OIL WELL INVESTMENT STRATEGY

GROUP DESIGN PROJECT

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EXECUTIVE SUMMARY

The opportunity has arisen to invest on two relatively newly drilled oil wells. The first oil well is in Texas, and the second well is in Louisiana. However, management has indicated that it has only enough resources to invest in one of the two wells. The production data from each well (data is available only for the first four months of production) has been provided. It is highly recommended to invest in the Texas oil well. Although the initial investment is $900,000 more than that of the well in Louisiana, it has been proven that the well in Texas will be much more profitable. Neither is it significant that the Texas crude price is lower than that of Louisiana or that the operating costs are higher in Texas. The use of decline curves shows that both wells produce with hyperbolic decline. The production data was matched to Fetkovich's type curves to find the decline rate for each well. It was then shown that the Louisiana well had a much higher decline rate, making it especially detrimental to the project since the well has already produced much of its oil in the previous four months. On the other hand, the well in Texas produces with a slower decline rate and has more cumulative production. The net present value profile of the two alternatives shows that the well in Texas will generate higher profits than the well in Louisiana at all reasonable interest rates.

PROBLEM STATEMENT

The company has been offered to invest on two relatively newly drilled oil wells. The first oil well is in Texas, and the second well is in Louisiana. Management has indicated that it has only enough resources to invest in one of the two wells. Therefore, a recommendation must be made to management on this investment opportunity. The production data from each well (data is available only for the first four months of production) has been provided. It is also important to note that the time value of money for the company over the next three years is 15.5 percent.

Decline curve analysis should be performed using the given production data and a (monthly) net cash flow for the next three years should be generated for both wells. Then, the projects may be evaluated with an accredited yardstick, either the discounted cash flow rate of return technique or the net present value profile. At the conclusion of the analysis, a recommendation, justified by sound engineering, must be made to management.

The crude being produced from these two wells are different in quality. The crude from Texas can be sold for $17.00 per barrel, while the crude from Louisiana is worth $18.95 per barrel. It is safe to assume that the price of oil will increase by five percent each year for both crudes. Fixed operating costs in Texas are approximately $5.51 per barrel and $4.93 per barrel in Louisiana throughout the next three years of operation. Also, initial investment for the project in Texas requires $1,000,000, while the venture in Louisiana requires only $100,000.

Finally, a complete engineering report on the findings must be provided. All arguments made to management should be convincing and based on facts and carefully calculated numbers. Any illustrations and graphs may be provided to make the project understandable to management.

INTRODUCTION

Shortly after oil wells are completed, a decline in production occurs. The rapidity of a well's decline depends on its output and other factors governing its productivity. Knowledge of production rates over time can be useful in creating decline curves. Decline curves can be used to forecast future production and to estimate the value of an oil well. Oil wells can be separated into two groups -- those that experience exponential decline, and those that experience hyperbolic decline. Exponential decline occurs when a plot of production rate versus time yields a straight line on a semi-log paper, therefore possessing a constant decline rate. Whereas hyperbolic decline occurs when the data plots concave upward on a semi-log paper, therefore possessing a decline rate that is continuously changing over time.

Type curves are essential tools used to analyze a well's decline. Matching a well's production rate versus time data with a type curve can generate essential values needed to analyze future production rates and cumulative production of an oil well. Type curves can also be used to determine if the well is in the transient or pseudo-steady state of production.

With the aid of future production data, the value of the well may be judged. By finding the net present value of two oil wells at several interest rates, a net present value profile can be constructed to see if the wells are profitable to the company, and also to see which one is more profitable.

METHODOLOGY

To begin investment analysis, decline curves were generated using the four months of given production data for the oil well in both Texas and Louisiana. The decline curves are shown as the logarithm of production rate in barrels of oil per day plotted against time in days. The type of decline by which each well produces can be determined from the shape of its decline curve. Wells that produce with exponential decline will result in a straight-line decline curve, while those that produce with hyperbolic decline will not. As seen in the Appendix on pages 12 and 16, both oil wells under consideration produce with hyperbolic decline.

Because of this phenomenon, type curve matching was utilized to establish the initial production rate in barrels of oil per day and the initial nominal decline factor per day. For both wells, the logarithm of production rate in barrels of oil per day was plotted against the logarithm of time. These graphs were done on tracing paper by hand in order to best match the points to Fetkovich's type curves. By visual inspection, it was seen that both sets of production data reside in the pseudo-steady state region of flow. These graphs were then moved over top of the Fetkovich type curves until a match was made. Since the plotted curve is a linear transformation of the Fetkovich type curve to which it matches, movement is only allowed in the horizontal and vertical directions. A match point is made, and all values corresponding to it (on both the plot and the Fetkovich type curve page) are recorded.

This match point enables the calculation of the initial production rate in barrels of oil per day and the initial decline factor per day. The initial production rate is calculated as the production rate on the plot divided by the dimensionless production rate from the Fetkovich type curves. The initial decline factor is the dimensionless time divided by time. The decline, or b-value, is read directly from the Fetkovich type curve to which the production data matches. The logarithmic graphs, constructed on tracing paper, may be seen at the end of the Appendix. The b-values, match point coordinates, initial production rate, and initial decline factor for the Texas well can be viewed on page 13, with the corresponding values on page 17 for the Louisiana well.

Once the initial production rates, initial decline factors, and b-values are determined, the production rates predicted by the hyperbolic fit can be calculated in barrels of oil per day. Using the equation for hyperbolic decline found in the Appendix on page 10, the production rate was calculated for the first four months (previously produced and, thus, not considered later in the net present value computations) and the next three years. The cumulative production in barrels of oil was then determined for all forty months using the equation for hyperbolic decline in the Appendix on page 10. Then, the change in cumulative production gave way to the oil production per month predicted by the hyperbolic fit. The values of production rate, cumulative production, and oil production per month for the first four months (previously produced) and the next three years may be viewed on page 14 for Texas and page 18 for Louisiana.

After the predicted production for each month was established, net present value profile was chosen as the yardstick of preference. First, the investment for each well was determined. The amount of investment for both wells were given ($1,000,000 for Texas and $100,000 for Louisiana) and were assumed as a lump sum spent before any production under new ownership occurred. Next, the previously calculated oil production for each month and the given production cost per barrel of oil produced ($5.51 for Texas and $4.93 for Louisiana) were used to find the operating costs each month for both wells. The revenue generated for each month was then calculated using the oil production for each month and the price of the crude per barrel ($17.00 for Texas and $18.95 for Louisiana, with an assumed price increase of five percent per year for both wells).

In order to generate net cash flow values for each month, the investment and operating costs were subtracted from the revenue. The net present value for each month was generated using the equation found in the Appendix on page 11. It is important to note that the interest rate is converted to a monthly interest rate. The monthly net present values were then summed to find the net present value at each interest rate for both wells. The monthly net cash flows were also summed to find the net present value for each well at an interest rate of zero percent. These values can be seen for Texas on pages 14 and 15 and pages 18 and 19 for Louisiana. Finally, the net present values for each well were plotted against their corresponding interest rate in order to obtain a graph of the net present value profile (seen on page 20 of the Appendix).

RESULTS & DISCUSSION

The table below displays the net present value for each project, one in Texas and the other in Louisiana, at the different interest rates used to generate the net present value profile. The thorough and detailed results may be seen starting on page 12 and continuing to the end of the report.

Interest Rate	Texas	Louisiana	
	Net Present Value		
0%	$1,925,069	$26,371	Net Cash Flow
5%	$1,836,371	$25,105	
15.5%	$1,668,596	$22,543	Time Value of money to company
50%	$1,248,344	$14,939	
100%	$853,560	$5,662	
135.695%	$657,348	$0	Louisiana Discounted Cash Flow Rate of Return
250%	$257,320	-$14,397	
378.9525%	$0	-$26,153	Texas Discounted Cash Flow Rate of Return
397.157%	-$27,546	-$27,546	NPV Texas = NPV Louisiana
500%	-$157,299	-$34,496	

Several important observations may be made about the above table and can be visually observed on the net present value profile plot seen in the Appendix on page 18. First, the net cash flow (highlighted in grey) is the profit of the project before interest is taken into consideration. The net cash flow at the end of the next three years for Texas is $1,925,069 and $26,371 for Louisiana. It was seen at this point that the well in Texas generates a much higher profit than the one in Louisiana. It is important to note that analysis can not stop here -- many projects are very sensitive to increases in interest rate and can lose their profitability when compared to others.

Secondly, it is important to note that the time value of money to the company for the next three years is 15.5 percent. It can be seen that both the well in Texas and the one in Louisiana will be profitable at this interest rate, at $1,668,596 and $22,543, respectively (shown in orange). Again, the well in Texas has a higher net present value than that of Louisiana. However, since the company can make other, less risky forms of investment at 15.5 percent, it is vital to determine how these two projects will perform at even higher interest rates.

Thirdly, the discounted cash flow rate of return, the interest rate at which the net present value is zero, was determined for both investment alternatives. For Louisiana, the discounted cash flow rate of return is approximately 136 (denoted in red), while it was nearly 379 percent for Texas (emphasized in blue). Thus, the Texas well, can tolerate much higher interest rates than the one in Louisiana. This is true even though it is actually the Louisiana project that is less sensitive to changes in interest rate. This means that a change in interest rate will result in a smaller change in net present value for the well in Louisiana than that of the one in Texas. (Observe the steepness of the slopes on the net present value profile plot.) This, again, reemphasizes that the Texas well is a more profitable investment than the oil well in Louisiana. However, since both of these interest rates are very high, it is safe to say that neither project will lose money if implemented.

Finally, a vital part of the net present value profile graph is that of the intersection of the two projects (shown in purple in the above table and on the net present value profile plot). At this particular interest rate, both projects make the same amount of money. It is also at this interest rate that the profitability of the projects switches -- the project that had a lower net present value at lower interest rates will have a higher net present value than its competitor at higher interest rates. For this analysis, however, this intersection (at about a 397 percent interest rate) is not very vital since neither project is profitable (-$27,546).

CONCLUSION

It is highly recommended to invest in the Texas oil well. Although the initial investment is $900,000 more than that of the well in Louisiana, it has been proven that the well in Texas will be much more profitable. Neither is it significant that the Texas crude price is lower than that of Louisiana or that the operating costs are higher in Texas. The use of decline curves shows that both wells produce with hyperbolic decline. The production data was matched to Fetkovich's type curves to find the decline rate for each well. It was then shown that the Louisiana well had a much higher decline rate, making it especially detrimental to the project since the well has already produced much of its oil in the previous four months. On the other hand, the well in Texas produces with a slower decline rate and has more cumulative production. The net present value profile of the two alternatives shows that the well in Texas will be profitable at interest rates less than 379 percent and 136 percent for the Louisiana well. At all these points, the Texas well has a higher net present value than the Louisiana well. However, at interest rates of 397 percent and above, the well in Texas will lose more money than the one in Louisiana. Since the aforementioned interest rates are very high, it can be concluded that the Texas well will generate higher profits than the well in Louisiana at all reasonable interest rates.

REFERENCES

Mohaghegh, Shahab D. Ph.D. Class notes and handouts. Petroleum and Natural Gas Engineering 241: Oil Property Evaluation. West Virginia University: Morgantown, West Virginia. 1999.

Thompson, Robert S. and John D. Wright. "Oil Property Evaluation." 2nd ed. Thompson-Wright Associates: Golden, Colorado. 1985.

APPENDIX

Calculations

1.) Hyperbolic Decline

Producing Rate:

$q = q_i(1 + bD_it)^{-1/b}$

Cumulative Production:

$$N_p = \frac{qi^b}{D_i(1-b)}\left[q_i^{1-b} - q^{1-b}\right]$$

where:
- q = producing rate at time t, STB/day
- q_i = producing rate at time 0, STB/day
- D_i = initial nominal decline rate (t = 0), 1 / day
- b = hyperbolic exponent
- t = time, days
- N_p = Cumulative Production, STB

2.) Type Curve Analysis (Pseudo-Steady State Region)

Initial Flow Rate:

$$q_i = \frac{q}{q_{TD}}$$

Initial Decline Rate:

$$D_i = \frac{t_{DT}}{t}$$

where:
- q_i = producing rate at time 0, STB/day
- q = producing rate at time t, STB/day
- q_{TD} = dimensionless producing rate
- D_i = initial nominal decline rate (t = 0), 1 / day
- t_{DT} = dimensionless time

3.) Economic Analysis

Net Present Value:

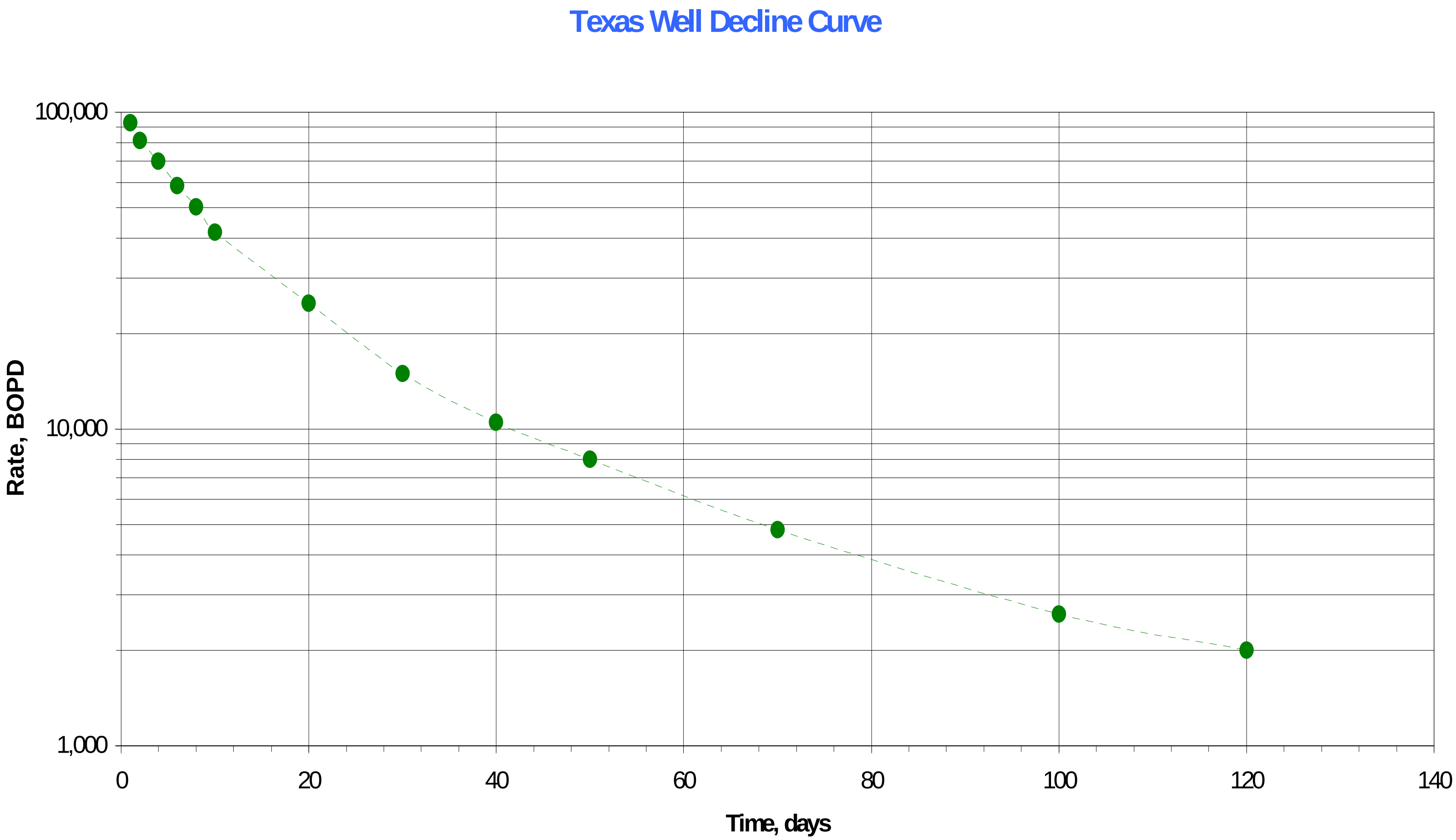
$$NPV = \sum_{j=0}^{L} \frac{NCF_j}{(1+i)^j}$$

where: NPV = net present value, $

NCF$_j$ = net cash flow for period j, $

i = interest rate (monthly)

j = period (month)


Texas Well Decline Curve
100,000
10,000
1,000
0
20
40
60
80
100
120
140
Time, days
Rate, BOPD

TEXAS

Price, \$/BO	Op Cost, \$/BO
17.00	5.51
Price increase by 5%	

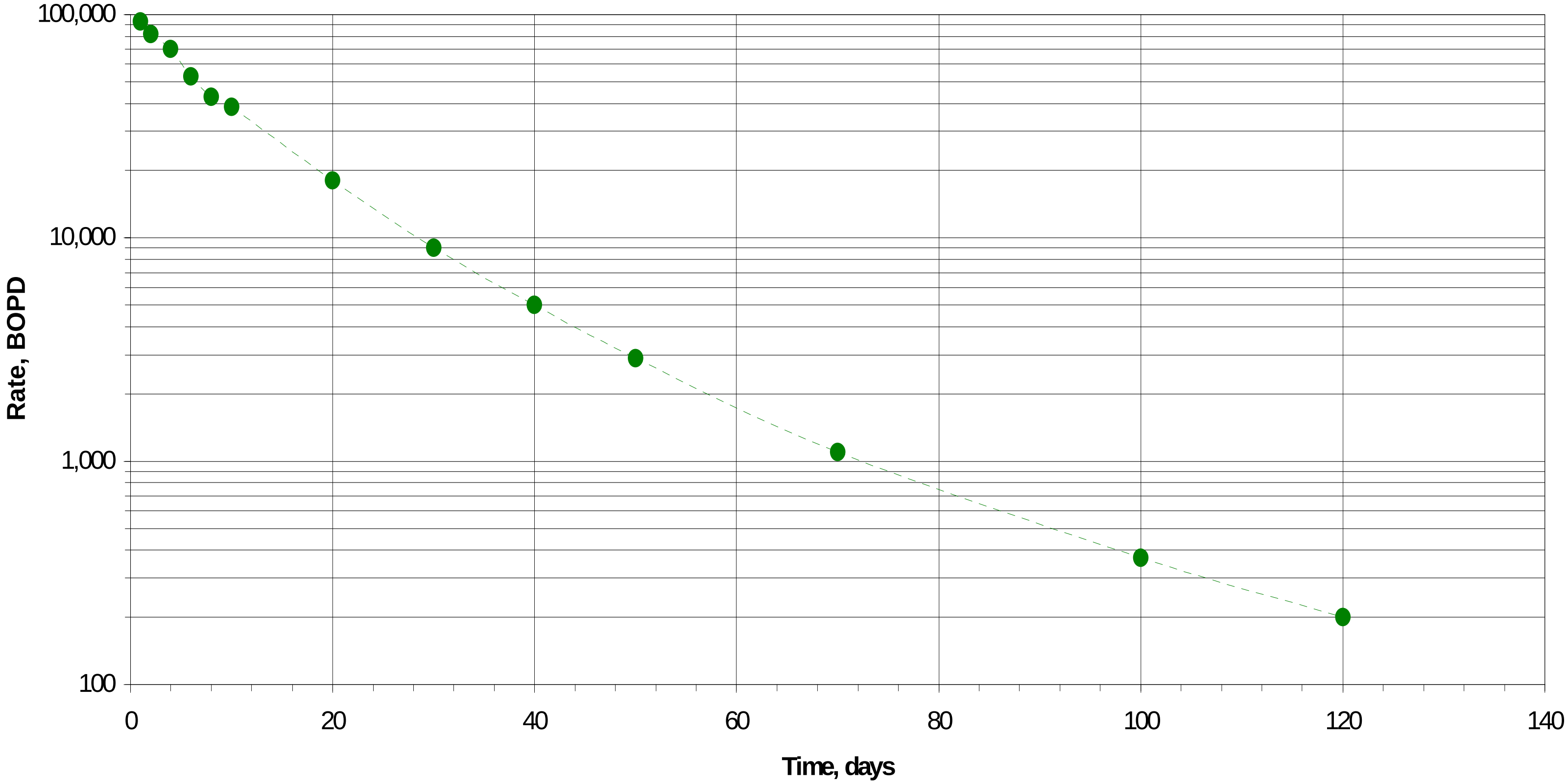
Time, days	Production Rate, BOPD
1	92,800
2	81,390
4	69,980
6	58,800
8	50,100
10	41,800
20	25,000
30	15,000
40	10,500
50	8,000
70	4,800
100	2,600
120	2,000

Match Point		
$b =$	0.5	
$q =$	10,000	BOPD
$q_{Dd} =$	0.1	
$t =$	1	days
$t_{Dd} =$	0.1	
$q_i = q/q_{Dd} =$	100,000	BOPD
$D_i = t_{Dd}/t =$	0.1	per day

	Time, months	Production Rate, BOPD	Cumulative Production, BO	Production per Month, BO/month	Investment, $/month	Operating Cost, $/month	Revenue, $/month	Net Cash Flow, $/month
Past Production	0	100,000	0	0				
	1	15,747	1,206,349	1,206,349				
	2	6,127	1,504,950	298,601				
	3	3,235	1,640,288	135,337				
	4	1,995	1,717,514	77,226				
Investment					1,000,000	0	0	-1,000,000
Year 1	5	1,352	1,767,442	49,928	0	275,102	848,772	573,670
	6	976	1,802,372	34,930	0	192,463	593,805	401,342
	7	738	1,828,179	25,807	0	142,197	438,722	296,524
	8	577	1,848,024	19,846	0	109,349	337,376	228,026
	9	464	1,863,760	15,736	0	86,705	267,510	180,806
	10	381	1,876,543	12,783	0	70,434	217,311	146,877
	11	318	1,887,133	10,590	0	58,351	180,030	121,679
	12	270	1,896,050	8,917	0	49,131	151,584	102,453
	13	232	1,903,661	7,611	0	41,937	129,387	87,450
	14	201	1,910,233	6,573	0	36,215	111,733	75,518
	15	177	1,915,966	5,733	0	31,589	97,461	65,872
	16	156	1,921,011	5,045	0	27,796	85,759	57,963
Year 2	17	139	1,925,484	4,473	0	24,648	79,848	55,200
	18	124	1,929,478	3,994	0	22,006	71,289	49,283
	19	112	1,933,066	3,587	0	19,767	64,036	44,269
	20	101	1,936,306	3,240	0	17,853	57,836	39,983
	21	92	1,939,247	2,941	0	16,205	52,496	36,291
	22	84	1,941,928	2,681	0	14,774	47,862	33,088
	23	77	1,944,383	2,455	0	13,525	43,816	30,290
	24	71	1,946,638	2,256	0	12,428	40,262	27,834
	25	66	1,948,718	2,080	0	11,459	37,123	25,664
	26	61	1,950,642	1,924	0	10,600	34,338	23,739
	27	57	1,952,426	1,785	0	9,833	31,855	22,022
	28	53	1,954,086	1,660	0	9,147	29,632	20,485
Year 3	29	49	1,955,634	1,548	0	8,530	28,950	20,420
	30	46	1,957,082	1,447	0	7,974	27,061	19,087
	31	43	1,958,437	1,356	0	7,470	25,351	17,882
	32	41	1,959,710	1,273	0	7,012	23,799	16,787
	33	38	1,960,907	1,197	0	6,596	22,385	15,789
	34	36	1,962,035	1,128	0	6,215	21,093	14,878
	35	34	1,963,100	1,065	0	5,867	19,910	14,043
	36	32	1,964,106	1,007	0	5,546	18,824	13,277
	37	31	1,965,059	953	0	5,252	17,824	12,572
	38	29	1,965,963	904	0	4,980	16,902	11,922
	39	28	1,966,821	858	0	4,729	16,049	11,320
	40	26	1,967,638	816	0	4,496	15,260	10,764
							Net Cash Flow	**$1,925,069**

	Time, months	Net Cash Flow, $/month	NPV 5%, $/month	NPV 15.5%, $/month	NPV 50%, $/month	NPV 100%, $/month	NPV 135.695%, $/month	NPV 250%, $/month	NPV 378.9525%, $/month	NPV 397.157%, $/month	NPV 500%, $/month
Past Production	0										
	1										
	2										
	3										
	4										
Investment		-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000	-1,000,000
Year 1	5	573,670	571,289	566,354	550,723	529,541	515,390	474,761	435,988	431,018	404,943
	6	401,342	398,018	391,172	369,877	341,972	323,938	274,879	231,814	226,559	199,977
	7	296,524	292,848	285,324	262,346	233,224	215,022	168,074	130,166	125,765	104,293
	8	228,026	224,265	216,616	193,673	165,553	148,553	106,964	76,074	72,664	56,613
	9	180,806	177,085	169,568	147,424	121,172	105,823	70,190	45,843	43,289	31,686
	10	146,877	143,258	135,991	114,969	90,862	77,232	47,188	28,303	26,421	18,170
	11	121,679	118,188	111,224	91,435	69,483	57,482	32,352	17,820	16,446	10,625
	12	102,453	99,101	92,456	73,909	54,004	43,483	22,544	11,403	10,404	6,315
	13	87,450	84,238	77,911	60,562	42,550	33,345	15,925	7,397	6,672	3,805
	14	75,518	72,442	66,422	50,207	33,918	25,870	11,381	4,855	4,329	2,319
	15	65,872	62,927	57,199	42,042	27,310	20,273	8,216	3,218	2,837	1,428
	16	57,963	55,142	49,690	35,515	22,182	16,027	5,983	2,152	1,876	887
Year 2	17	55,200	52,296	46,718	32,469	19,500	13,712	4,715	1,558	1,342	596
	18	49,283	46,496	41,178	27,829	16,071	10,999	3,484	1,057	900	376
	19	44,269	41,592	36,517	23,998	13,325	8,876	2,590	722	608	238
	20	39,983	37,410	32,561	20,807	11,109	7,202	1,936	495	412	152
	21	36,291	33,814	29,177	18,131	9,308	5,873	1,454	342	281	97
	22	33,088	30,702	26,263	15,869	7,833	4,811	1,097	237	193	63
	23	30,290	27,990	23,736	13,946	6,620	3,956	831	165	132	40
	24	27,834	25,613	21,533	12,303	5,615	3,266	632	115	91	26
	25	25,664	23,518	19,601	10,890	4,779	2,706	482	81	63	17
	26	23,739	21,663	17,899	9,670	4,080	2,248	369	57	44	11
	27	22,022	20,014	16,393	8,612	3,494	1,874	284	40	31	7
	28	20,485	18,540	15,055	7,690	3,000	1,566	218	28	21	5
Year 3	29	20,420	18,404	14,815	7,359	2,761	1,402	180	21	16	3
	30	19,087	17,132	13,672	6,604	2,382	1,178	139	15	11	2
	31	17,882	15,983	12,645	5,939	2,060	991	108	11	8	1
	32	16,787	14,942	11,719	5,352	1,785	836	84	8	6	1
	33	15,789	13,995	10,882	4,833	1,550	706	65	6	4	1
	34	14,878	13,133	10,123	4,372	1,348	598	51	4	3	0
	35	14,043	12,345	9,434	3,962	1,174	507	40	3	2	0
	36	13,277	11,623	8,805	3,596	1,025	431	31	2	1	0
	37	12,572	10,960	8,231	3,269	896	366	24	1	1	0
	38	11,922	10,350	7,706	2,975	784	312	19	1	1	0
	39	11,320	9,787	7,224	2,712	687	266	15	1	1	0
	40	10,764	9,267	6,781	2,476	603	228	12	1	0	0
	Total NPV	**$1,925,069**	**$1,836,371**	**$1,668,596**	**$1,248,344**	**$853,560**	**$657,348**	**$257,320**	**$0**	**-$27,546**	**-$157,299**
	Interest Rate	**0%**	**5%**	**15.5%**	**50%**	**100%**	**135.695%**	**250%**	**378.9525%**	**397.157%**	**500%**

Louisiana Well Decline Curve



LOUISIANA

Price, \$/BO	Op Cost, \$/BO
18.95	4.93
Price increase by 5%	

Time, days	Production Rate, BOPD
1	93,000
2	81,500
4	70,000
6	53,000
8	43,000
10	38,500
20	18,000
30	9,000
40	5,000
50	2,900
70	1,100
100	370
120	200

Match Point		
$b =$	0.2	
$q =$	10,000	BOPD
$q_{Dd} =$	0.1	
$t =$	10	days
$t_{Dd} =$	1	
$q_i = q/q_{Dd} =$	100,000	BOPD
$D_i = t_{Dd}/t =$	0.1	per day

	Time, months	Production Rate, BOPD	Cumulative Production, BO	Production per Month, BO/month	Investment, $/month	Operating Cost, $/month	Revenue, $/month	Net Cash Flow, $/month
	0	100,000	0	0				
	1	9,302	1,063,033	1,063,033				
Past Production	2	1,871	1,198,164	135,131				
	3	557	1,230,346	32,182				
	4	210	1,240,990	10,644				
Investment					100,000	0	0	-100,000
	5	93	1,245,308	4,318	0	21,286	81,819	60,533
	6	46	1,247,322	2,014	0	9,929	38,167	28,237
	7	25	1,248,362	1,040	0	5,129	19,714	14,585
	8	14	1,248,943	581	0	2,863	11,005	8,142
	9	9	1,249,288	345	0	1,699	6,532	4,833
Year 1	10	6	1,249,503	215	0	1,060	4,074	3,014
	11	4	1,249,642	140	0	689	2,647	1,958
	12	3	1,249,736	94	0	463	1,780	1,317
	13	2	1,249,801	65	0	321	1,232	912
	14	1	1,249,847	46	0	228	875	647
	15	1	1,249,881	34	0	165	635	470
	16	1	1,249,906	25	0	122	470	348
	17	1	1,249,924	19	0	92	372	280
	18	0	1,249,939	14	0	70	284	214
	19	0	1,249,950	11	0	55	220	166
	20	0	1,249,958	9	0	43	173	130
	21	0	1,249,965	7	0	34	137	103
Year 2	22	0	1,249,971	6	0	27	110	83
	23	0	1,249,975	4	0	22	89	67
	24	0	1,249,979	4	0	18	73	55
	25	0	1,249,982	3	0	15	60	45
	26	0	1,249,984	2	0	12	49	37
	27	0	1,249,986	2	0	10	41	31
	28	0	1,249,988	2	0	9	35	26
	29	0	1,249,990	1	0	7	31	23
	30	0	1,249,991	1	0	6	26	20
	31	0	1,249,992	1	0	5	22	17
	32	0	1,249,993	1	0	5	19	15
	33	0	1,249,994	1	0	4	16	13
Year 3	34	0	1,249,994	1	0	3	14	11
	35	0	1,249,995	1	0	3	12	9
	36	0	1,249,995	1	0	3	11	8
	37	0	1,249,996	0	0	2	9	7
	38	0	1,249,996	0	0	2	8	6
	39	0	1,249,997	0	0	2	7	6
	40	0	1,249,997	0	0	2	6	5
							Net Cash Flow	**$26,371**

	Time, months	Net Cash Flow, $/month	NPV 5%, $/month	NPV 15.5%, $/month	NPV 50%, $/month	NPV 100%, $/month	NPV 135.695%, $/month	NPV 250%, $/month	NPV 378.9525%, $/month	NPV 397.157%, $/month	NPV 500%, $/month
Past Production	0										
	1										
	2										
	3										
	4										
Investment		-100,000	-100,000	-100,000	-100,000	-100,000	-100,000	-100,000	-100,000	-100,000	-100,000
Year 1	5	60,533	60,282	59,761	58,112	55,877	54,384	50,096	46,005	45,481	42,729
	6	28,237	28,003	27,522	26,023	24,060	22,791	19,340	16,310	15,940	14,070
	7	14,585	14,404	14,034	12,904	11,472	10,576	8,267	6,402	6,186	5,130
	8	8,142	8,008	7,735	6,916	5,911	5,304	3,819	2,716	2,595	2,022
	9	4,833	4,733	4,532	3,940	3,239	2,828	1,876	1,225	1,157	847
	10	3,014	2,940	2,791	2,359	1,864	1,585	968	581	542	373
	11	1,958	1,902	1,790	1,471	1,118	925	521	287	265	171
	12	1,317	1,274	1,188	950	694	559	290	147	134	81
	13	912	878	812	631	444	348	166	77	70	40
	14	647	621	569	430	291	222	98	42	37	20
	15	470	449	408	300	195	145	59	23	20	10
	16	348	331	298	213	133	96	36	13	11	5
Year 2	17	280	265	237	164	99	69	24	8	7	3
	18	214	202	179	121	70	48	15	5	4	2
	19	166	156	137	90	50	33	10	3	2	1
	20	130	122	106	68	36	23	6	2	1	0
	21	103	96	83	52	26	17	4	1	1	0
	22	83	77	66	40	20	12	3	1	0	0
	23	67	62	52	31	15	9	2	0	0	0
	24	55	50	42	24	11	6	1	0	0	0
	25	45	41	34	19	8	5	1	0	0	0
	26	37	34	28	15	6	4	1	0	0	0
	27	31	28	23	12	5	3	0	0	0	0
	28	26	24	19	10	4	2	0	0	0	0
Year 3	29	23	21	17	8	3	2	0	0	0	0
	30	20	18	14	7	2	1	0	0	0	0
	31	17	15	12	6	2	1	0	0	0	0
	32	15	13	10	5	2	1	0	0	0	0
	33	13	11	9	4	1	1	0	0	0	0
	34	11	10	7	3	1	0	0	0	0	0
	35	9	8	6	3	1	0	0	0	0	0
	36	8	7	5	2	1	0	0	0	0	0
	37	7	6	5	2	1	0	0	0	0	0
	38	6	6	4	2	0	0	0	0	0	0
	39	6	5	4	1	0	0	0	0	0	0
	40	5	4	3	1	0	0	0	0	0	0
	Total NPV	**$26,371**	**$25,105**	**$22,543**	**$14,939**	**$5,662**	**$0**	**-$14,397**	**-$26,153**	**-$27,546**	**-$34,496**
	Interest Rate	**0%**	**5%**	**15.5%**	**50%**	**100%**	**135.695%**	**250%**	**378.9525%**	**397.157%**	**500%**

Net Present Value Profile