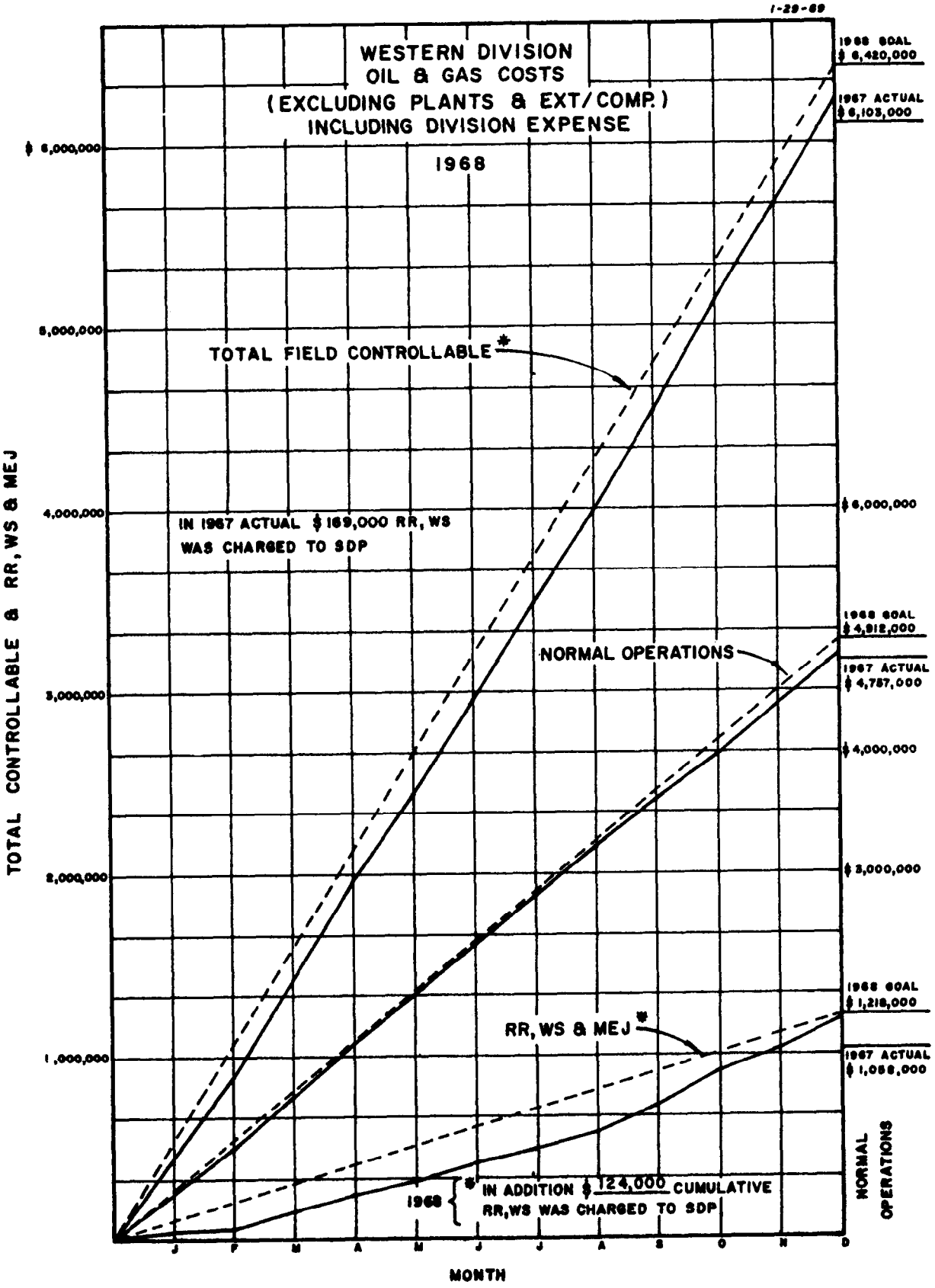
1-28-69
WESTERN DIVISION
OIL & GAS COSTS
(EXCLUDING PLANTS & EXT/COMP.)
INCLUDING DIVISION EXPENSE
1968
TOTAL CONTROLLABLE & RR, WS & MEJ
$ 6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
TOTAL FIELD CONTROLLABLE *
IN 1967 ACTUAL $ 169,000 RR, WS
WAS CHARGED TO SDP
NORMAL OPERATIONS
RR, WS & MEJ *
1968 GOAL $ 6,420,000
1967 ACTUAL $ 6,103,000
$ 6,000,000
1968 GOAL $ 4,812,000
1967 ACTUAL $ 4,787,000
$ 4,000,000
$ 2,000,000
1968 GOAL $ 1,218,000
1967 ACTUAL $ 1,058,000
NORMAL OPERATIONS
1968 * IN ADDITION $ 124,000 CUMULATIVE
RR, WS WAS CHARGED TO SDP
J F M A M J J A S O N D
MONTH

FIGURE 7

ANALYSIS OF SUB-SURFACE COSTS

WESTERN DIVISION

Grouping of Fields With Similar Operating Conditions		Pulling Unit	Pump Repair	Tbg & Rod Replace	Chemical	Total Sub-Surface
Secondary Recovery						
Under 2000'						
Toborg	500'	$16.20	$ 4.80	$ 5.60	$ 0	$ 26.60
Yates (Smith)	1100'	44.80	16.50	3.90	0	65.20
Weighted Average	800'	30.50	10.60	4.75	0	45.90
2000' to 4500'						
World	2500'	32.50	15.40	32.70	17.40	98.00
Durgin Lease	2500'	50.40	12.60	5.20	10.00	78.20
York Lease	2500'	33.30	9.10	4.62	16.00	67.70
Lucy Adams Lease	2500'	49.10	15.40	47.50	0	112.00
McFarland 37 Lease	2500'	97.40	21.20	111.20	22.20	252.00
Howard-Glasscock (CF)	3000'	41.30	16.50	4.50	16.60	109.80
Keystone-Colby	3200'	25.46	2.73	5.20	7.66	41.05
Weighted Average	2774'	41.26	10.23	22.23	10.30	81.03
4500' to 6500'						
Kelly-Snyder (Cisco)	6200'	68.50	37.73	1.40	14.16	121.80
Primary Recovery						
Under 2000'						
Howard-Glasscock (Yates)	1300'	$ 4.62	$ 4.13	$ 0.49	$ 0.65	$ 9.90
Atoka Pool	1700'	29.58	22.30	11.87	18.50	82.30
Howard-Glasscock (Queen)	1800'	21.61	8.94	0.87	0	31.25
Weighted Average	1680'	23.60	15.42	6.86	9.95	55.63
2000' to 3500'						
Howard-Glasscock (San Andres)	2300'	10.39	12.51	0	8.10	31.00
North Cowden Deep	2500'	3.10	5.00	6.50	0	14.60
Howard-Glasscock (B & O'B)	2700'	1.50	3.66	0	9.50	14.70
Iatan E. Howard	2700'	5.70	4.16	0.07	0	9.94
Kermit Grayburg	3000'	8.20	12.40	2.00	0	22.60
T. E. Bar	3000'	8.00	9.10	6.10	0	23.20
Westbrook	3200'	7.25	3.46	3.87	4.74	19.40
Weighted Average	2918'	6.41	4.24	2.11	2.61	15.41
3500' to 4500'						
North Square Lake	3600'	37.72	10.44	0	9.36	57.60
Wheat	4200'	32.00	31.00	4.40	0	67.40
Vacuum	4200'	22.33	3.05	0	0	25.39
Fuhrman-Mascho	4200'	11.50	21.43	22.30	24.30	79.56
Eumont	4200'	13.82	18.32	8.50	0	40.65
Hobbs	4200'	3.00	5.40	10.90		19.30
West O'Brien	4400'	26.00	16.50	0	0	42.50
Verde Gallup	4500'	57.81	14.05	1.19	9.13	82.20
Weighted Average	4230'	25.29	18.33	9.90	11.05	64.60
4500' to 7500'						
Fuhrman-Glorieta	5200'	6.66	11.00	0	0	17.66
Kermit Clearfork	5200'	18.45	10.00	1.10	0	29.55
Bisti L. Gallup	5600'	83.46	26.85	0.31	10.00	120.78
Escrito Gallup	5600'	57.75	22.94	0	0	80.70
Hulldale	5400'	20.38	12.30	5.40	0	38.08
Tucker	6000'	32.90	6.40	0	0	39.30
Rehm (Granite Wash)	6200'	77.00	6.00	1.00	0	84.00
Neva West (Canyon)	6200'	136.00	40.30	19.20	0	196.00
Kelly-Snyder (Canyon)	7000'	13.08	7.54	0.10	0	20.73
North Snyder (Strawn)	7500'	28.38	9.60	0.85	0	38.80
Weighted Average	5215'	52.09	15.78	1.21	3.01	72.09
7500' to 9000'						
Smith Spraberry	9000'	132.00	37.00	2.00	0	171.00
Over-all weighted	3527'	30.00	13.25	8.45	7.30	59.00

TABLE 1

OPERATING COST BREAKDOWN

SURFACE MAINTENANCE

Field	Labor	Equipt. Usage		Other Supplies	Repairs Surface Material	Total
		Mtr.	Other			

SURFACE OPERATING

Field	Labor	Equipt. Usage		Other Supplies	Oil Treat Chemicals	Total
		Mtr.	Other			

SUBSURFACE COSTS

Field	Pulling Unit	Pump Repairs	Tub.& Rod Replace	Inhibitors	Total

OTHER COSTS

Field	Fuel Power & Water	Ext. Plant Exp.	District Exp.	Other Field Cont.	Total

TABLE 2

STANDARD OF TEXAS
PRO-96

1960	1961	1962	1965
			10 COMPANY LABOR
	LABOR		12 CONTRACT LABOR
	OPERATING COMPANY		16 MOTOR EQUIPMENT USAGE
SUBCLASSIFICATION DESCRIP	WELL PULLING COMPANY		18 OTHER EQUIPMENT USAGE
	MAINTENANCE-COMPANY	10 COMPANY LABOR	20 CHEMICALS - SURFACE
	TOTAL COMPANY LABOR	12 CONTRACT LABOR	22 R + S - PIPE LINES
LABOR	OPERATING CONTRACT	14 WELL PULLING SERVICES	23 R + S - TANKS, SEP., HEATERS, LACT
OPERATING	WELL PULLING CONTRACT	16 MOTOR EQUIPMENT USAGE	24 R + S - PUMP UNITS AND MOVERS
WELL PULLING	MAINTENANCE CONTRACT	18 OTHER EQUIPMENT USAGE	25 R + S - PRESSURE PUMPS AND MOVERS
MAINTENANCE	TOTAL CONTRACT LABOR	20 OIL TREATING CHEMICALS	26 R + S - OTHER SURFACE
MATERIALS AND SERVICES	MATERIALS AND SERVICES	22 CORROSION OR SCALE INHIBITORS	27 FUEL - OWN USE
SUPPLIES	SUPPLIES	24 OTHER SUPPLIES	28 FUEL, POWER, AND WATER
REPAIRS	REPAIR PARTS	26 REPAIRS SURFACE	30 WELL PULLING SERVICES
POWER & WATER	POWER AND WATER	28 REPAIRS SUBSURFACE	32 CHEMICALS - SUBSURFACE
FUEL	FUEL	30 TUBING AND ROD REPLACEMENTS	34 R + S - PUMPS AND DOWN HOLE
EQUIPMENT RENTAL	WELL PULLING EQUIPMENT USAGE	32 FUEL GAS-OWN USE	35 TUBING + ROD REPLACEMENTS
MISCELLANEOUS	MOTOR EQUIPMENT USAGE	34 FUEL,POWER AND WATER	36 OTHER FIELD CONTROLLABLE
DISTRICT EXPENSE	OTHER EQUIPMENT USAGE	36 NON OPERATED JOINT VENTURES	39 SUB TOTAL
	MISCELLANEOUS-NOJV	38 DISTRICT EXPENSE	40 NON-OPERATED JOINT VENTURES
TOTAL NORMAL OPERATIONS	OTHER	40 OTHER FIELD CONTROLLABLE	42 DISPLACEMENT FLUIDS PURCHASED
	TOTAL MATERIALS AND SERVICES	49 NORMAL FIELD CONTROLLABLE	44 EXTRACTION PLANT SERVICES
REMEDIAL, REDRILL & WELL STIMULATION	DISTRICT EXPENSE-SALARIES		46 DISTRICT EXPENSE
COTTAGE EXPENSE (LESS RENTALS)	OTHER	50 MAJOR EXPENSE JOBS	49 NORMAL FIELD CONTROLLABLE
MAJOR EXPENSE JOBS—MAINTENANCE	TOTAL DISTRICT EXPENSE	52 REMEDIAL,REDRILL + WELL STIM.	
MAJOR EXPENSE JOBS—OTHER	TOTAL NORMAL OPERATIONS	54 COST OF ABANDONING	52 REMEDIAL, REDRILL, + WELL STIM.
COST OF ABANDONING	REMEDIAL, REDRILL & WELL STIMULATION	56 SUNDRY ADJUSTMENTS	54 MAJOR EXPENSE JOBS
SUNDRY ADJUSTMENTS	COTTAGE EXPENSE (LESS RENTALS)	59 TOTAL FIELD CONTROLLABLE	56 SUNDRY ADJUSTMENTS
	MAJOR EXPENSE JOBS-MAINTENANCE		59 TOTAL FIELD CONTROLLABLE
TOTAL FIELD CONTROLLABLE	MAJOR EXPENSE JOBS-OTHER	60 EXTRACTION PLANT SERVICES	
	COST OF ABANDONING	62 LEASE OBLIGATIONS	62 LEASE OBLIGATIONS
LEASE OBLIGATIONS	SUNDRY ADJUSTMENTS	64 DIVISION EXPENSE	64 DIVISION EXPENSE
DIVISION EXPENSE		66 GENERAL + ADMINISTRATIVE EXP.	66 GENERAL + ADMINISTRATIVE EXP.
ADMINISTRATIVE EXPENSE	TOTAL FIELD CONTROLLABLE	69 TOTAL PROD.COSTS EXCL.TAXES	69 TOTAL PROD. COSTS - EXCL. TAXES
PPOPERTY, SEVERANCE AND RELATED TAXES	LEASE OBLIGATIONS		
EXTRAORDINARY EXPENSES	DIVISION EXPENSE	70 PARTNERS SHARE EXCLUDING TAXES	70 PARTNERS' SHARE - EXCL. TAXES
	ADMINISTRATIVE EXPENSE	79 SOTEX PROD.COSTS EXCL.TAXES	79 SOTEX PROD. COSTS - EXCL. TAXES
TOTAL PRODUCTION COST	PRODUCTION TAXES		80 SOTEX PRODUCTION TAXES
	PROPERTY AND OTHER TAXES	80 SOTEX PRODUCTION TAXES	82 SOTEX PROPERTY + OTHER TAXES
BARRELS OF OIL PRODUCED — 100% PRODUCTIO	EXTRAORDINARY EXPENSES	82 SOTEX PROPERTY AND OTHER TAXES	89 SOTEX PROD. COSTS - INCL. TAXES
WORKING INTERE	TOTAL PRODUCTION COST	89 SOTEX PROD.COSTS INCL.TAXES	
PRODUCING WELL DAYS			-OPERATING STATISTICS-
COST PER BARREL ON WORKING INTEREST —	OIL OR GAS PRODUCED-LSE 100% BBLS C	-OPERATING STATISTICS-	91 W.I.PROD. BBLS. (GAS 20 MCF/BBL)
	-CO. 100% BBLS	91 W.I.PROD.BBLS.-GAS 20MCF/1BBL.	93 CALENDAR WELL DAYS
COST PER DAY ON WORKING INTEREST	-WORKING INT. B	93 CALENDAR WELL DAYS	
	NUMBER OF WELLS PRODUCED		-UNIT COSTS-
	PRODUCING WELL DAYS	-UNIT COSTS-	SOTEX PRODUCTION COSTS/W.I.BBL.
	AVERAGE PRODUCTION PER PROD. WELL	SOTEX PROD.COSTS/W.I.BBL. 89/91	EXCLUDING TAXES 79/91
	COST PER BBL OR MCF ON W. I. -NORM	NORM.FLD.COSTS/WELL DAY 49/93	INCLUDING TAXES 89/91
	-FIELD C	TOTAL FLD.COSTS/WELL DAY 59/93	NORMAL FIELD COSTS/WELL DAY 49/93
	-PRODU	TOTAL PROD.COSTS/WELL DAY 69/93	TOTAL FIELD COSTS/WELL DAY 59/93
	COST PER DAY ON WORKING INT-NORM		TOTAL PRODUCTION COSTS/WELL DAY 69/93
	-FIELD C		
	-PRODU		

SOTEX OIL AND GAS PRODUCTION COSTS PRO-96
IN DOLLARS

KEYSTONE COLBY FLD — DECEMBER 1965

CURRENT MONTH	CODE	COST CLASSIFICATION	YEAR TO DATE COSTS	INCR. OR DECR. (CR.) VS. PRIOR YR. TO DATE	OPERATING	MAINTENANCE
$ 2,211	10	COMPANY LABOR	$ 29,985	$ 11,835 CR	$ 28,365	$ 1,620
918	12	CONTRACT LABOR	13,274	1,312	6,884	6,390
808	16	MOTOR EQUIPMENT USAGE	11,029	1,223	8,055	2,974
223	18	OTHER EQUIPMENT USAGE	4,432	456	3,007	1,425
149	20	CHEMICALS - SURFACE	7,449	222 CR	7,299	149
336	22	R + S - PIPE LINES	3,838	4,492 CR	1,312	2,526
249	23	R + S - TANKS, SEP., HEATERS, LACT	2,858	1,116	1,609	1,248
26	24	R + S - PUMP UNITS AND MOVERS	5,409	1,177 CR	3,736	1,673
996	25	R + S - PRESSURE PUMPS AND MOVERS	7,682	658 CR	5,976	1,706
443	26	R + S - OTHER SURFACE	4,762	2,268 CR	2,770	1,993
35	27	FUEL - OWN USE	3,444	9,416 CR	3,444	
3,913	28	FUEL, POWER, AND WATER	23,559	11,187	23,559	
474	30	WELL PULLING SERVICES	11,458	7,070 CR	11,458	
	32	CHEMICALS - SUBSURFACE	4,035	1,951 CR		4,035
327	34	R + S - PUMPS AND DOWN HOLE	3,494	3,031 CR	1,805	1,688
95 CR	35	TUBING + ROD REPLACEMENTS	1,280	2,705 CR	1,062	218
43 CR	36	OTHER FIELD CONTROLLABLE	1,589 CR	203 CR	1,627 CR	38
$10,964*	39	SUB TOTAL	$136,398*	$25,833*CR	$108,714*	$27,684*
	40	NON-OPERATED JOINT VENTURES				
	42	DISPLACEMENT FLUIDS PURCHASED				
	44	EXTRACTION PLANT SERVICES	9	9	9	
2,557	46	DISTRICT EXPENSE	36,259	424 CR	36,259	
$13,521*	49	NORMAL FIELD CONTROLLABLE	$172,667*	$26,248*CR	$144,982*	$27,684*
9,853	52	REMEDIAL, REDRILL, + WELL STIM.	61,331	573	22,101	39,229
	54	MAJOR EXPENSE JOBS		21		
266	56	SUNDRY ADJUSTMENTS	271	180 CR	271	
$23,639*	59	TOTAL FIELD CONTROLLABLE	$234,268*	$25,834*CR	$167,355*	$66,914*
	62	LEASE OBLIGATIONS				
1,239	64	DIVISION EXPENSE	14,962	7,499 CR	14,962	
5,675	66	GENERAL + ADMINISTRATIVE EXP.	63,103	15,682	63,103	
$30,553*	69	TOTAL PROD. COSTS - EXCL. TAXES	$312,334*	$17,651*CR	$245,420*	$66,914*
	70	PARTNERS' SHARE - EXCL. TAXES				
$30,553*	79	SOTEX PROD. COSTS - EXCL. TAXES	$312,334*	$17,651*CR	$245,420*	$66,914*
2,945	80	SOTEX PRODUCTION TAXES	31,847	2,470 CR	31,847	
1,675	82	SOTEX PROPERTY + OTHER TAXES	15,634	117 CR	15,634	
$35,173*	89	SOTEX PROD. COSTS - INCL. TAXES	$359,815*	$20,239*CR	$292,901*	$66,914*
		-OPERATING STATISTICS-				
21,960	91	W.I.PROD. BBLS. (GAS 20 MCF/BBL)	236,286	12,794 CR		
2,819	93	CALENDAR WELL DAYS	33,173	897 CR		
		-UNIT COSTS-				
		SOTEX PRODUCTION COSTS/W.I.BBL.				
1.39		EXCLUDING TAXES 79/91	1.32	.00 CR		
1.60		INCLUDING TAXES 89/91	1.52	.00 CR		
4.80		NORMAL FIELD COSTS/WELL DAY 49/93	5.21	.63 CR		
8.39		TOTAL FIELD COSTS/WELL DAY 59/93	7.06	.57 CR		
10.84		TOTAL PRODUCTION COSTS/WELL DAY 69/93	9.42	.27 CR		

TABLE 4

GUIDING STANDARDS

COST PER WELL PER MONTH

Surface Maintenance Costs

	Labor	Equipment Usage Motor	Equipment Usage Other	Other Supplies	Repair Surface Material	Total
Gas	35.00	3.00	7.00	15.00	20.00	80.00
Floods	23.00	2.00	4.00	2.00	14.00	45.00
Flowing	12.00	2.00	2.00	3.00	5.00	24.00
Pumping	13.00	1.00	6.00	1.00	7.00	28.00

Surface Operating

					Oil Treat	Total
Gas	30.00	6.00	0.00	7.00	0.00	43.00
Floods	30.00	2.00	4.00	5.00	4.00	45.00
Flowing	30.00	6.00	2.00	1.00	2.00	41.00
Pumping	30.00	6.00	10.00	6.00	6.00	58.00

Subsurface Costs

Floods	Depth	Pull. Unit	Pump Repairs	Tubular Repl.	Inhibitors	Total
	2000'	17.00	6.00	5.00	5.00	33.00
	2000-4500'	25.00	8.00	12.00	9.00	54.00
	4500-6500'	30.00	9.00	12.00	9.00	60.00
Primary Production						
	2000'	5.00	4.00	5.00	5.00	19.00
	2000-3500'	8.00	4.00	6.00	5.00	23.00
	3500-4500'	10.00	6.00	7.00	6.00	29.00
	4500-7500'	15.00	8.00	13.00	7.00	43.00
	7500-9000'	$23.00	$9.00	$14.00	$10.00	$56.00

TABLE 5

TABLE 6

SURFACE COSTS - COST/WELL/MONTH
1963

Field	Surface Maintenance							Surface Operating					
	Labor	Equip. Usage Mtr.	Usage Other	Other Supp.	Surf. Rep. Mat.	Total	No. Wells	Labor	Equip. Usage Mtr.	Usage Other	Oil Treat. Chem.	Other Supp.	Total
Waterfloods													
Toborg	12.52	1.51	0.10	0.73	6.93	21.79	16	28.90	2.00	5.40	0	2.81	39.11
Yates (S)	17.67	1.90	2.50	0.75	13.75	36.57	8	41.20	0	8.50	0	1.00	50.70
How-Glass	30.69	0.44	0.25	1.00	31.40	63.78	51	41.70	2.84	3.80	4.21	6.00	58.55
Iatan E.	14.35	1.00	2.88	0.30	13.97	32.50	91	28.97	1.72	6.18	15.14	3.02	55.03
K-S Cisco	19.54	1.97	2.93	0.67	13.75	38.86	86	22.77	0	6.00	5.52	3.37	37.66
Key-Colby	28.64	1.88	6.80	3.69	23.37	64.38	93	32.70	4.25	3.48	0.18	2.34	42.95
N. Ward	44.81	5.16	4.36	2.36	21.43	78.12	55	67.81	3.09	6.78	1.00	6.32	85.00
S. Ward	39.33	4.27	6.75	4.26	17.42	72.03	102	38.73	2.86	2.80	1.45	10.98	56.82
Wt/Avg.	23.74	2.37	4.22	2.12	18.70	55.15	514	37.06	2.90	5.03	4.45	5.64	55.08
Guide	$23.00	$2.00	$4.00	$2.00	$14.00	$45.00	1	$30.00	$2.00	$4.00	$4.00	$5.00	$45.00

SURFACE COSTS - COST/WELL/MONTH
1963

Field	Surface Maintenance						Surface Operating					
	Labor	Equip. Usage Mtr.	Other	Other Supp.	Surf. Rep. Mat.	Total	Labor	Equip. Usage Mtr.	Other	Oil Treat Chem.	Other Supp.	Total
Pumping Production												
Neva W.	8.16	1.46	7.98	4.53	2.94	25.07	35.00	7.00	0	0	0	42.00
Taylor Link	8.87	2.00	0	0	2.00	12.87	15.50	0	2.00	0	7.00	22.50
Good	9.00	0	6.00	0	1.00	16.00	49.10	0	0	0	0	49.10
Haskell	2.00	0	2.00	0	9.00	13.00	46.50	6.50	45.50	0	0	98.50
K-S(Can.)	27.49	2.33	5.50	0	4.16	39.48	40.70	10.50	7.50	0	1.50	60.20
West Pat.	85.00	0	1.25	0.50	15.50	102.25	63.75	6.50	52.00	0	6.25	128.50
W.O'Brien	2.89	0	1.00	2.00	3.00	8.89	56.44	8.00	6.00	0	1.00	71.44
Rehm	2.08	0	1.33	0.75	3.00	7.16	64.10	0	54.00	0	7.00	125.00
Iatan(SA)	9.14	1.00	0.28	0	1.00	11.42	32.10	7.00	2.00	0	1.00	42.10
Smith (S)	30.50	0	10.50	0	18.00	59.00	64.30	0	43.20	9.00	9.00	116.50
NSS	32.17	3.45	4.30	2.10	23.70	65.72	39.40	10.40	7.90	0	2.10	59.80
Adcock	63.00	0	33.00	4.00	5.00	105.00	86.00	0	22.00	10.00	0	108.00
Atoka(SA)	4.40	0	8.52	1.36	1.00	15.28	29.40	4.40	21.60	2.20	0.10	57.70
Bisti	15.72	0	12.23	2.20	11.95	42.10	37.54	12.33	10.38	41.00	11.60	112.85
Cowden	12.00	0	3.00	0	0	15.00	35.50	5.50	0	0	0	41.00
Escrito	11.00	0	7.00	5.00	8.00	31.00	59.80	13.70	16.70	9.10	16.70	116.00
Mascho	10.12	0	4.85	2.48	5.86	23.31	40.00	6.29	0.25	11.21	3.19	60.94
K (CF)	2.00	0	6.50	0	6.50	15.00	18.60	3.40	0	0	1.40	23.40
Eumont	8.14	0	4.00	2.00	6.70	20.84	85.70	14.14	0	4.50	4.00	108.34
Hobbs	47.81	0	23.00	3.00	9.00	82.81	107.00	13.00	4.25	4.25	4.00	132.50
Vacuum	19.00	0	10.33	1.20	8.33	38.86	24.33	7.53	2.00	4.50	2.00	40.36
Wheat	8.57	0	5.58	0.41	14.16	28.72	33.33	0	0.50	0	0	33.83
Marcos	5.66	0	6.66	1.00	1.00	14.30	62.30	0	0	9.00	9.00	81.30
Verde G.	6.87	0	6.87	5.00	14.00	32.74	92.10	20.60	2.10	42.30	3.50	160.60
Sq. Lake	11.45	0	9.81	0.50	12.50	34.26	44.81	0	3.00	13.27	0	61.08
Wt/Avg.	13.03	0.79	6.29	1.05	6.68	27.84	37.11	6.39	9.91	5.29	6.06	64.76
Guide	$13.00	$1.00	$6.00	$1.00	$7.00	$28.00	$30.00	$6.00	$10.00	$6.00	$6.00	$58.00

TABLE 7

Determination of Cost Yardsticks
Cost/Well/Month Basis
Pumping Wells

Grouping of Wells With Similar Operating Conditions	Total Pulling Cost	Pulling Unit Cost				Total Pump Repairs	Tubular Replacement			Total Chemical Cost
		Total	Pump	Rods	Tubing		Total	Rods	Tubing	
SECONDARY RECOVERY										
Under 2000'	Average Cost to Pull All Rods $48.00.					Average Cost of Pump Repair $57.00.				
Weighted Average	$ 45.90	$ 30.50	$ 18.75	$ 11.75	$ 0	$ 10.60	$ 4.75	$ 3.65	$ 1.10	$ 0
Jobs/Well/Year 1. Experience		8.00	4.80	3.20	0					
2. Forecast		3.60	1.25	2.00	0.35	1.25		2 rods	1 joint	
Cost of Forecast Jobs/Well/Year	396.00	204.00	60.00	96.00	48.00	72.00	60.00	36.00	24.00	60.00
Yardstick - Cost/Well/Month	33.00	17.00	5.00	8.00	4.00	6.00	5.00	3.00	2.00	5.00
2000' to 4500'	Average Cost to Pull All Rods $72.00.					Average Cost of Pump Repair $76.00.				
Weighted Average	81.03	41.26	8.74	21.18	11.33	10.23	22.22	17.51	4.71	10.30
Jobs/Well/Year 1. Experience		5.35	1.50	3.25	0.60					
2. Forecast		3.60	1.25	2.00	0.35	1.25		4 rods	3 joints	
Cost of Forecast Jobs/Well/Year	648.00	300.00	96.00	144.00	60.00	96.00	144.00	72.00	72.00	108.00
Yardstick - Cost/Well/Month	54.00	25.00	8.00	12.00	5.00	8.00	12.00	6.00	6.00	9.00
4500' to 6500'	Average Cost to Pull All Rods $120.00.					Average Cost of Pump Repair $120.00.				
Weighted Average	121.80	68.50	36.18	24.23	8.10	37.73	1.40	1.22	0.16	14.16
Jobs/Well/Year 1. Experience		3.58	1.65	1.70	0.23					
2. Forecast		3.60	1.25	2.00	0.35	1.25		6 rods	3 joints	
Cost of Forecast Jobs/Well/Year	984.00	540.00	144.00	288.00	108.00	144.00	180.00	108.00	72.00	120.00
Yardstick - Cost/Well/Month	82.00	45.00	12.00	24.00	9.00	12.00	15.00	9.00	6.00	10.00
Average Secondary Producer	60.00	30.00	9.00	15.00	6.00	9.00	12.00	6.00	6.00	9.00
PRIMARY RECOVERY										
Under 2000'	Average Cost to Pull All Rods $48.00.					Average Cost of Pump Repair $57.00.				
Weighted Average	55.63	23.60	12.83	0.45	6.31	15.42	6.86	5.63	0.77	9.95
Jobs/Well/Year 1. Experience		1.90	1.30	0.40	0.20					
2. Forecast		1.05	0.75	0.20	0.10	0.75		2 rods	1 joint	
Cost of Forecast Jobs/Well/Year	228.00	60.00	36.00	12.00	12.00	48.00	60.00	36.00	24.00	60.00
Yardstick - Cost/Well/Month	19.00	5.00	3.00	1.00	1.00	4.00	5.00	3.00	2.00	5.00
2000' to 3500'	Average Cost to Pull All Rods $65.00.					Average Cost of Pump Repair $57.00.				
Weighted Average	15.41	6.41	3.89	0.61	2.00	4.24	2.11	0.06	1.86	2.61
Jobs/Well/Year 1. Experience		0.63	0.55	0.04	0.04					
2. Forecast		1.05	0.75	0.20	0.10	0.75		3 rods	1 joint	
Cost of Forecast Jobs/Well/Year	276.00	96.00	48.00	24.00	24.00	48.00	72.00	48.00	24.00	60.00
Yardstick - Cost/Well/Month	23.00	8.00	4.00	2.00	2.00	4.00	6.00	4.00	2.00	5.00
3500' to 4500'	Average Cost to Pull All Rods $95.00.					Average Cost of Pump Repair $92.00.				
Weighted Average	64.60	25.29	18.64	6.32	13.56	18.33	9.90	0.43	0	11.05
Jobs/Well/Year 1. Experience		1.75	1.23	0.35	0.12					
2. Forecast		1.05	0.75	0.20	0.10	0.75		4 rods	1 joint	
Cost of Forecast Jobs/Well/Year	324.00	120.00	72.00	24.00	24.00	72.00	84.00	60.00	24.00	72.00
Yardstick - Cost/Well/Month	29.00	10.00	6.00	2.00	2.00	6.00	7.00	5.00	2.00	6.00
4500' to 7500'	Average Cost to Pull All Rods $130.00.					Average Cost of Pump Repairs $120.00.				
Weighted Average	72.09	52.09	23.97	11.13	24.43	15.78	1.21	1.02	0	3.01
Jobs/Well/Year 1. Experience		1.80	1.02	0.60	0.18					
2. Forecast		1.05	0.75	0.20	0.10	0.75		6 rods	2 joints	
Cost of Forecast Jobs/Well/Year	516.00	180.00	108.00	36.00	36.00	96.00	156.00	108.00	48.00	84.00
Yardstick - Cost/Well/Month	43.00	15.00	9.00	3.00	3.00	8.00	13.00	9.00	4.00	7.00
7500' to 9000'	Average Cost to Pull All Rods $192.00.					Average Cost of Pump Repair $144.00.				
Weighted Average	171.00	132.00	35.10	65.00	31.90	37.00	2.00	2.00	0	0
Jobs/Well/Year 1. Experience		6.60	2.10	4.20	0.30					
2. Forecast		1.05	0.75	0.20	0.10	0.75		6 rods	3 joints	
Cost of Forecast Jobs/Well/Year	672.00	276.00	144.00	84.00	48.00	108.00	168.00	108.00	60.00	120.00
Yardstick - Cost/Well/Month	56.00	23.00	12.00	7.00	4.00	9.00	14.00	9.00	5.00	10.00
Average Primary Producers	26.00	9.00	5.00	2.00	2.00	5.00	7.00	5.00	2.00	5.00

TABLE 8

NORMAL OPERATIONS
1965 FORECAST
SNYDER DISTRICT

	Normal	Surface Operating	Surface Maint.	Well Pulling	Other Costs
Snyder District					
Clara Good (F)	2,000	1,000	0	500	500
Hobo (Penn)	32,000	9,000	5,000	6,000	12,000
How-Glass	152,000	30,000	33,000	24,000	65,000
Iatan E. How.	310,000	66,000	30,000	41,000	173,000
West Patricia	40,000	14,000	9,000	10,000	7,000
Atoka Pools	58,000	30,000	3,000	8,000	17,000
Eumont	19,000	8,500	3,500	4,000	3,000
Vacuum (Abo)	42,000	15,000	7,200	6,800	13,000
TOTAL	$1,642,000	$416,000	$272,000	$258,000	$696,000

NOTE: Excerpts from 1965 - all fields not shown.

TABLE 9

SNYDER DISTRICT

Average Per Month Costs - First Half 1964 W/Goals
(All Fields Not Shown)

Field	Normal	Surface Operating	Surface Maint.	Well Pulling	Other Costs
Clara Good (Fuss.)					
Actual	$ 203	$ 97	$ 0	$ 65	$ 41
Goal	131	41	24	25	41
Haskell County Field					
Actual	617	246	150	52	169
Goal	427	116	56	86	169
Howard Glasscock					
Actual	13,901	3,057	2,800	2,554	5,491
Goal	11,539	2,160	2,160	1,728	5,491
Iatan East Howard					
Actual	25,641	5,369	2,500	3,359	14,413
Goal	27,157	4,320	4,320	4,104	14,413
Kelly-Snyder (Cisco)					
Actual	21,090	2,939	4,337	4,612	9,202
Goal	20,640	3,915	3,415	3,608	9,202
Kelly-Snyder					
Actual	1,576	292	345	326	613
Goal	1,387	348	168	258	613
West Patricia					
Actual	2,930	967	861	700	402
Goal	1,396	406	196	392	402
West O'Brien					
Actual	1,707	737	109	349	575
Goal	1,865	580	280	430	575
N.E. I.A.B. (Grayburg)					
Actual	194	41	63	30	60
Goal	189	58	28	43	60
Reinecke					
Actual	323	116	54	0	153
Goal	475	140	76	106	153
Smith (Spraberry)					
Actual	2,405	734	253	1,186	232
Goal	800	232	112	224	232
SNYDER DISTRICT					
Actual	104,887	24,942	17,531	18,305	44,109
Goal	95,494	20,333	15,291	15,761	44,109
OBJECTIVES	$ 9,300	$ 4,600	$ 2,200	$ 2,500	$ 0

TABLE 10

EXAMPLE OF USE OF GUIDES
COST PER FIELD PER MONTH

Field	Normal	
Keystone-Colby		
Guide	$15,964	
Actual	16,289	
Kermit (Ellen)		
Guide	3,991	
Actual	3,652	
N. Ward Estes		
Guide	8,030	Note analysis below
Actual	13,145	to find cause.
Tucker		
Guide	1,209	
Actual	1,180	

N. Ward Estes	Normal	Surface Operating	Surface Maint.	Well Pulling	Other Costs
Guide	$ 8,030	$1,980	$1,980	$1,566	$2,504
Actual	13,145	3,709	4,340	2,592	2,504

N. WARD ESTES FIELD
SURFACE MAINTENANCE

	Labor	Equipment Use: Motor	Equipment Use: Other	Other Supplies	Surface Repairs	Total
Guide	$23.00	$2.00	$4.00	$2.00	$14.00	$45.00
Actual	44.81	5.16	4.36	2.36	21.43	78.12

SURFACE OPERATING

					Oil Treat	
Guide	30.00	2.00	4.00	5.00	4.00	45.00
Actual	67.81	3.09	6.78	1.00	6.32	85.00

SUBSURFACE

	Unit	Pump	Tubing	Inhibitors	Total
Guide	25.00	8.00	12.00	9.00	54.00
Actual	65.60	20.00	21.36	12.04	119.00

TOTAL COST $144.00 VS. $282.12

TABLE 11

EXAMPLE OF USE TO LOCATE AREA & SOURCE OF HIGH COST

KELLY-SNYDER CISCO FIELD

	Surface Maintenance					
		Equipment Usage		Other	Surface	
	Labor	Motor	Other	Supplies	Repairs	Total
Guide	23.00	2.00	4.00	2.00	14.00	45.00
Actual	19.54	1.97	2.93	0.67	13.75	38.86
	Surface Operating					
Guide	30.00	2.00	4.00	5.00	4.00	45.00
Actual	22.77	0.00	6.00	5.52	3.37	37.66

	Subsurface				
	Unit	Pump	Tubular	Inhibitors	Total
Guide	30.00	9.00	12.00	9.00	60.00
Actual	92.51	45.97	12.13	0.00	150.61

Corrective Action Resulted in the Following:

1965 Actual	42.00	19.92	9.75	15.22	86.89

A 42% Reduction in Subsurface Maintenance Cost was Accomplished.

TABLE 12

PRODUCTION COSTS OIL AND GAS C-946A CO-OP

WESTERN DIVISION 319 30

CURRENT MONTH $	LINE NO.	ITEM	CUR OVER/UNDER- PR - $	$ PCT	YEAR - TO - DATE PRIOR $	CURRENT $	OBJECTIVE OBJ - $	CUR OVER/UNDER- $	$ PCT
	1								
29,059	002	WELL PULLING	37,510-		331,348	293,838			
5,551	003	SUBSURF-TECHNICAL SERV	4,936		58,941	63,877			
277-	004	SUBSURF-TBG + RODS	6,232-		15,126	8,894			
12,177	004A	SUBSURF-OTHER EQUIP REP	16,593-		128,273	111,680			
81,807	005	COMPANY LABOR			866,832	886,879			
26,270	006	CONTRACT LABOR	24,996		230,459	255,345			
17,371	007	LEASE FUELS			250,697	239,533			
35,361	008	UTILITIES-ELECTRICITY	49,851		324,109	373,960			
380-	009	UTILITIES-OTHER	6,737-		5,992	745-			
11,300	010	CHEMICALS - SURFACE	14,264-		75,950	61,686			
7,307	010A	CHEMICALS - SUBSURFACE	15,555		101,497	117,052			
44,256	011	ASSISTED RECOVERY MATLS	172,389		340,721	513,110			
32,870	012	MATLS/SUPP/REP PARTS	17,409		332,253	349,662			
27,689	013	TRANSPORTATION-MOTOR			281,575	292,461			
	013A	TRANSPORTATION-AIR							
	013B	TRANSPORTATION-MARINE							
4,362	014	OTHER NORM FLD-DIRECT	29,127		41,176	70,303			
	015	OTHER NORM FLD-DISTRIB							
334,723	*16	TOTAL FOREMAN COST	252,586		3,384,949	3,637,535	4,582,168	944,633-	
66,308	017	DISTRICT EXPENSE			753,516	753,723			
26,136	018	EXTRACT/COMPR PLT SERV	58,613		215,818	274,431			
427,167	*19	TOTAL FIELD CONTROL	311,406		4,354,283	4,665,689	5,383,000	717,311-	
19,243	020	DIVISION EXPENSE	26,863-		265,467	238,604	257,105	18,501-	
21,001	021	WELL STIMULATION	81,377-		399,929	308,552	623,000	314,448-	
97,943	022	REMEDIAL/REDRILL	85,879		468,871	554,750	784,000	229,250-	
23,274	023	MAJOR EXPENSE JOBS	12,423		247,041	259,464	205,000	54,464	
367	024	COST OF ABANDONMENTS	18,094-		24,941	6,847			
216	025	SUNDRY ADJUSTMENTS	3,015		15,765	18,780			
589,211	*26	TOTAL FIELD COSTS	286,389		5,766,297	6,052,686	7,252,105	1,199,419-	
107,828	027	GENERAL AND ADMIN EXP			1,160,563	1,183,696			
1,073-	028	CASH ROYALTY/LSE OBLIG	4,611-		10,940-	15,451-			
132	029	CHARGEOUTS	1,532-		8,048	6,516			
271,293	030	TAXES			3,078,232	3,102,769			
	031	OTHER NON-FIELD CONTROL							
967,391	*32	TOT COST-BEFORE P E			10,002,330	10,330,216			
168,085-	033	JV PARTNERS EQUITY	310,943-		1,502,460-	1,813,403-			
799,306	034	TOTAL COST-COMP INT			8,499,840	8,516,813			
	35								
2,926,364	036	OIL PRODUCTION BBLS	2,578,045		32,602,559	35,180,604			
6,244,597	037	GAS PRODUCTION MCF	1,952,865-		70,353,284	68,410,419			
3,238,594	38	OEG PRODUCTION BBLS	2,480,402		36,120,723	38,601,125			
1,136,508	039	OEG PRODUCTION-WI BBLS	404,212		12,732,320	13,136,532			
49,847	040	PROD WELL DAYS PWD	4,297-		565,378	561,081			
	41								
.10	042	TOT FOREMAN COST BBL(16/38)			.09	.09			
.13	043	TOT FLD CONTROL/BBL (19/38)			.12	.12			
.18	043A	TOT FLD COST/BBL (26/38)			.16	.16			
.70	044	TOT COST-WI BBLS (34/39)		.02-	.67	.65			
6.72	045	TOT FOREMAN COST/PWD(16/40)		.49	5.99	6.48			
8.57	046	TOT FLD CONTROL/PWD (19/40)		.62	7.70	8.32			
11.82	046A	TOT FLD COST/PWD (26/40)		.59	10.20	10.79			

TABLE 13

NORTH WARD ESTES (YATES)
OPERATING COSTS VS. GUIDES

Surface Operating

	Labor	Equipt Usage Motor	Equipt Usage Other	Other Supplies	Oil Treat Chem	Total
Guide	30.00	2.00	4.00	5.00	4.00	45.00
1963	67.81	3.09	6.78	1.00	6.32	85.00
1964	48.49	6.29	3.80	4.77	3.32	66.67
1965	35.30	7.37	6.40	5.26	4.27	58.60
1966	22.23	2.22	4.40	11.62	6.34	47.01

Surface Maintenance

	Labor	Motor	Other	Other Supplies	Repairs & Mat	Total
Guide	23.00	2.00	4.00	2.00	14.00	45.00
1963	44.81	5.16	4.36	2.36	21.43	78.12
1964	43.36	10.16	5.94	8.98	23.41	91.85
1965	33.25	7.24	4.30	4.51	11.91	61.20
1966	24.87	1.79	1.47	2.14	13.86	43.04

Subsurface

	Well Pull	Pump Repair	Tubing & Rod	Chem	Total
Guide	25.00	8.00	12.00	9.00	54.00
1963	65.60	20.00	21.36	12.04	119.00
1964	48.60	31.56	15.58	16.40	112.14
1965	53.30	28.80	5.68	6.80	85.70
1966	44.15	20.98	4.10	4.46	73.69

NORMAL OPERATIONS - COST/YEAR

	Total		Total
1963		1966	
A	168,000	A	110,000
G	104,000	G	105,000
1964		1967	
A	159,000	A	108,000
G	100,000	G	105,000
1965		1968	
A	129,000	A	106,000
G	107,000	G	105,000

TABLE 14

COMPARISON OF COST GUIDES
FOR
WESTERN & NORTHERN DIVISIONS

COST PER WELL PER MONTH

		Labor	Equipment Usage Motor	Equipment Usage Other	Other Supplies	Repairs Surface	Total
Gas	W	35.00	3.00	7.00	15.00	20.00	80.00
	N	35.00	2.00	7.00	5.00	10.00	59.00
Flood	W	23.00	2.00	4.00	2.00	14.00	45.00
	N	23.00	2.00	5.00	2.00	15.00	47.00
Flow	W	12.00	2.00	2.00	3.00	5.00	24.00
	N	12.00	2.00	4.00	2.00	5.00	25.00
Pump	W	13.00	1.00	6.00	1.00	7.00	28.00
	N	15.00	2.00	4.00	1.00	8.00	30.00

Surface Operating

		Labor	Motor	Other	Supplies	Oil Treat	Total
Gas	W	30.00	6.00	0.00	7.00	0.00	43.00
	N	35.00	7.00	2.00	2.00	0.00	46.00
Flood	W	30.00	2.00	4.00	5.00	4.00	45.00
	N	35.00	5.00	6.00	5.00	4.00	55.00
Flow	W	30.00	6.00	2.00	1.00	2.00	41.00
	N	35.00	7.00	6.00	3.00	2.00	53.00
Pump	W	30.00	6.00	10.00	6.00	6.00	58.00
	N	35.00	7.00	6.00	6.00	6.00	60.00

Subsurface Costs (Well Pulling)

	Depth		Pull Unit	Pump Repair	Tub. Repl.	Inhibitors	Total
Flood	2000'	W	17.00	6.00	5.00	5.00	33.00
		N	17.00	6.00	5.00	5.00	33.00
	2000'-4500'	W	25.00	8.00	12.00	9.00	54.00
		N	30.00	10.00	12.00	9.00	61.00
	4500'-6000'	W	30.00	9.00	12.00	9.00	60.00
		N	45.00	12.00	13.00	9.00	79.00
	6500'-8500'	W					
		N	60.00	20.00	14.00	10.00	104.00
Primary	2000'	W	5.00	4.00	5.00	5.00	19.00
		N					
	2000'-3500'	W	8.00	4.00	6.00	5.00	23.00
		N	8.00	4.00	6.00	5.00	23.00
	3500'-4500'	W	10.00	6.00	7.00	6.00	29.00
		N	12.00	8.00	7.00	5.00	32.00
	4500'-7500'	W	15.00	8.00	13.00	7.00	43.00
		N	18.00	9.00	10.00	6.00	43.00
	7500'-9000'	W	23.00	9.00	14.00	10.00	56.00
		N	24.00	11.00	13.00	7.00	55.00

** W = Western Division
N = Northern Division

TABLE 15

TABLE 16

WESTERN DIVISION - ACTUAL PRODUCTION COSTS VERSUS GUIDES

FUHRMAN-MASCHO 4500' SEC OIL PUMP-25 FLOW-0 INJ-23 OTHER-2

SURFACE COSTS		LABOR	SURFACE CHEMICALS	M-S-R	TRANS-PORT	OTHER	TOTAL
	ACTUAL	45.41	3.02	23.26	10.81	2.70	85.20
	GUIDE	43.00	3.00	14.00	10.00	5.00	75.00

SUBSURFACE COSTS		PULLING UNIT	PUMP REPAIR	TBG & RODS	SUBSURFACE CHEMICALS		TOTAL
	ACTUAL	59.82	23.41	3.43	26.50		113.16
	GUIDE	25.00	10.00	5.00	7.00		47.00

FIXED COSTS		SUBSURF TECH	LEASE FUELS	UTILITIES ELECTRIC	UTILITIES WATER	ASSISTED RECOVERY	DISTRICT EXPENSE	TOTAL
	ACTUAL	3.30	22.97	35.43	1.07		33.26	96.03
	GUIDE							

KELLY-SNYDER CISCO 6200' SEC OIL PUMP-38 FLOW-0 INJ-43 OTHER-0

SURFACE COSTS		LABOR	SURFACE CHEMICALS	M-S-R	TRANS-PORT	OTHER	TOTAL
	ACTUAL	39.09	.24	12.27	9.27	.95	61.82
	GUIDE	43.00	3.00	14.00	10.00	5.00	75.00

SUBSURFACE COSTS		PULLING UNIT	PUMP REPAIR	TBG & RODS	SUBSURFACE CHEMICALS		TOTAL
	ACTUAL	58.76	24.99	.54	11.30		95.59
	GUIDE	30.00	13.00	9.00	9.00		61.00

FIXED COSTS		SUBSURF TECH	LEASE FUELS	UTILITIES ELECTRIC	UTILITIES WATER	ASSISTED RECOVERY	DISTRICT EXPENSE	TOTAL
	ACTUAL	.52	16.25	.67		32.49	30.59	80.52
	GUIDE							

ARENOSO STRAWN 8600' SEC OIL PUMP-6 FLOW-9 INJ-3 OTHER-0

SURFACE COSTS		LABOR	SURFACE CHEMICALS	M-S-R	TRANS-PORT	OTHER	TOTAL
	ACTUAL	80.18		25.00	28.12	24.50	157.80
	GUIDE	43.00	3.00	14.00	10.00	5.00	75.00

SUBSURFACE COSTS		PULLING UNIT	PUMP REPAIR	TBG & RODS	SUBSURFACE CHEMICALS		TOTAL
	ACTUAL	141.33	30.68				172.01
	GUIDE	35.00	16.00	12.00	10.00		72.00

OTHER COSTS		SUBSURF TECH	LEASE FUELS	UTILITIES ELECTRIC	UTILITIES WATER	ASSISTED RECOVERY	DISTRICT EXPENSE	TOTAL
	ACTUAL	3.79	6.50	37.50		49.67	41.83	139.29
	GUIDE							

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GUIDING STANDARDS

COST PER WELL PER MONTH

Surface Costs

	Labor	Surf Chem	M-S-R	Transport	Other	Total
Gas	65.00	3.00	27.00	9.00	7.00	111.00
Floods	43.00	3.00	14.00	10.00	5.00	75.00
Flowing	40.00	2.00	8.00	10.00	2.00	62.00
Pumping	45.00	3.00	14.00	12.00	4.00	78.00

Subsurface Costs

Floods	Depth	Pull. Unit	Pump Repair	Tbg & Rods	Subsurf Chem	Total
	2000'	15.00	9.00	4.00	5.00	33.00
	2000-4500'	25.00	10.00	5.00	7.00	47.00
	4500-6500'	30.00	13.00	9.00	9.00	61.00
	6500-8500'	35.00	16.00	12.00	10.00	72.00
Primary Production						
	2000'	5.00	3.00	4.00	3.00	15.00
	2000-4500'	8.00	4.00	5.00	5.00	22.00
	4500-6500'	20.00	5.00	7.00	7.00	39.00
	6500-8500'	25.00	9.00	12.00	9.00	55.00
	8500-10000'	30.00	11.00	14.00	10.00	65.00
Flowing						
	Oil Well	10.00	0	0	0	10.00
	Gas Well	5.00	0	0	0	5.00

TABLE 17